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LEADERSHIP AND REFORM IN TRANSITIONING HEALTH SYSTEMS: CHALLENGES AND IMPERATIVES IN AUSTRALIA, NEW ZEALAND, AND BEYOND

Dr Neale Fong FCHSM

President of Australasian College of Health Service Management



In recent years, the landscape of global healthcare has been evolving at a rapid pace, driven by technological advancements, demographic shifts, and changing societal needs. Countries around the world are grappling with similar challenges and trying to navigate the complexities of providing equitable, efficient, and high-quality healthcare to their populations.

Australia's and New Zealand's health systems are some of the best in the world, providing safe and affordable health care for all.

The state of health in Australia post its Federal election is marked by significant changes and challenges. The re-appointment of Mark Butler as Federal Health Minister following the re-election of the Government, must now see the government match its election commitments to actions.

In Australia healthcare reform (mainly in the primary care space) was a central topic pre-election; it was at the recent Digital Health Festival, and many other meetings and conferences. But reform of the significant variety seems to have taken a back seat. Many reform directions are seen to be unpalatable.

There also remain significant challenges facing private hospitals in Australia with funding shortfalls and with several hospitals closing or earmarked for imminent closure.

The chronic underpayment for patient care by health insurers has led to a funding crisis with the Federal Government setting up a new national forum to address these issues. But can it bring in the changes?

In the USA private hospitals are facing significant financial headwinds, including rising costs, limited funding, and inefficiencies. The American Hospital Association (AHA) highlights the financial burden of heightened expenses, workforce shortages, and underpayments from Medicare and Medicaid.

In New Zealand major leadership and structural changes are underway along with severe budget and management constraints. Huge change is happening there.

What is clear is that everywhere there is a need for even more capable leaders and managers for navigating these stormy seas. However, what we don't need right now is a battle royale between clinicians (mostly the medical doctors) and the administrative leaders (most managers, but many who are clinician-managers).

I address this critical issue in an article which appeared in *The Australian* national press in May 2025 (see below for a full text paper).

Serious and significant reform is necessary. Yes we all get fatigued from it. But as the world changes so must we adapt and change (and that's what reform is). Are we up to the challenge? Are we ready to cooperate and collaborate to bring an even better health and social care system to wherever we may be living and working.

ACHSM is a major vehicle to equip us all of with the necessary leadership skills, education and support our health systems so desperately needed. Get on board!

Dr Neale Fong

President of Australasian College of Health Service Management

APENDIX: THE AUSTRALIAN 14 MAY 2025

Leadership Under Pressure: Now Is the Time to Rebuild Trust in Public Health Care

By Dr Neale Fong, President, Australasian College of Health Service Management (ACHSM)

Recent media coverage, including *The Australian's* "Life Support" series, paints a confronting and sobering picture of the state of Australia's public health system. The stories of clinicians under duress, of whistleblowers silenced, and of an escalating culture of fear demand our full attention—and more importantly, our collective action.

Let's be clear: the frustrations and concerns voiced by doctors, nurses and clinical leaders are not new. Nor are they misplaced. But the depiction of public health leadership as bureaucratically indifferent, adversarial or even punitive is only half the story—and it risks deepening the very divide we all need to bridge if we are to secure the future of quality public care.

Clinicians and Managers: Not Opposing Forces, but a Fractured Team

There is no public hospital in Australia that runs without the dedication of both its clinical staff and its administrative leaders. Yes, tensions exist. The system is under unsustainable pressure from chronic underfunding, rising complexity, and workforce shortages.

But characterising this as a simple clash between "frontline truth-tellers" and "detached administrators" does a disservice to the many health executives who are themselves fighting for improved patient outcomes, better working conditions, safer staffing, and system-level reform.

We cannot afford a narrative that pits doctors against leaders. That's not just unhelpful—it's harmful. And it is way too simplistic to label healthcare managers as being opposed to high quality health care for the sake of bringing in a budget, or for doctors as the "white knights" "out there being the only ones saving the crippled hospital systems".

For years now many of us who are both doctors and managers have been attempting to say farewell to the expression that administrators and managers belong to the "dark side". As if doctors and clinicians are the only ones concerned with patient welfare and good outcomes.

Over 50% of our members are from clinical backgrounds (doctors, allied health workers and nurses), with around 300 members who are actually doctors. Many of whom are full-time in leadership roles; others who combine their ongoing clinical work with managerial roles.

Doctors and health leaders are not enemies—they are co-pilots trying to land the same storm-battered plane.

ACHSM's Commitment: A Safer, Stronger Leadership Culture

As the national peak body for health service leaders, the Australasian College of Health Service Management is actively working with our members, our partners and our clinical colleagues to:

- Champion leadership models that are collaborative, clinician-informed and values-led.
- Provide ongoing professional development that strengthens ethical decision-making, communication and organisational integrity and competency.
- Support reforms in clinical and corporate governance that prioritise patient safety and workforce wellbeing over political performance targets.
- Foster safe mechanisms for staff to speak out without fear of retribution—and for leaders to listen and act with accountability in an environment of psychological safety.

A Broken System Needs Structural Renewal, Not Personal Blame

As highlighted in the articles, the issues we face are structural, cultural and national. There are indeed instances of misused governance processes, poor communication, and retaliation against those who speak up. These are unacceptable, and ACHSM supports protections for all health workers who raise legitimate concerns.

But this is not a failing of individuals. It is a consequence of systems that have become increasingly reactive, politically constrained, and disconnected from long-term clinical outcomes. What is needed now is not more finger-pointing—but systemic reform grounded in partnership, transparency and mutual respect.

We acknowledge the pain, burnout and moral injury described in these reports. But we also know that leadership—when it is courageous, inclusive and future-focused—is a critical part of the solution.

Our Call: Rebuilding Trust, Together

This is not the moment to entrench conflict. It's the moment to rebuild trust.

That trust will not be restored by slogans or sweeping condemnations—but by real conversations, shared decision-making and a recommitment to the values that bring people into healthcare in the first place: compassion, integrity, and public service.

We at ACHSM stand ready to lead that change—alongside every clinician, patient, administrator, politician and policymaker who shares the belief that Australia's public health system is worth fighting for.

A CALL FOR A HOLISTIC APPROACH TO MEASURING QUALITY IN HEALTHCARE SERVICES

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ABSTRACT

Quality in healthcare is a construct whose measurement is vital for quality assurance and improvement purposes. However, achieving a holistic view of quality in healthcare settings can be challenged by having multiple stakeholders involved, such as patients, healthcare providers and managers, with each having different viewpoints and priorities. Whilst service marketing and quality-of-care literature offer a plethora of quality-measuring models that show similarities, each discipline prioritises measuring quality as perceived by one stakeholder (e.g.: patients or service providers), thus offering a partial picture that does not necessarily capture the viewpoints of all stakeholders involved. Moreover, some models evaluate the overall quality of a service, rather than providing a detailed evaluation that captures the quality of different elements of care. Local context and culture are factors to consider as well when measuring quality.

Therefore, this paper aims to propose an approach to measuring quality that captures the viewpoints of multiple stakeholders in a service setting.

A customised model is constructed, based on comparing the basic elements of models derived from service marketing and quality-of-care literature. The elements are chosen to also reflect the contextual and cultural peculiarities of the service under evaluation, while ensuring that such a detailed approach remains practical upon application.

KEYWORDS

service quality, healthcare quality, quality models, quality measurement

INTRODUCTION

The World Health Organization defines quality of care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes" and asserts that a quality health care can be defined in different ways [1, p.1]. Quality of care is a vital performance indicator that reflects achieving health outcomes and patient satisfaction, whilst guiding improvement efforts to optimize care delivery. However, its measurement can be challenged by the involvement of multiple stakeholders in healthcare services design, delivery, and consumption, such as patients, healthcare providers, and managers, with each perceiving quality from a perspective that is governed by their priorities [2]. This was captured by Ovretveit's paper that differentiates between three dimensions of quality: patient quality, professional quality, and management quality that prioritizes designing efficient services that abide by guidelines and regulations [3]. Therefore, a quality that is judged as appropriate by one stakeholder may overlook quality elements that are crucial for others. Consequently, it is imperative that healthcare providers "...move away from internal service auditing practice" [4, p.127] when defining and evaluating the quality of the service they deliver.

Lee *et al.* identified two distinct approaches in their paper that can be utilised in appraising the quality of healthcare services [5]. The first approach is the **service marketing perspective** that is rooted in business and management literature, and it is concerned with service recipients' viewpoints, with Grönroos and Parasuraman *et al.* being notable scholars in this field. The second approach, which is derived from **quality-of-care literature**, appraises the quality of a healthcare service from the perspective of its providers [5]. Examples of models primarily adopting the latter approach include Donabedian's structure-process-outcome (SPO) model [6], Donabedian's seven elements of quality of care [7], and the STEEEP model proposed by the Institute of Medicine (IOM) [8]. Therefore, it is argued that the concurrent utilisation of models derived from both: service marketing and quality-of-care literature will facilitate the formulation of a picture of quality that represents the expectations of multiple stakeholders involved.

To this end, this paper commences with a brief overview of selected quality-measuring models derived from seminal work of service marketing and quality-of-care scholars. This is followed by a proposal of an approach to measuring quality, which benefits from the synergistic utilisation of models derived from both: service marketing and quality-of-care disciplines, to provide a representative picture of quality in healthcare services. Being a viewpoint, this paper does not aim to offer a comprehensive review of all quality-measuring models in relevant literature. Instead, it focuses on presenting selected models, that the author is familiar with from her studies and professional experience, and the stakeholders whose viewpoints are represented by such models.

GENERIC, MULTI-DIMENSIONAL QUALITY MODELS

Table 1 presents the elements of three generic quality models that this viewpoint focuses on, whilst providing the definition of each element. By adopting the healthcare provider's perspective, medical care quality can be measured using the seven elements proposed by Donabedian: efficacy, efficiency, effectiveness, equity, optimality, acceptability, and legitimacy [7]. These elements are partially synonyms with the six domains of safe, timely, efficient, effective, equitable, and patient-centred care that form IOM's STEEEP model [8]. On the other hand, the SERVQUAL (service quality) model, as conceptualised by Parasuraman *et al.*, is one of the most well-known tools for measuring service quality as perceived by service recipients, with its five determinants being: assurance, empathy, reliability, responsiveness, and tangibles [9]. Such a recipient-centred perspective is partially covered in STEEEP's 'patient-centred' domain.

TABLE 1: THE ELEMENTS OF DONABEDIAN'S, STEEEP AND SERVQUAL MODELS OF QUALITY

Model	Elements of the model
Donabedian's seven pillars [7, p.1]	Efficacy: the ability of care, at its best, to improve health Effectiveness: the degree to which attainable health improvements are realised Efficiency: the ability to obtain the greatest health improvement at the lowest cost Optimality: the most advantageous balancing of costs and benefits Acceptability: conformity to patient preferences regarding accessibility, the patient-practitioner relation, the amenities, the effects of care, and the cost of care Legitimacy: conformity to social preferences concerning all the above Equity: fairness in the distribution of care and its effects on health
STEEEP model [8, p. 599]	Safe: avoiding injuries to patients Timely: reducing waits and delays in care Effective: providing care based on evidence Efficient: avoiding waste Equitable: ensuring quality does not vary based on personal characteristics Patient Centred: providing care that is responsive to patient's values and preferences.

SERVQUAL [9, p. 23]	Tangibles: Physical facilities, equipment, and appearance of personnel Reliability: Ability to perform the promised service dependably and accurately Responsiveness: Willingness to help customers and provide prompt service Assurance: Knowledge and courtesy of employees and their ability to inspire trust and confidence Empathy: Caring, individualised attention the firm provides its customers

By evaluating the quality of the overall service, such models fail to specify which service aspects are being evaluated as safe, effective, or reliable, thus providing vague feedback that does not pinpoint the exact service elements in need of attention. It is, therefore, proposed to use such models concurrently with models that evaluate a service by deconstructing it into its various elements. This will help detect which service aspect is underperforming and guides improvement efforts where needed, as discussed below.

SYSTEMATIC CONCEPTUALIZATION OF QUALITY

Table 2 provides a detailed deconstruction of three models that measure quality systemically, whilst comparing their elements for similarities. As discussed in Naidu's systematic review, Donabedian presented healthcare quality as a construct comprising three elements: technical quality of the core aspect of diagnosis and disease management, interpersonal quality that is reflected by the friendliness and responsiveness of provider-patient interaction, and amenities of the health care facility [10]. Such deconstruction is mirrored by the work of Grönroos in service marketing literature, capturing two dimensions of customer-perceived service quality synonym to Donabedian's conceptualisation: technical quality of the core outcome and functional quality of the process delivering the outcome. A third dimension was added by Grönroos as the quality perceived regarding the image of the corporation delivering the service, which is created through traditional marketing or word-of-mouth recommendations [11]. Such a dimension does not only matter from a pure marketing perspective, but also influences the perceptions of different stakeholders such as potential employees, policymakers, payers, suppliers, and the public. Therefore, it is argued that considering such element is crucial when evaluating service quality in healthcare institutions.

Another well-endorsed work of Donabedian is a model that systematically defines and measures quality of health care, with structure, process, and outcome being its three dimensions [6]. Such three elements are not presented as standalones but are seen as being interrelated, with a well-designed structure facilitating the run of an effective process, which ultimately leads to satisfactory outcomes [12]. Brady and Cronin also offered a hierarchical conceptualization of customer-perceived service quality in their paper [13]. It is noted that the elements of Brady and Cronin's model mirror the elements of Donabedian's model and Grönroos' work, as displayed in Table 2.

TABLE 2: COMPARISON BETWEEN THE ELEMENTS OF DONABEDIAN'S, BRADY AND CRONIN'S AND, GRÖNROOS' MODELS OF MEASURING QUALITY

Model (by author name)	Whose perspective on quality this model measures	Elements of the model that measure the quality of:			
		the static physical elements	the service process	the service outcome	the organisation's perceived image
Donabedian SPO Model [6, pp. 20-21] [10]	(Mainly) Health care providers	Structure: Staff education and training	Process: Technical:	Outcome: - Patient's health status	---

		Facility Equipment	Activities undertaken to deliver care Interpersonal: Staff-patient relationship	- Patient's satisfaction - Cost of care	
Brady and Cronin's hierarchical model [13]	Quality as perceived by recipients of care	Physical environment: Ambient conditions Design Social factors	Customer- employee interaction: Attitude. Behaviour Expertise	Outcome: Waiting time Tangibles Valence	---
Grönroos' Conceptualization [11]		---	Functional quality: Quality of process	Technical quality: Quality of the core outcome	Corporate image: Perceived quality of the institution delivering the service

Brady and Cronin also deconstructed each of the three primary dimensions in their model further into three sub-dimensions. This resulted in nine sub-dimensions that can be evaluated by service recipients as empathic, responsive, or reliable (i.e.: modifiers) (Table 2). Such approach aims to offer a more detailed evaluation of service recipients' perception of service quality. It also forms a departure from the generic use of SERVQUAL determinants in that it explicitly states which aspects of the service customers evaluate as reliable or responsive [13]. It is argued that such an approach can be replicated by using STEEP domains or Donabedian's seven elements of care as modifiers. Consequently, the STEEP model, Donabedian's seven elements, and SERVQUAL can be utilised concurrently with the models highlighted in Table 2, as illustrated in Figure 1. Such an integrated approach is proposed to offer a more nuanced evaluation of service quality by deconstructing it into its main elements, detecting which aspects are underperforming, and then guiding efforts toward improving it. However, it is acknowledged that a detailed model may render its application challenging when implemented in real-life contexts, and a well-informed trade-off must be made between the thoroughness of a quality-measuring approach and the feasibility of its application.

ADAPTATION FOR CONTEXT AND CULTURE

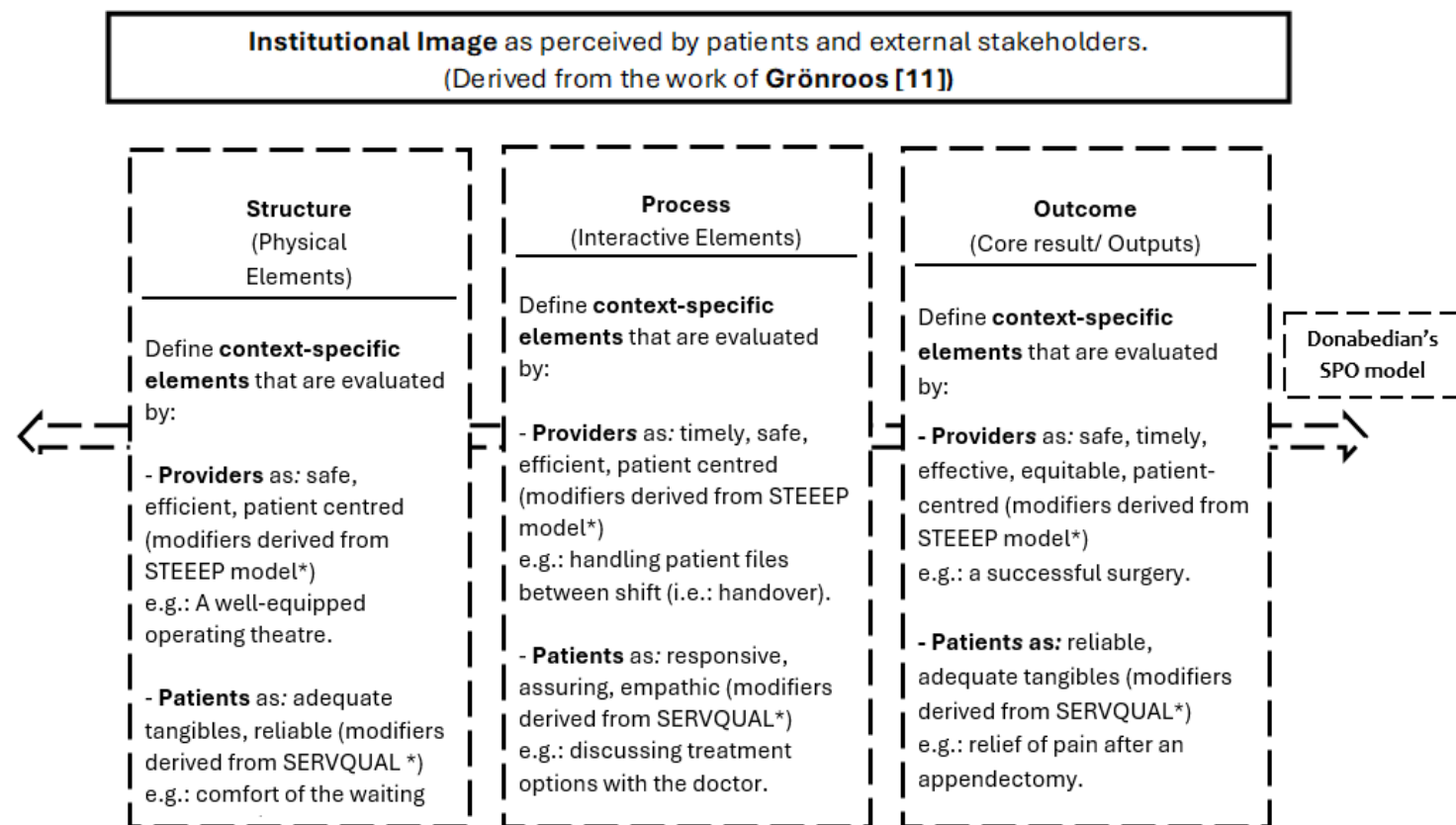
Quality must be interpreted as a context-specific construct, that is: it is only successfully measured by deconstructing it into elements that are governed by the specialty of concern (e.g.: public vs. private sectors, intensive care vs. elective care). Consequently, whilst applying the above-mentioned models concurrently can provide invaluable insights into both: healthcare providers' and recipients' viewpoints, deploying them in their generic form risk overlooking critical quality elements that are specific to the context investigated. Such an argument resonates with the note made regarding the use of Donabedian's seven elements, where choosing which elements to measure and deciding on their relative importance is dictated by the context in which they are used [12]. This is also relevant to one of the early criticisms of SERVQUAL, questioning whether its generic determinants are reliably applicable in different service contexts [14]. Therefore, when attempting to measure quality in a healthcare service, the author proposes that a context-specific model is built, as in Figure 1, starting with identifying three variables:

- 1) Context-specific elements of the structure, process, and outcome whose quality is evaluated from the providers' perspective.

- 2) Context-specific elements of structure, process, and outcome whose quality is evaluated from patients' perspective.
- 3) Modifiers (derived from STEEP, Donabedian's seven elements or SERVQUAL) used to describe the quality of the elements chosen. By acknowledging that some quality determinants can be used as modifiers to describe more than one element of care (e.g.: STEEP's 'safe' determinant can be used to describe the healthcare facilities (i.e.: structure) as well as the process of service delivery), a more meaningful evaluation of care can be provided.

Whilst being beyond the scope of this paper, accounting for organisational and national cultures is another facet of context. This is highlighted in Endeshaw's review of healthcare quality measurement models, which argues that many of those models are western in origin. Therefore, they may fail to capture the cultural and economic peculiarities of developing countries, thus warranting an articulation of models relevant to developing countries cultures [15]. This emphasises the need to abandon the use of generic quality measurement models and, instead, utilising customised models that capture quality determinants relevant to the economic, cultural, and organisational contexts of the organisation involved [15].

FIGURE 1: AN EXAMPLE OF A CUSTOMIZED MODEL THAT MEASURES HEALTH SERVICES QUALITY FROM BOTH: PROVIDERS' AND PATIENTS' PERSPECTIVES.



Elements from four models were integrated to construct the model: Donabedian's SPO model, STEEP, SERVQUAL, and the quality of institutional image as proposed by Grönroos.

* The use of STEEP elements and SERVQUAL determinants as modifiers is derived from the work of Brady and Cronin [13]

CONCLUSION AND LIMITATIONS

This viewpoint paper proposes an approach to measuring the quality of healthcare services that captures the viewpoints of different stakeholders. This is enabled by using a model founded on the work of notable scholars from the fields of service marketing and quality of care, whilst customising its various elements to the context and culture of the service of concern. Such a dynamic approach will enable a more accurate measurement of quality that is useful to different stakeholders. Being a refined adaptation from older models, this approach offers policymakers a with contemporary and updated model that can be utilized for quality assurance purposes. It ensures that the tools comply with the IOM

recommendations to adopt an approach to measuring quality that shows "constant modification and reassessment—that is, the continual development of new strategies and the refinement of old ones" [16, p. 1]. Moreover, this model will help healthcare providers appreciate the service they provide from patients' perspective, and work on improving care not only to meet scientific standards and benchmarks [17], but also to satisfy their patients' needs. Finally, a detailed measurement of healthcare quality will help patients evaluate the level of care provided to them, so that they make informed choices about which healthcare facility to choose as their care provider [17].

This paper was presented as a viewpoint and, therefore, has certain limitations that must be acknowledged. Firstly, whilst the paper offered a brief appraisal of some quality models, it did not provide a systematic review of the relevant literature available to date. Therefore, it is acknowledged that the list of quality models discussed is neither exhaustive nor inclusive of all tools available in the literature. Also, best effort was made to retain objectivity, yet bias was inadvertent as this piece presents a viewpoint articulated by the author, and it is presented with the aim of stimulating discussion about how of quality in healthcare is articulated and measured. Whilst healthcare providers' and patients' perspectives were the focus of analysis, it is crucial to acknowledge the need to consider the viewpoints of other stakeholders who play a vital role in healthcare systems, such as legislators, caregivers, and the public. Finally, the discussion was largely generic and abstract, discussing quality in broad terms rather than linking it to specific real-life contexts. Consequently, applying any advice offered in this paper must consider the feasibility of using multiple tools concurrently when measuring quality, whilst acknowledging any trade-offs to be made between thoroughness of measurement and practicality of application.

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MEASURING SYSTEM PERFORMANCE OR JUST COUNTING: A CONCEPTUAL ANALYSIS

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ABSTRACT

PURPOSE

The paper explores the concept of performance measurement and identifies that when measurement information does not inform about the performance of the system, it is not utilised, and the effort becomes wasteful. Strategies to make performance measurement and reporting more meaningful are identified.

DESIGN/METHODOLOGY/APPROACH

The paper explores concepts and selected literature to understand the measurement of performance and how to make it meaningful. Some strategies to make the measurement and reporting of performance meaningful are suggested.

FINDINGS

The process of collection and use of performance measures is resource-intensive. If this information is then not used appropriately and fully, it can become a considerable waste. Healthcare system performance measurement is complex. These complexities include the fact that outputs or deliverables may not inform the strategic objectives. The package of care also has to be customised to the needs of each consumer, which can make generalisations difficult. Moreover, measures are often interrelated, and one measure by itself may not inform about the system's performance.

RESEARCH LIMITATIONS/IMPLICATIONS

Complex systems have many variables that are quite interdependent of each other. Although this conceptual paper explores the measurement of system performance, it is essential to acknowledge that specific interdependencies between performance variables for each complex system, which may be quite independent of one another, must be understood to determine the relevance of performance measures for those specific systems.

PRACTICAL IMPLICATIONS

The paper describes ways in which performance measurement information can be reported to make it more meaningful and value-adding for the organisation. The visualisation of measures of performance should be customised for specific stakeholders to retain their interest. However, it must also be acknowledged that visualisation without an opportunity for analysis makes visualisations non-value-adding.

ORIGINALITY/VALUE

A lot has been written about performance measurement; however, there is not much discussion about how unproductive and wasteful reporting can be if it is not used to drive improvements.

KEYWORDS

Performance, improvement, reporting

INTRODUCTION

In public service systems, one of the aims of performance measurement is to review evidence of the effectiveness of programs authorised on behalf of the citizenry to consider whether the investment is providing public value. Interest in targets and performance indicators has also evolved in government-sponsored public services, with an interest of governments to be results-driven [1-3]. Looking at data and other statistical information is also helpful to make comparisons across organisations and services to rate their performance and enable appropriate allocation decisions to be made [4, 5].

However, measuring and reporting system performance can be time-consuming and resource-intensive. Choosing measures of performance for reporting and managing dashboards to make performance information visible can consume considerable time and effort. If this data and information are then not able to be utilised, not utilised, not able to provide answers to the questions about the performance of the system or do not add value proportionate to the effort made to collect, report, analyse and use them, it is nothing but a significant waste.

There are a variety of reasons for the interest of organisations in measuring performance. These include using results to incentivise individuals and teams to improve performance, demonstrate achievement of goals and provide feedback for analysis [6]. Both in public as well as private sector organisations, gaining a competitive advantage and improving future performance have remained important goals of the performance management systems. However, there is a concern that measurement and reporting of performance in complex healthcare systems do not always result in improvement of outcomes at the organisational or population levels [7, 8]. Reasons include multiple stakeholders with diverse and sometimes conflicting interests as well as multiple interdependencies within a complex system that can have different levels of performance on activity, outputs, satisfaction, outcomes and traditional budgets, human resources and other corporate indicators [9].

A variety of performance measurement tools are in use, including a balanced scorecard [10], performance prism [11], integrated reporting framework [12], Skandia navigator and many others. With the availability of artificial intelligence, administrative applications to inform about system performance are also becoming available [13, 14].

WHY THE INTEREST IN MEASURING PUBLIC HEALTH SECTOR PERFORMANCE

The desire to overcome inefficiency and to ensure that the healthcare provided is effective, safe and appropriate is inherent in the ethos of a public health system. There is general recognition that unless wastage of resources and provision of ineffective or inappropriate care can be eliminated, it will not be possible to have an equitable, affordable and sustainable healthcare system [15-17]. This does necessitate developing methods to ascertain whether performance is meeting expectations and aspirations.

Regardless of the funding arrangements, governance and management structures, and the design of the health system, the essential role of performance measurement is to inform about how the entire system performs. Many jurisdictions internationally and every jurisdiction in Australia have attempted to develop a suite of performance measures as part of their performance management effort to manage the health system actively [18, 19].

There is no disputing the fact that to improve the performance of the system and achieve better health outcomes for the population, it is important and necessary to visualise a set of performance measures [20]. The question is whether a comprehensive and vast suite with hundreds of performance measures that spans the spectrum of activity, quality, business and human resources serves a purpose proportionate to the time and effort invested in its collection and reporting.

COMPLEXITIES THAT REQUIRE A RETHINK ABOUT MEASURING AND REPORTING HEALTHCARE SYSTEM PERFORMANCE

Measurement of a health system's performance is complex. Simply measuring outputs (or deliverables) does not inform about the system's performance, especially whether its strategic intent (which in the public health system is to improve the health of the population) is being achieved. Consumer expectations change frequently, and therefore, the product delivered (i.e. the service that the consumer receives) is not simple to pre-define against which performance can be measured. A package of care and treatment has to be negotiated to meet the needs of an individual consumer, which has to be customised for that consumer. Moreover, there is always a risk that improving the performance of an organisation from one perspective may result in a deterioration in the performance of some other essential variable [21, 22].

Since there are many co-producers involved in the process, including the patient and their families, the production of healthcare cannot always be controlled. In fact, the wider healthcare delivery environment also cannot be controlled as demand within the system frequently outstrips supply and emergency care provision must supersede any planned care delivery. Adding to this complexity is the fact that the causality of a disease or disorder is often unknown, the quality of care is difficult to define, and the healthcare provision environment cannot always be controlled. Furthermore, the product is a service whose value is determined by the recipient, not by the provider, meaning that more factors influence performance that cannot be controlled than can be controlled. This also means a lower sense of confidence that assessed performance is indeed a reflection of actual performance.

Many designers of performance measurement systems conveniently overlook the fact that more important determinants of system performance are, in fact, the healthcare system's structure and processes. To improve performance, healthcare system redesign, payment system reforms and process improvement have a far greater potential to affect measures of morbidity than a treatment or intervention [23-25].

Then, some measures take a significant time to change and are not dependent upon transactional strategies. Measures of life expectancy, perinatal mortality, maternal deaths, birth weight of babies, and similar statistics, often considered useful measures, may not be the most effective indicators of how the health system is performing at present. Improvements in these statistics are dependent on social and educational determinants and cannot be directly attributed to the functioning of a health system. In social welfare democracies, in particular, the impact of societal improvement, social welfare policies and provision, education and housing, etc., has a far greater impact on system performance statistics than the performance of the healthcare system.

SO, WHAT SHOULD A PERFORMANCE MEASUREMENT SYSTEM TRY TO ACHIEVE?

Three primary goals for a health system performance measurement have been suggested to be accountability, strategic direction and learning/improving [26]. Performance measurement processes must achieve these three primary goals and, at the same time, identify less-than-optimal performance by focusing on variables that are affecting performance. At least in theory, in a well-performance-measured (and managed) system, good performance monitoring and management can provide opportunities to require the system to take necessary remedial action, articulate appropriate policies and encourage redesign and reform of administrative systems and processes to remedy deficiencies in performance.

To make performance measurement useful, it is extremely important to be cognizant of the perspective of the actors. Most stakeholders become disengaged and disinterested in measures because the measures reported are not of interest or relevance to them in making decisions. Even those who remain somewhat engaged become more interested in achieving favourable performance on measures that matter to them, as the suite of performance measures is not entirely

relevant to their interests. Their enthusiasm is limited to improving the performance of their sub-system, even if it is at the expense of the performance of the rest of the system.

The purpose of monitoring and reviewing measures should be to understand organisational performance and assist with making decisions to improve performance. This is not possible unless it is understood that change and variability in performance indicators result from dynamic interaction and interdependence between many indicators of performance that one may see on the dashboard. Moreover, as articulated above, at different levels of the health system and for different players in the healthcare system, considerations from a performance measurement system can be quite different.

Therefore, two aspects are extremely important. Firstly, the performance measurement scorecard or dashboard must be customised to meet the requirements of different stakeholders. The experience of visualisation of performance measures needs to be specific for different stakeholder groups. Presenting a suite with hundreds of measures that stakeholders then have to choose from is not value-adding.

Secondly, having a performance measurement scorecard or dashboard is not enough. The defined suite of performance measures that is relevant to a stakeholder (or a group of stakeholders) must provide the basis for further analysis. It is this analysis that is value-adding. Not creating an opportunity for performance measures to be analysed is what makes a display of performance measures meaningless and wasteful. If this analysis is done, it allows a judgment to be made about whether performance information suggests a deterioration or improvement. This analysis needs to consider that variation in the data may not necessarily be a reflection of the variation in the quality of care delivered, as it may be an intrinsic property of the data known as common sense variation [27].

CONCLUSIONS

Delivering something is of no value if the recipient does not want it or if its delivery does not add any value to the recipient. Collecting and reporting hundreds of performance measures across the entire health system when only a minority view it and even fewer use it can make this investment wasteful. The fact that monthly reporting and viewing of these indicators becomes an 'interesting piece of colourful graphs' without compelling, meaningful adjustments to the health system is a stark reminder to continue the search for more meaningful ways of measuring and reporting performance.

Considering that the design of the healthcare system, how the healthcare system is managed and various administrative systems and processes that exist within the healthcare system, are significant determinants of the performance of the healthcare system, performance measures and indicators that are not linked to the policy and accountability processes or are misaligned with the strategy, render these measures completely meaningless. The collection and reporting of performance measures are resource-intensive. If this information is then not analysed and interpreted to help with making decisions, personal and system accountability cannot be assured.

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LEADERSHIP AND MANAGEMENT FOR THE NEW ERA OF PUBLIC HEALTHCARE IN SINGAPORE: A QUALITATIVE STUDY OF SENIOR HEALTHCARE LEADERS

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ABSTRACT

BACKGROUND

Singapore's public healthcare system is undergoing significant transformation through the 'Healthier SG' initiative. Effective leadership is crucial to successfully manage this strategic shift and ensure the continued success of the public healthcare model.

METHODS

A qualitative study was conducted with senior leaders in Singapore's public healthcare sector to identify the key qualities required in future leaders and the necessary environment for nurturing them. In-depth individual interviews (n=46) and online open-ended questionnaires (n=11) were administered, and responses were analysed using thematic analysis.

RESULTS

Four key leadership qualities were identified: (i) systems-based thinking to balance competing priorities across the healthcare system, (ii) a long-term perspective with cross-industry experience to understand health within a broader sociological context, (iii) personal integrity, honesty, and authenticity aligned with public service values, and (iv) strong communication and collaboration skills to foster a shared vision.

The study also highlighted four essential environmental factors to cultivate future leaders: (i) a healthcare system that embraces learning, innovation, and failure as part of growth, (ii) opportunities for cross-functional rotation and networking, (iii) a mature talent management system with robust succession planning and senior leaders as role models, and (iv) a focus on people management and talent potential over seniority in leadership selection.

CONCLUSION

As Singapore transforms its healthcare system with a focus on population health, developing capable leaders is essential for achieving long-term strategic goals. This study provides insights for policymakers, senior healthcare leaders, and HR planners to identify and foster talent, creating an environment where future healthcare leaders can thrive.

KEYWORDS

Management, administration, healthcare leadership, executive development, Singapore, Healthier SG

INTRODUCTION

Singapore's public healthcare system is undergoing major change. The publication of the 2022 'Healthier SG' white paper outlines a strategic shift in the delivery of healthcare in the city state towards population and preventive healthcare. [1] With ageing population, rising chronic disease burden, and high costs of healthcare – the next generation of healthcare leaders must step up and manage the unrelentless developments in medical technology, healthcare delivery platforms, changing patient expectations, and pressures in healthcare financing. [2]

This 2022 white paper seeks to change the public healthcare system via a focus on healthier lifestyle, supporting health and wellbeing needs of the Singapore residents. This is achieved by engaging stakeholders such as residents who are paired with a regular family doctor, mobilising primary care physicians to provide holistic and preventive care, and engaging community partners such as the Health Promotion Board to deliver social prescription to individuals with chronic disease.

Furthermore, the three major healthcare clusters in Singapore – National Healthcare Group (NHG), National University Health System (NUHS), and Singhealth (SHS) – will take on the role of regional health managers to look after the health (not just healthcare) of the populations within their respective regions. [3] System enablers such as IT electronic medical records, health apps such as Healthy 365, and funding model, will also be tailored to match the healthcare system transformation. [4]

FUTURE-FOCUSED QUALITATIVE STUDY

This study seeks to explore the qualities needed amongst future public healthcare sector leaders and managers in Singapore, and the environment required to nurture such leadership qualities within the next generation. Such individuals are envisioned to manage the change in Singapore's public healthcare landscape.

LEADERSHIP AND MANAGEMENT

Leadership and management, while interconnected, differ in both focus and function. Leadership is often defined as the ability to influence and inspire individuals toward a shared vision, emphasising change and innovation. Conversely, management is concerned with planning, organising, and controlling resources to achieve specific organisational objectives, prioritising efficiency and stability. These distinctions highlight the subtle yet significant differences in their roles within organisations. [5]

However, for the purpose of this research, we have opted to focus on the overarching concept of leading people, as the skills and qualities required for leadership in healthcare often blur the lines between management and leadership. Effective healthcare leadership requires not only the ability to manage resources and people but also the vision to guide teams through complex challenges, adapting to evolving healthcare demands. [6]

In this study, we consider management and leadership as complementary and intertwined aspects of effective leadership practice.

METHODS

METHODOLOGY APPLIED FOR QUALITATIVE STUDY

A systematic inductive approach based on 'grounded theory' was adopted to guide this qualitative research, providing a comprehensive framework for understanding the phenomena under study. Grounded theory is a methodological approach that aims to develop a theory that is directly derived from the data itself, rather than imposing preconceived hypotheses or assumptions. This method emphasises the emergent nature of theory development, where patterns, concepts, and themes arise organically from the data through a process of constant comparison and iterative analysis. [7]

The research data collection sought to answer two key research questions:

1. What qualities do we need in Singapore's healthcare leaders of tomorrow, against the backdrop of a changing public healthcare landscape?
2. What environment do we need to nurture in Singapore, to ensure that we build a robust system where public healthcare leadership can thrive?

In line with the research questions, the data collection process was centred around in-depth interviews and written responses from participants. These data collection choices were chosen to ensure that rich, detailed, and diverse perspectives on the leadership qualities and environmental factors in Singapore's public healthcare system could be gathered. The interviews were conducted with individuals in positions of leadership or expertise within Singapore's healthcare system. Subsequently, written responses were used to supplement the interview data, providing further depth and context.

Upon completion of the data collection, the transcripts from the interviews, along with the written responses, were subjected to thematic analysis. Thematic analysis is a method for identifying and analysing patterns (or themes) within qualitative data. This analysis was conducted through an iterative process of coding, where initial themes were identified, refined, and redefined as the analysis progressed. [8]

DESIGNING THE QUESTIONS FOR THE IN-DEPTH INTERVIEW AND ONLINE QUESTIONNAIRE

The interview guide consisted of 8 open-ended questions grouped into two key categories: leadership qualities for navigating a changing public healthcare landscape, and the environment for leadership development in Singapore.

The questions were designed to explore the individual's perceptions and experiences regarding leadership in the evolving healthcare landscape. Additional information collected include gender, affiliated institution, and current leadership position.

To ensure the reliability and relevance of the questionnaire; this was validated by seeking feedback from public health academics and practitioners in Singapore to review the clarity, relevance, and comprehensiveness of the questions. Minor revisions were made based on the feedback to align the questions to the appropriate research study context.

PARTICIPANT SELECTION

A shortlist of senior healthcare leaders from Singapore's public healthcare clusters and Ministry of Health were identified via the online Singapore Government Directory Interactive (SGDI). [9] Individuals who hold the designation of 'Deputy Director' and above were sent an invitation email to schedule a time for the in-depth interview.

These leaders were identified to have an established record of managing teams, departments, or institutions within the public sector – which range from tertiary hospitals, polyclinics, healthcare clusters, regulatory bodies.

Based on the SGDI, a total shortlist of 2,652 individual were noted to have met the criteria across the public healthcare system. Such individuals were sent an invitation email, together with the participant information sheet and consent form on the details of the study. They were invited to schedule a time for an in-depth interview with the researcher to hear their views on the above research questions.

IN-DEPTH INTERVIEWS AND OPEN-ENDED QUESTIONNAIRE FOR DATA COLLECTION

This study sought to obtain views and opinions of existing healthcare leaders, and adopts an open-ended approach to obtain a diversity of responses; either via in-depth interviews or open-ended questionnaires conducted online.

To achieve this – in-depth in-person interviews were conducted with study participants to obtain their responses. A second stage online open-ended questionnaire survey (not in-person) was sent to participants to check for concordance in their responses.

This series of (i) in-depth interviews and (ii) open-ended questionnaires were conducted with public sector healthcare leaders in Singapore between August 2022 to February 2023.

DATA COLLECTION PROCESS

During the collection of data from the in-depth interview, no other individuals were present except for the sole interviewer and interviewee. The interview was conducted at a time and place of convenience with majority being at the participants' workplace.

The interview guide was sent to the participants prior to the start of the interview for their review and preparation. No repeat interviews were carried out. Live audio-recording was ongoing with consent during the in-depth interview. This was to allow for verbatim transcription and coding thereafter.

After data saturation was achieved from the in-depth interviews, other participants took part in an online-based weblink questionnaire with open-ended responses. The questions were similar to the in-depth interviews. This is to check for concurrence or divergence of views.

RECRUITMENT PROCESS AND NUMBER OF PARTICIPANTS

A total of 120 participants replied to the invitation email to request further information and indicate that they were provisionally keen on participating in this study. Seven individuals subsequently dropped out stating that they were not keen to participate in the study. Of the remaining 113 individuals who were keen to participate in the study, scheduling was done to achieve as many individuals as possible to be interviewed.

46 individual in-depth interviews were conducted with the researcher (also the sole interviewer). Data saturation was achieved at this stage, as no new themes emerged during the final stages of in-depth interviews. [10] Thematic analysis revealed consistent patterns across participants, indicating sufficient data collection to address the research questions comprehensively.

Subsequently, the remaining 67 individuals who earlier indicated interest in participating but had not yet scheduled an in-depth interview were instead offered an option for an online-based questionnaire survey based on the same research questions. Participants here had to electronically submit written responses. This second stage was utilised to check for concordance or discordance in responses compared to the in-person interview responses.

11 of the 67 individuals subsequently agreed to participate in the online questionnaire in February 2023. The other 56 individuals did not respond. All 46 interviewees and 11 questionnaire respondents had informed consent obtained. They noted that their responses will be recorded, and deidentified quotes may be published.

Whilst majority of eligible individuals did not indicate a reason for non-participation, some reasons cited include lack of time, or lack of interest.

CODING AND ANALYSIS PROCESS

A total of 46 in-depth interview transcripts and 11 questionnaire responses were analysed and coded thematically. Coding was done manually with no use of any particular coding software as the nuances of Singapore's healthcare system and verbal/written speech patterns/expression allow the coder to appreciate the context more succinctly. The analysis consisted of examining, organising, and coding segments of the interviews.

RESULTS

RESEARCH PARTICIPANTS' PROFILE

A total of 46 in-depth interview transcripts and 11 questionnaire responses were analysed and coded – for a total of 57 unique responses.

Of these, 24 respondents held C-suite appointments. The rest were holding an appointment of 'Deputy Director' and above. There were 36 clinicians versus 21 non-clinician backgrounds. Participants ranged across all 3 major Singapore public healthcare clusters, 7 restructured hospitals, 5 national specialty centres, 3 healthcare-related statutory boards, and the Ministry of Health.

There were few variations in the response themes from different groups – whether it be from their affiliated institutions and organisations or their professional backgrounds.

CONCORDANCE BETWEEN IN-DEPTH INTERVIEWS AND ONLINE QUESTIONNAIRE

Based on the thematic analysis coding, there was strong concordance observed in the thematic responses between participants who engaged in the in-depth interview process and those who completed the online open-ended questionnaire. This consistency suggests that both data collection platforms yielded comparable insights, with no significant differences in the responses.

The findings are organised and presented in Table 1 and Table 2, which highlight the major themes and corresponding sub-themes that emerged in relation to the two key research questions.

Table 1 focuses on the leadership qualities required for future healthcare leaders, while Table 2 examines the environmental factors necessary to nurture effective healthcare leadership.

These tables are further enriched by selected participant quotes and discussion, which aim to provide deeper insights into the thought processes behind the responses and offer a more nuanced understanding of the themes identified.

THEMES IDENTIFIED

TABLE 1: QUALITIES NEEDED IN SINGAPORE'S HEALTHCARE LEADERS OF TOMORROW AGAINST THE BACKDROP OF A CHANGING PUBLIC HEALTHCARE LANDSCAPE

Themes	Sub-themes
A1: Possess individual character and behaviour which is in line with the public service ethos and be a role model for fellow staff.	Integrity, honesty, authenticity.
	Recognising own faults and taking responsibility.
	Being a role model for staff.
	Tenacity and grit managing disappointments.
	Receptiveness and openness to new ideas, with tools for change management.
	Lifelong learning and self-improvement.
	Compassion and viewing healthcare as a higher calling.

A2: Possessing the ability to work with others, via a combination of persuasion skills and people skills to drive projects.	Working with senior and junior staff; and managing laterally.
	Influencing people not just on authority alone.
	Understanding the ground staff.
	Appreciate that success is a team-based effort.
	Having good communication skills.
A3: Possessing strong systems-based thinking by understanding the tensions between organisational priorities versus individual priorities, thus prioritising accordingly.	Appreciating the public health aspects in decision making.
	Prioritisation of medical problems.
	Healthcare issues extend beyond medical problems alone.
	Understanding the financial and IT enablers, and its limitations in healthcare.
	Translating textbook knowledge to real world practice.
A4: Possessing significant foresight and longer term thinking beyond the healthcare system of today, which require cross industry knowledge and experience, but having implementable/realistic goals.	Being visionary and horizon scanning.
	Being a step ahead and preparing team for the next change ahead.
	Managing stakeholders that goes beyond just the healthcare sector.
	Setting operationally feasible targets to achieve results.

A1: Possess individual character and behaviour which is in line with the public service ethos and be a role model for fellow staff

"I guess in healthcare, we are dealing with people who find health being personal to them. So that sensitivity and empathy becomes a factor. So unlike a hotel industry, if not enough rooms, then go another hotel. But in healthcare, we cannot turn patients away. So we need to be aware of that." P6

Quote Box 1

Participants generally agreed that there was a need for healthcare leaders to possess exemplary character traits which are relevant for the patient population locally. They understand that unlike many other industries, there is a need for compassion and sincerity, and in turn being a role model to their junior staff. The unique nature of the healthcare industry had respondents appreciating that clients who utilise healthcare services are oftentimes not in the optimal state physically or emotionally.

Furthermore, qualities of compassion extend beyond just patients. Leaders must have the courage to speak truth to power and see the larger longer-term projects through. The tension between operational feasibility in many healthcare projects, such as during the COVID-19 pandemic in Singapore required leaders to engage policymakers to explain why certain instructions may not be workable.

"So I think healthcare is a little bit more risk averse than most other industries. I think that that would be one major factor. Anything to do with human health and all that is inherently conservative though."

P10

Quote Box 2

Participants understand that healthcare in general, can be risk averse which means that the ability to drive change within the organisation must be in line with the public service objectives within the healthcare industry. The nature of healthcare which demands evidence-based action also reflect how the industry is comparatively less nimble to effect change quickly, and may be slower to market forces. Opinions were divided as to whether this safeguards patient safety or whether this is a reason as to why innovations are being taken up at a slower rate amongst healthcare institutions.

"Authentic as in you know the things you have to do, be sincere about it and not do things because the government says so." P39

Quote Box 3

The participants concurred that one should have compassion for others and for self, and that viewing healthcare as a higher or personal calling will allow them to lead the challenges of the next decade ahead. Many appreciated that the heterogenous nature of many healthcare institutions means that there may not ever be a single oversight in terms of the actions taken by various healthcare teams. This means that larger organisations require leaders who have the individual conviction and personal drive to improve the state of the system, even without the pressure from higher authorities.

A2: Possessing the ability to work with others, via a combination of persuasion skills and people skills to drive projects

"The ability to work with people, persuasion is also very important. You cannot do anything in healthcare by yourself, you need to work through people." P1

Quote Box 4

Respondents further emphasised that leaders should be able to manage staff vertically, horizontally, and laterally. They understand that the ability to delegate effectively and manage the creative tensions amongst staff is important. The need for a wide variety of expertise in order to effect a change or project means that this is not a workstream that any single individual can do alone.

This usually translates to having a close connection with staff on the ground and communicating effectively the sensitivities required to influence individuals not just based on authority alone, but to build trust within the team. Respondents appreciate that methods of communicating such a vision are beyond platitudes and words alone, but deep understanding and appreciation of the needs of the staff under them. They were averse to stylistics and were keener to show determination and consistency via actions as well.

"Healthcare has very strong professional leaders, different professional groups so it is not about signing a directive and everyone will fall in. It is about once again building that collective sense to drive change." P12

Quote Box 5

There is a need for healthcare leaders to build successful relationships to drive efforts, and that a team-based effort amongst the staff will be able to deliver exceptional results better than having a sole driver. The sense of divide amongst the different professional groups was also a possible source of impediment towards teamwork. Examples cited included doctors-only lunches or doctors-only lounges which sought to sharpen the divide within the institution.

A3: Possessing strong systems-based thinking by understanding the tensions between organisational priorities versus individual priorities, thus prioritising accordingly

Participants agreed that healthcare change today cannot be siloed to medical care alone. There needs to be a public health consideration whether it be social costs, financial costs, political costs. This means that there is an element of prioritisation and decision making which needs to occur. The ability to grapple with such dilemma of prioritising whose needs should come first may have to be nuanced further. Individual departments being profitable may lead to worse outcomes for patients or work against hospital-wide strategy.

The theme was well encapsulated within healthcare as trying to balance optimising for the system versus optimising for the individual institution, and this would require leaders to have to prioritise. The social determinants of health were well appreciated by many of the respondents who noted that many of the change which they wish to see in healthcare require change in the public policy sphere beyond the healthcare institutions.

A4: Possessing significant foresight and longer term thinking beyond the healthcare system of today, which require cross industry knowledge and experience, but having implementable/realistic goals

"Because you know your stuff, you are very focused on your work. But you also need to be that sensor of the environment. You need to be out there and to feel and see the change, and what you can do about it and translate it to your organisation." P20

Quote Box 6

Participants agreed that healthcare leaders must have an element of being visionary and seeing beyond the next step, with the ability to horizon scan. They should also be able to anticipate the changes and be a step ahead to prepare their organisation. This sense making requires leaders to be knowledgeable about what is happening not just within healthcare, but other industries as well.

This includes the changes that may be happening in global geopolitics, or political sentiment on the ground on how healthcare should be financed. As healthcare can sometimes be a political issue nationally, the sensitivities to deciding which change is feasible to local Singapore residents must be nuanced further.

"So I think that is where you need courageous leadership. To be able to understand what is the big change the world needs to happen in order to enable the change we want to see. So people may look at it as incrementalism and whilst very conservative and safe, also frustrates others. The system is under severe stress and people want to see larger change rather than smaller change." P12

Quote Box 7

The setting of operationally feasible, realistic, and performance-oriented goals are necessary in the next generation of leaders. Sometimes, such change stem from severe stress within the system, and the change management will require more drastic actions to be taken.

Some respondents agreed that frustration towards pain points within the healthcare system (long waiting times, for instance) requires boldness and clarity to achieve change. They understand the frustration on the end user, and are prepared to demand of their staff ambitious goals to achieve this.

TABLE 2: ENVIRONMENT NEEDED TO BE NURTURED TO ENSURE A ROBUST SYSTEM IN WHICH PUBLIC HEALTHCARE LEADERSHIP CAN THRIVE

Themes	Sub-themes
B1: The public healthcare system should have a more forgiving environment for individuals who make mistakes or attempt to try new ideas, by fostering a learning environment.	Tolerance of failure, moving away from blame culture.
	Encouragement to try new things.
	Less oriented to results only, but being open to ideas and suggestions.
	Building compassion in a system which look out for staff possessing public service ethos.
B2: Providing leaders and leaders-to-be opportunities to rotate across the different clusters, institutions, job scope to allow for broad based understanding, learning, and networking. This can also mean bringing in individuals from beyond healthcare, and giving them the time to train.	Cross employment allows for fostering of trust within the healthcare system.
	Forum to discuss national healthcare issues, such as in healthcare financing.
	Tour of duty in functional roles within healthcare for aspiring leaders.
	Openness to leaders with skills beyond the healthcare sector alone.
	Rewarding leaders who solve the problems of the future, and not just problems of today.
B3: A teaching culture where existing public healthcare leaders are willing to teach and nurture staff, by being open to junior staff taking over their positions at the appropriate timeline.	Mature talent management system.
	Building a robust and systematic leadership succession planning platform.
	Senior staff as role models for junior aspiring leaders.
	Providing sufficient time for staff to train and develop.
B4: Identifying leaders using a combination of not just years of service or clinical experience but thinking of leadership as a series of qualities that one should possess, which will help in talent retention and depth of experience.	Less emphasis on time-in-service when identifying potential leaders.
	Reduce distinction between different healthcare professional groups.
	Less emphasis on leaders wearing many hats, but having the workload be shared amongst various staff.
	Widen the pool of successors and aim for greater talent retention via building structural support for learning/development.
	Creating buffer and resilience in manpower within the organisation.

B1: The public healthcare system should have a more forgiving environment for individuals who make mistakes or attempt to try new ideas, by fostering a learning environment

"One of the helpful things that has happened along the way is that the ability to take an adverse outcome, and honestly, look at the system and see. And without trying to find fault with particular individuals or even teams, look at how we can fix things to make them better. So perhaps to move away from a blame culture." P7

Quote Box 8

Participants agreed that there needs to be more tolerance of failure and encouragement of those who try new things, by moving away from a blame culture to that of a learning environment.

The job assessment framework of staff and leaders who embark on new ideas will require less penalising for failures. Respondents agreed that a forgiving environment is set at the micro level by their individual superiors as opposed to an institution wide culture alone.

Furthermore, respondents noted that there should be a celebration of diversity and adaptability amongst staff by building a psychologically safe environment to support each other. This means allowing for a communication of ideas, suggestions and feedback. Senior leaders appreciated supervisors during their career who were able to support them and trusted their judgment in making decisions.

B2: Providing leaders and leaders-to-be opportunities to rotate across the different clusters, institutions, job scope to allow for broad based understanding, learning, and networking; this can also mean bringing in individuals from beyond healthcare, and giving them the time to train

"Healthcare leaders tend to be oblivious to how other successful companies are run. They assume that their current issues and challenges are unique to healthcare whereas these challenges have been inventively addressed by other fields." P50

Quote Box 9

Having healthcare leaders rotate around different teams also break down walls within the professional groups. Examples cited include doctor-only lunches which reduce the opportunity for cross fertilisation of ideas. The appreciation that healthcare leaders alone do not have all the answers will transition the healthcare leadership towards a 'bench strength' concept which emphasises collective talent by co-opting staff across different backgrounds.

B3: A teaching culture where existing public healthcare leaders are willing to teach and nurture staff, by being open to junior staff taking over their positions at the appropriate timeline

"We must be willing to put our young leaders through the paces in terms of leadership opportunities out there. ... We must first be willing to expose our leaders early." P14

Quote Box 10

There is a need for a mature talent management system where senior staff co-opt junior staff to committees and meetings for early learning. The reporting officer should take succession planning seriously and not just leave this up to the leaders hip system within the organisation alone. This has meant that younger leaders must be given the reins to display their leadership capabilities earlier.

"Clinical leadership on the clinical side is often seen as a dirty job. A job no one wants to do, and with lots of burdensome and thankless work." P2

Quote Box 11

Hence, whilst in the past the training may have been ad hoc for healthcare leadership, the processes today must be in place for succession planning. Yet, respondents agreed that leadership training takes time and resources which need to be planned in advance, notwithstanding the unpredictable succession timelines and high turnover of staff. Some

respondents have lamented that whilst they have identified successors, when it was time for a handover, such staff have already left their organisation.

Healthcare senior leaders who may have been in a position for too long should aim to move onwards to other increased responsibilities to allow their successors to takeover. Some respondents have shared that they were asked about successor identification as early as the first few months on the job.

There were various statements by senior clinicians who argued that they felt ill equipped when appointed to senior leadership positions and oftentimes had to rely on their subordinates to help with financing terminology or business development. Many clinicians also noted that doctors may not be keen to give up their clinical surgical hours or patient-contact hours to assume leadership positions.

B4: Identifying leaders using a combination of not just years of service or clinical experience, but thinking of leadership as a series of qualities that one should possess, which will help in talent retention and depth of experience

"Promotion in healthcare is actually the slowest compared to counterparts. Maybe because the nature of healthcare is that we are afraid that if we test out too many cross employed staff, we disrupt operational life of critical services. We are risk averse in that way." P2

Quote Box 12

Respondents also noted that with the rapidly changing tides of healthcare globally and locally, identifying junior staff and leaders with the right attitudes and values means that we should be less conscious of age alone. Time in service should not be the only yardstick to determine if decision making responsibilities be conferred on the individual.

Some have even suggested possibly less distinction in career paths and remuneration between doctors, nurses, allied health, administrators to blunt the systematic differences across the industry. The concept of clinical experience equating to leadership abilities was debunked by many of the respondents, and they understand that whilst such change in mindset will take time, an earlier appreciation of this will improve the organisation efficiencies.

DISCUSSION

There is general consensus in how healthcare is expected to change over the next decade. Respondents agreed that healthcare will be shaped by changing patient expectations, the rise of digital and IT healthcare tools, realities of healthcare financing, ageing population with increasing chronic disease burden.

As a study which was conducted immediately following the announcement of 'Healthier SG' in Singapore, this is a first glimpse of what healthcare leaders feel will be relevant in this shift towards preventive care and community-based models of care.

COMPARISON WITH EXISTING LITERATURE ON LEADERSHIP WITHIN HEALTHCARE ORGANISATIONS

The findings from this study highlight key themes that are consistent with the existing literature on healthcare leadership. One prominent theme is the need for systems-based thinking. Healthcare leaders of tomorrow must possess a deep understanding of the complex, interconnected nature of healthcare systems. Previous studies emphasise that leaders should be able to possess effective communication skills, technological expertise, teamwork and networking, collaborative and trusted relationships across various healthcare sectors. [11] [12] Systems thinking is not only a leadership trait but a necessary approach to address the dynamic healthcare environment, especially as public health challenges continue to evolve.

Another crucial theme identified is the requirement for cross-industry experience. The study found that healthcare leaders should have a long-term perspective that extends beyond healthcare alone. This theme resonates with the broader call for integrating healthcare leadership with experience from other sectors, such as public policy or business. Such cross-

sectoral experience helps healthcare leaders understand the broader social determinants of health and develop a holistic approach to health system transformation. [13]

The individual character traits emphasised in this study—such as integrity, honesty, and authenticity—align with the values that are central to public service leadership. Ethical leadership plays a pivotal role in fostering trust and accountability within healthcare settings. [14] Leaders who embody these qualities not only drive organisational success but also maintain the moral foundation of public healthcare institutions.

Furthermore, this research underscores the importance of collaboration and communication skills in building a shared vision within healthcare organisations. Healthcare leaders must inspire and engage their teams, facilitating collaboration across departments and disciplines. [15] Effective communication enhances the exchange of ideas and promotes innovation in healthcare delivery.

In terms of the environment that fosters leadership, the study highlights the need for a public healthcare system that is receptive to learning, accepts failure, and is continuously evolving. This aligns with the findings of Warhurst and Black who argue that leadership requires organisations to embrace change and cultivate a culture of continuous improvement. [16] Additionally, establishing robust talent management and succession planning systems is crucial for developing future healthcare leaders. Identifying leadership potential based on talent and people management qualities rather than years in service ensures a meritocratic approach to leadership succession. [17]

ROLE OF POLICYMAKERS IN SHAPING HEALTHCARE LEADERSHIP

The findings suggest a bigger role for policymakers in shaping healthcare leadership. The evolving healthcare landscape in Singapore requires more than just capable leadership within the sector—it also calls for strategic input from policymakers to drive systemic change. Healthcare policymakers are crucial in shaping the public health environment by ensuring the effective allocation of resources, addressing emerging healthcare needs, and promoting personal responsibility among the population.

As the study's results highlighted, healthcare leaders of tomorrow must possess strong systems-based thinking to navigate competing priorities within the healthcare system. However, for these leaders to thrive, policymakers must establish the right frameworks, funding, and policies that enable leadership to flourish. [18] The shift towards promoting personal responsibility in healthcare, as noted in the results, is a critical area where policymakers will need to guide the broader societal transition, creating a sustainable healthcare ecosystem that balances public resources and individual health ownership.

Future research could explore the intersection between healthcare leadership and policy-making, focusing on the role of government in fostering an environment where leaders are empowered to make impactful changes.

ROLE OF LEADERS IN BRIDGING POLICY AND PRACTICE

Healthcare leaders, on the other hand, must play an active role in translating policy changes into practice. As highlighted in the study, effective healthcare leaders are not only skilled in systems thinking and communication but also adept at fostering collaboration across various sectors. Given the increasing complexity of the healthcare environment, these leaders will need to bridge the gap between policy and practice, ensuring that policy shifts around resource reallocation and personal responsibility are effectively implemented at the grassroots level. [19] For example, fostering a learning culture and providing opportunities for leadership development, as outlined in the results, will allow healthcare leaders to adapt and thrive in an ever-changing system.

Moreover, health leaders should advocate for policies that promote long-term sustainability, ensuring that healthcare remains accessible and equitable, while balancing both individual and societal needs. Exploring the interaction between leadership capabilities and policy frameworks is essential for building a resilient healthcare system that can adapt to future challenges. [20]

STRENGTH OF THIS STUDY WITHIN EXISTING LEADERSHIP FRAMEWORKS

Such qualitative study findings provide detailed information to explain a complex issue within the Singapore public healthcare system. As the healthcare system is heterogenous with varying experience by the respondents, a broad number of individuals were invited and recruited into the study until data saturation was obtained.

As highlighted in the thematic results – around the world, healthcare systems today are calling for radical, transformational change and new systems of care which is characterised by sophisticated technology and a greater personal responsibility for health.

In Singapore, through a series of interviews and focus group discussions in 2017 across 150 leaders, the MOH Holdings ONE Healthcare Leadership Framework was formulated, which noted the increasingly complex healthcare landscape, and the need to make three important leadership shifts of (i) shifting from expert as leader to expert leader, (ii) going beyond developing leaders to developing collective leadership, and (iii) moving from leading institutions to leading eco-systems. [21] [22] Palpably – many of the qualities and traits required of organisational leaders and healthcare leaders overlap significantly. Yet, such principles continue to apply for the changes that will occur in healthcare over the years and decades ahead.

In the United Kingdom, the National Health Service (NHS) similarly published a leadership framework which recommends that healthcare leaders demonstrate personal quality of working with others, managing services, ability to set direction and vision, and to deliver upon the strategy. [23]

Interestingly, many of such themes raised are also present in non-healthcare related industries. Patel et al suggested that effective leaders transcend their title of 'manager' or 'boss' and have found the right combination of charisma, enthusiasm, and self-assurance to act strategically, be an effective communicator, accountable, and setting clear goals and visions whilst managing complexity and fostering innovation. [24] Warren Bennis and Peter Drucker found that the foundation elements of effective leadership include guiding vision, passion, integrity, curiosity and daringness. There is a need for a manager to understand the relationships and contribution that he or she is expected to make. [25] [26]

APPLICATION OF RESULTS TO OTHER HEALTHCARE SYSTEMS UNDERGOING INDUSTRY-WIDE TRANSFORMATION

As this study is conducted in Singapore with existing public healthcare leaders, the findings are largely context-specific. Yet, we argue that many of the themes raised on healthcare leadership models can evolve and be directed towards other healthcare systems when faced with challenges such as ageing populations and rising chronic disease burden.

McKinsey and Company contended that within the Asia region, there is rapid healthcare change which is driven by shifting demographics, rising consumer expectations, and technological innovations. [27] The report stated that the forces driving such transformation are ageing population and supply constraints. PWC Strategy further predicted that by 2030, healthcare will be centred on patients empowered to prevent diseases rather than them seeking treatment, and physicians and administrators alike will need to redefine their roles and ways of spending healthcare finances. [28] The New England Journal of Medicine (NEJM) Catalyst posited that over the next 10 years, the healthcare system will focus on continuity of care, integrated delivery networks, care within the community, surgeries being performed at community surgical centres, remote delivery of care, and an established focus on prediction and prevention. [29]

With such sweeping changes in healthcare systems globally, the Singapore-based findings here can be a framework in which healthcare leadership development theories can continue to iterate in the future. [30]

LIMITATIONS OF THE STUDY

Although there were more than 2,000 participants who were eligible for this qualitative study based on the inclusion parameters, only 120 participants agreed to find out more about the study. There is concern about selection bias in that only participants who were keen (i.e. volunteer bias) to speak about healthcare leadership will respond to the invitation. The other participants who did not participate may have differing opinions from that of the respondents. However, the

wide variety of participants across different healthcare institutions showed that participants across multiple healthcare clusters and at different levels of leadership seniority were keen to provide their insights to the research questions.

There were also concerns about social desirability bias, and the responses being transcribed verbatim may have contributed to this. However, participants were assured on the confidentiality of their responses and their statements are not individually attributable. All data collection processes were individual-based and no group discussions were conducted. All interviews were conducted in a private space which afforded maximal confidentiality. Many of the responses offered frank criticisms of the existing state of the healthcare leadership development in Singapore, which is evidence that many respondents were comfortable sharing their opinions freely.

FUTURE DEVELOPMENT OF LEADERSHIP THEORIES FOR PUBLIC HEALTHCARE

Understanding the relative significance of these themes could provide deeper insights into the qualities required for healthcare leaders to effectively navigate strategic change. However, this was not available from the study participants' response, and we did not identify which of the themes discussed were considered by study participants to be more important or relevant.

Exploring which themes should be prioritised will offer useful insights. We envision the results here will be valuable for future research. Such studies can foster future understanding which will generate new theories on how healthcare leaders can hone their qualities and traits, and how the industry can change to meet various healthcare demands.

CONCLUSION

The strength of any organisation is dependent on the leadership and environment which they act in. This is similarly important within healthcare, especially as Singapore transitions towards a 'Healthier SG' landscape which emphasises larger number of stakeholders and shifting priorities towards preventive community care.

Tomorrow's healthcare leaders will need to possess broad-ranging traits of communication, stakeholder management, and courage to drive change within their organisation and across the entire health eco-system to achieve results. Similarly, there needs to be continued significant investments made in building the leadership development and training platform to nurture the next generation of leaders who have compassion and skills to network across the healthcare continuum. This qualitative study places a spotlight on developing healthcare leaders who have the knowledge and experience to continue Singapore's public healthcare system success.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Saw Swee Hock School of Public Health, National University of Singapore Departmental Ethics Review Committee approval (DERC SSHSPH-184) was obtained to conduct this study. Participants' written and signed consent were obtained to participate in this study.

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THE IMPACT OF NURSES' DISASTER PREPAREDNESS COMPETENCIES ON PUBLIC HEALTH CENTER RESILIENCE IN DISASTER-PRONE AREAS: A CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND:

Disaster-prone areas need resilient health centers to ensure effective health management services and emergency response during earthquakes and tsunamis. Nurses play a critical role in disaster risk reduction which is essential to improving health center resilience. Resilience includes the ability of health centers to withstand, adapt to, and recover from the effects of disasters while continuing to provide essential health services. This study examined the influence of nurses' disaster preparedness skills on health center resilience in disaster scenarios.

METHODS:

Using a quantitative approach with a cross-sectional study design, this study sampled 125 nurses through proportional stratified random sampling. The questionnaire was administered to assess nurses' disaster preparedness skills, including disaster understanding and policy development and planning. Data were analyzed using Chi-squared and logistic regression.

RESULTS:

There was an association between understanding disaster risk ($p=0.013$) and policy development and planning competencies ($p=0.005$) with community health center resilience. Multivariate analysis showed that policy development and planning had a greater impact on community health center resilience ($\text{Exp}(B)=2.992$, $95\%CI=1.276-7.014$, $p=0.012$).

CONCLUSION:

This study highlights the importance of strengthening these competencies and fostering collaboration with local governments, health institutions, communities, and non-governmental organizations (NGOs) to support comprehensive disaster preparedness efforts.

KEYWORDS

community resilience, health management services, health policy, disaster preparedness, nurses' competencies

INTRODUCTION

With the increasing frequency of natural disasters such as earthquakes and tsunamis, health system resilience is essential to ensure the continuity of essential health services and effective emergency response. Community health centers, often the first point of contact for affected populations, play a critical role in providing emergency health services and mitigating the impact of disasters [1]. The ability of these centers to withstand, adapt to, and recover from disaster-related disruptions is critical to maintaining public health and safety.

Nurses are an integral part of disaster preparedness and management, working on the front lines of health care delivery. Their expertise in disaster preparedness is critical to the overall resilience of health centers. According to the International Council of Nurses (ICN) [2], nurses must possess key competencies to effectively contribute to disaster preparedness and response, including understanding disaster risks, promoting health during disasters, and developing strategies and plans to manage such events [3].

Given the central role of community health centers in disasters, efforts should be made to strengthen their resilience to save lives and provide essential services during emergencies. These efforts can be categorized into three main areas: (a) protecting the lives of patients and health workers by ensuring the structural resilience of health centers; (b) maintaining the functionality of health services and facilities during disasters and emergencies; and (c) enhancing the emergency management capabilities of health workers and related agencies. Understanding the concept of disaster resilience and its supporting elements is essential to building the resilience of community health centers [4]. Resilience is the ability to cope with or adapt to situations, disasters, or stresses that are perceived as life-altering shocks [5]. While resilience has traditionally been studied in psychology to assess individual responses to life's challenges, the concept has now been applied to organizations, health care institutions, and broader contexts such as disasters and the economy. Resilience involves preparing for, coping with, and learning from shocks that occur, and is closely related to the concept of "shock," which is defined as a rapid and drastic change that has a significant impact on the health system. For example, epidemics can dramatically increase the demand for health services [6].

In the context of community health centers resilience, it is critical to focus on the competency of nurses in disaster management. The severe impact of disasters requires their competency such as adequate knowledge and skills [7]. Disaster management has prioritized emergency response over effective mitigation in the pre-disaster phase. There is a need for proactive mitigation that can effectively reduce disaster risk [3]. Mitigation is essential to ensure that key facilities, such as community health centers, can provide services and protect communities during disaster emergencies.

Nurses have an important role to play in prevention and mitigation. According to the ICN Framework of Disaster Nursing Competencies, essential competencies for nurses in disaster scenarios include risk reduction, disease prevention, health promotion, and policy development and planning [2]. The lack of disaster competencies has resulted in limited preparedness. The Director-General of UNESCO has emphasized that anticipation, education and information are key to reducing the deadly impact of natural disasters. Enhancing nurses' competence through training, technical guidance and experience is crucial to improving disaster preparedness and response [8].

Moreover, disaster risk management to build the good resilience should be based on understanding disaster risk [9] and good policy and planning [10]. The resilience of public health centers is not only about the structural integrity of the buildings, but also about the ability of health care workers (i.e., nurses) and a management system (e.g., policy and planning) that is adaptive and responsive to disaster threats [11]. Therefore, the aim of this study was to examine the impact of nurses' disaster preparedness competencies on the resilience of health centers in disaster scenarios.

METHODS

STUDY DESIGN

This quantitative study used a descriptive-analytical design with a cross-sectional methodology [12]. The cross-sectional design was used to collect data at a single point in time, allowing for analysis of the relationships between nurses' disaster preparedness competencies and health center resilience.

RESEARCH LOCATION

This study was conducted from January to June 2024 in a community health center (Puskesmas) in Palu City, Indonesia. This location was selected because of its vulnerability to disasters and the strategic role of PHCs in disaster response and resilience. Figure 1 shows a description of the damage to all facilities, including health facilities, that occurred during the disaster.

FIGURE 1. NATURAL DISASTER EVENT OF EARTHQUAKE, TSUNAMI, AND LIQUEFACTION IN PALU CITY, SEPTEMBER 28, 2018, INDONESIA



Source: <https://www.bbc.com/indonesia/indonesia-45832237>.

POPULATION AND SAMPLING

The population comprised 158 nurses working in the 14 Community Health Centers. The sample size was calculated using the Slovin formula [12].

$$n = \frac{N}{1 + N (e^2)}$$

Formula Description:

n = Sample size

N = Population size

e = Margin of error (with a 95% confidence level or 5% error tolerance)

$$n = \frac{158}{1 + 158 (0,05^2)}$$

$$n = \frac{158}{1 + 158 (0,0025)}$$

$$n = \frac{158}{1 + 0,395}$$

$$n = \frac{158}{1,395}$$

$$n = 113 \text{ samples.}$$

Thus, the calculated sample size was 113 samples. In this research, the authors added an additional 10% to the total sample to account for potential *dropouts*, as recommended by Lwangga and Lemeshow [13].

The sample size was increased by 10% using the following formula:

$$n = \frac{n}{1 - f}$$

Formula Description:

n = calculated sample size

f = estimated dropout proportion

$$n = \frac{113}{1 - 0,10}$$

$$n = \frac{113}{0,9}$$

$$n = 125 \text{ samples.}$$

Therefore, the respondent in this research was 125 respondents. The sample was selected using stratified random sampling technique [12] as shown on Table 1. The formula was below:

$$ni = \frac{Ni \cdot n}{N}$$

Formula description:

ni = number of each sample stratum

Ni = number of each population stratum

n = total sample size (125 nurses)

N = total population (158 nurses)

TABLE 1. STRATIFIED RANDOM SAMPLING TECHNIQUE FOR THE SAMPLE

No	Community Health Centers (<i>Puskesmas</i>)	Stratified Population	Stratified Sample
1.	Puskesmas Birobuli	8	6
2.	Puskesmas Talise	7	5
3.	Puskesmas Singgani	12	10
4.	Puskesmas Bulili	20	16
5.	Puskesmas Pantoloan	14	11
6.	Puskesmas Taweli	11	9
7.	Puskesmas Kawatuna	12	10
8.	Puskesmas Sangurara	11	9
9.	Puskesmas Mabelopura	6	4
10.	Puskesmas Mamboro	11	9
11.	Puskesmas Kamonji	15	12
12.	Puskesmas Tipo	8	6

13.	Puskesmas Nosarara	10	8
14.	Puskesmas Lere	13	10
Total		158	125

INSTRUMENTS AND PROCEDURES

This study used a structured questionnaires about mitigation competencies according to International Council of Nurses (ICN-WHO), including nurses' disaster risk preparedness ($\alpha=765$, 17 items, e.g., *Do you have an estimate of losses as a result of the disaster?*) and policy development and planning competencies ($\alpha=794$, 6 items, e.g., *Does Puskesmas have a SOP for the management of disaster victims?*) [2], and Resilient health centers questionnaire using indicators from the Health Centre Resilience Framework for Disasters ($\alpha=0.769$, 18 items, e.g., *All health center services are still accessible to the community during disasters*) [14].

Understanding disaster preparedness reflects nurses' knowledge and awareness of disaster situations. Policy development and planning competency refers to the involvement of nurses in disaster-related policy development and implementation. Each variable was scored using a Guttman scale where responses were dichotomous, scored as 0 (no) or 1 (yes). The variable was categorized using mean score. The variable was categorized using the mean score. The lower score from the mean would be categorized as less or poor, while the counterpart would be categorized in the opposite direction.

Regarding the procedures, the sample was randomly selected at each puskesmas using a RNG (Random Number Generate) tool. The questionnaires were distributed directly to the nurses in their respective community health centers. Before the survey, participants were informed about the purpose of the study, the voluntary participation, and the confidentiality. An informed consent form was signed upon agreeing to participate. The questionnaire was then given to the participants to complete independently without any intervention from the researcher. If a question was unclear, the researcher would help explain its meaning.

DATA ANALYSIS

The questionnaires were assessed using Cronbach's alpha coefficient test. This test was used to measure the reliability or consistency of a set of survey items. The data distribution was tested using Kolmogorov-Smirnov to ensure the normality of the data. Therefore, the data were normally distributed. Moreover, univariate analysis was performed on the research characteristics using frequencies (n) and percentages (%). The Chi-square test was used to examine the bivariate association. Finally, multivariate analysis using logistic regression to examine the independent factors that had a greater impact on the dependent variable. All analyses were performed using IBM SPSS version 22 with 95% confidence of interval ($\alpha=0.05$).

ETHICS CLEARANCE STATEMENT

This research was conducted after obtaining ethical approval from the Research Ethics Commission of the Faculty of Public Health, Hasanuddin University, Makassar with number 1316/UN4.14.1/TP.01.02/2024.

RESULTS

TABLE 1. RESPONDENT CHARACTERISTICS

Characteristics	N	Percentage (%)
Gender		
Male	19	15.2
Female	106	84.8

Age		
17 – 25 years	4	3.2
26 – 35 years	52	41.6
36 – 45 years	58	46.4
46 – 55 years	8	6.4
56 – 55 years	3	2.4
Understanding Disaster Risk		
Less Understanding	55	44.0
Understanding	70	56.0
Policy and Planning		
Less Effective	44	35.2
Effective	81	64.8
Resilience of Community Health Centers		
Poor	40	32.0
Good	85	68.0

Table 1 shows that most respondents were female (84.8%) and between the ages of 36 and 45 (46.4%). Respondents with good understanding of risk were 70 people (56.0%), while respondents with poor understanding of risk were 55 people (44.0%). Respondents with effective policies and planning were 81 people (64.8%), while respondents with less effective policies and planning were 44 people (35.2%). Respondents with good health center resilience were 85 people (68.0%), while respondents with poor health center resilience were 40 people (32.0%).

TABLE 2. BIVARIATE ANALYSIS BETWEEN NURSES' DISASTER PREPAREDNESS COMPETENCIES AND HEALTH CENTER RESILIENCE

Variables	HC resilience				N		P Value
	Poor		Good		n	%	
	n	%	n	%			
Understanding Disaster Risk							
Less Understanding	24	17,6	31	37,4	55	100	0,013
Understanding	16	22,4	54	47,6	70	100	
Policy and Planning							
Less Effective	21	14,1	23	29,9	44	100	0,005
Effective	19	25,9	62	55,1	81	100	

Table 2 shows that there were significant associations between understanding disaster risk ($p=0.013$) and policy and planning competencies ($p=0.005$) with community health center resilience. As shown in the table that 47.6% and 55.1% respondents who understood disaster risk and had effective policy planning, had good HC resilience.

TABLE 3. MULTIVARIATE ANALYSIS OF NURSES' DISASTER PREPAREDNESS COMPETENCIES AND HEALTH CENTER RESILIENCE

	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI Lower	Upper
Understanding Disaster Risk	1.017	0.426	5.703	1	0.017	2.766	1.200	6.375
Policy and Planning	1.096	0.435	6.358	1	0.012	2.992	1.276	7.014
Constant	-4.878	1.496	10.631	1	0.001	0.008		

Logistic regression; Method: Enter.

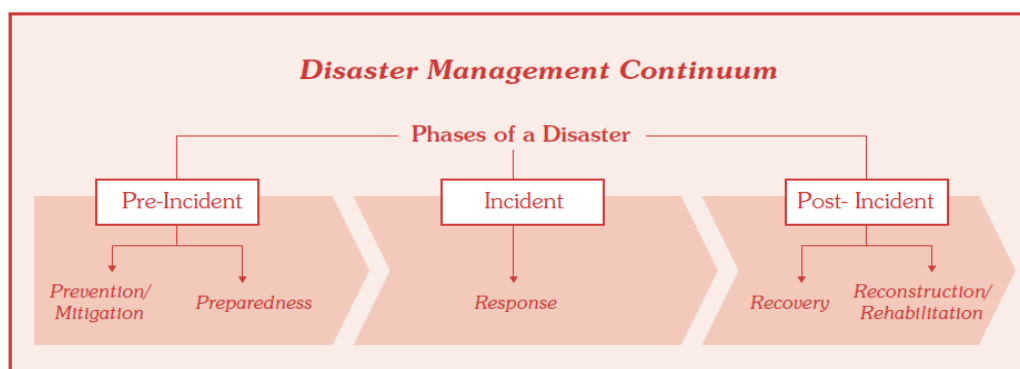
Table 3 shows that policy and planning competency had the strongest impact on community health center resilience ($\text{Exp(B)} = 2.992$, $95\% \text{CI} = 1.276-7.014$, $p = 0.012$). Meanwhile, understanding disaster risk competency also had significant impact ($\text{Exp(B)} = 2.766$, $95\% \text{CI} = 1.200-6.375$, $p = 0.017$).

DISCUSSION

Community or public health centers can develop specific and effective preparedness plans, including evacuation procedures, storage of emergency medicines, and training for health staff to be adaptable and resilient in difficult situations [15]. By identifying risks, public health centers can take mitigating actions, such as strengthening building structures [1], placing medical equipment in safe locations, and increasing staff capacity to handle emergency situations. Community health centers that understand disaster risks can respond more quickly and effectively, reducing the negative impact on health services and ensuring faster recovery after a disaster [17].

The resilience of facing disaster can be applied in disaster risk management by knowing and implementing the framework to address the element of disaster risk including exposure to hazards, vulnerability and capacity of exposed elements, and characteristics of hazards to prevent the creation of new risks and reduce existing risks as recommended by the Sendai Framework for Disaster Risk Reduction 2015-2030 adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on 18 March 2015 [18,19]. Moreover, disaster risk management to build the good resilience should be based on understanding disaster risk in all its dimensions. This knowledge can be used for risk assessment, prevention, mitigation, preparedness and response [20].

FIGURE. 2. DISASTER MANAGEMENT CONTINUUM FROM THE INTERNATIONAL COUNCIL OF NURSES (ICN -WHO).



Source: This figure is extracted from the original ICN-WHO reference [2].

The resilience of public health centers is not only about the structural integrity of the buildings, but also about the ability of health care workers (i.e., nurses) to maintain primary health care services during and after a disaster. Nurses are often on the front lines, providing critical care, coordinating emergency response, and assisting in the recovery process. Their preparedness and competencies directly affect the ability of health centers to withstand, adapt to, and recover from disasters [11]. This study examines nurses' disaster preparedness competencies as key determinants of health center resilience.

The results showed that most respondents who have a good understanding of various aspects of disaster risk tend to work in health centers with better resilience, suggesting the importance of continuous education and training on disaster risk management to improve the preparedness and response capacity of Puskesmas. This is consistent with recent research on disaster preparedness, which suggests that nurses who understand potential disasters and how to prevent them can respond better when a disaster occurs [20]. Teaching nurses more about disasters can help them make better decisions, which can make health facilities more resilient [21].

Nurse educators and trainers are helping community health centers prepare for and respond to disasters [22]. This shows that education and training on disaster risk management is important. Efforts to educate and train people on disaster risk must continue [23]. Ibrahim et al. [16] said that nurses can help communities prepare for disasters and reduce their impact. They are health workers close to the community. The International Council of Nurses (ICN) suggests that nurses should be involved in disaster preparedness. Nurses in Indonesia can work with other health workers, the government, and the community to manage disasters. They can support rural communities by working with village heads, village government officials, hamlets, and community health center representatives [24]. Therefore, this study emphasizes the importance of education and training in disaster risk management as a key component in improving the strength of health centers. Ongoing training and disaster simulations can increase the awareness and preparedness of *Puskesmas* staff.

Most respondents said that health centers had effective policies and plans which suggest that they are actively involved in collaboration with external parties, including local governments, other health institutions, and local communities (Table 1). Such collaboration helps get the resources and knowledge needed to create effective strategies. Proactive management of policies, plans, and monitoring will increase success in disasters. Effective policies and planning lead to more efficient disaster mitigation and response.

Policy and planning were the most important factors in how well health centers could cope with challenges. This is evidenced by the multivariate analysis that shows the most significant of these variables for public health resilience. This shows that good policies and planning make health centers three times more likely to be resilient in a disaster. Therefore, strong policies are important for responding to disasters and making good use of resources.

Developing policies and planning for disaster management is a critical aspect of building the resilience of community health centers. The resilience of community health centers includes not only physical capacity and resources, but also a management system that is adaptive and responsive to disaster threats [25]. Effective policy development in the context of community health centers includes the establishment of clear and structured standard operating procedures (SOPs) for disaster management. These SOPs include steps to be taken at various stages of disaster management, such as preparedness, mitigation, response, recovery, and rehabilitation [10].

The involvement and collaboration of community health centers with external parties has a positive impact on disaster preparedness and response [10]. This effective collaboration not only expands available resources, but also increases access to knowledge, technology, and best practices in disaster management [26,27]. This involvement allows community health centers to integrate multidimensional perspectives into disaster planning, thereby strengthening the adaptive capacity to deal with different disaster scenarios that may occur [28].

The significant influence of both policy and planning and understanding of disaster risk highlights the multifaceted nature of resilience in health centers. While strategic policies and comprehensive planning provide the structural backbone for disaster response, a thorough understanding of disaster risk empowers health professionals to implement these plans effectively. It is therefore recommended that, in addition to focusing on the development of robust policies, investment be made in the ongoing education and training of health workers. In addition, policy frameworks should include elements that increase nurses' risk awareness and preparedness [29]. Collaborative efforts involving local governments, health care institutions, communities, and non-governmental organizations (NGOs) are essential to creating an integrated disaster preparedness ecosystem. Such collaboration can facilitate the sharing of best practices, resources, and support systems that are critical during disaster events [30].

CONCLUSIONS

This research underlines the critical role of nurses in increasing the resilience of Community Health Centers through disaster mitigation competencies. The development of sustainable training programs and the preparation of comprehensive policies are needed to strengthen *Puskesmas* preparedness and response to disasters. In addition, effective collaboration

with local governments, other health institutions, and local communities is essential to increase resources and access to knowledge and technology in disaster management. This research contributes to the literature on disaster risk management and shows that increasing mitigation competencies among nurses is a long-term investment in building community resilience to disasters. These findings are relevant for application not only in Indonesia but also in various disaster-prone regions around the world, providing the basis for better mitigation strategies and stronger public health resilience.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest

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ORGANIZATIONAL JUSTICE AS A PREDICTOR OF ORGANIZATIONAL CITIZENSHIP BEHAVIOR AND EMPLOYEE ENGAGEMENT IN THE HEALTHCARE SECTOR: A CONCEPTUAL STUDY

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ABSTRACT

The healthcare sector framework highlights the importance of organizational justice in shaping employee attitudes and behaviors within healthcare settings. It emphasizes that perceptions of fairness—encompassing distributive, procedural, and interactional justice—are crucial for fostering (OCB) and enhancing employee engagement, ultimately impacting the quality of patient care and organizational effectiveness. This research aims to examine the impact of organizational justice on organizational citizenship behavior (OCB) and employee engagement among healthcare professionals. The study emphasizes the critical role that perceptions of fairness play in enhancing employee morale and productivity within healthcare settings.

The study utilizes a comprehensive literature review to analyze existing theories and empirical findings related to organizational justice, OCB, and employee engagement. It synthesizes insights from various studies to develop a theoretical framework that illustrates the relationships between these constructs. Specifically, when healthcare employees feel that they are treated fairly with respect to resource distribution, decision-making processes, and interpersonal interactions, they are more likely to exhibit behaviors that support their organization and engage actively in their roles.

The research concludes that fostering a culture of organizational justice is essential for promoting OCB and enhancing employee engagement in healthcare environments. Its originality lies in its focus on the healthcare sector, providing a unique perspective on how justice perceptions can drive positive organizational outcomes. This study lays the groundwork for future empirical research to validate these proposed relationships in practical settings, especially within the healthcare sector, and the dedication and willingness of employees are vital for success.

KEYWORDS

Organizational Justice, Organizational Citizenship Behavior, Employee Engagement, Healthcare Sector, Fairness.

INTRODUCTION

In systems that are complex, specifically in professions that are basic necessities to society, the structure of an organization is sometimes deficient in consistency and transparency, which can result in perceived unfairness. Healthcare is a complex structure. It is challenging to address such complexities. Healthcare managers and professionals usually insist on

comprehending business and industry improvements in quality and effectiveness. The use of such methods enhances the level of healthcare, although this is not always demonstrated. Healthcare involves moral aspects that are difficult to categorize into business or technology categories. Therefore, healthcare facilities are advised to create cutting-edge management frameworks where organizational justice helps to define the essence and core principles of healthcare. In complex systems, especially in essential professions, an organization's structure may lack consistency and transparency. Khanam et al (2024) highlight the growing importance of responsible leadership in fostering a positive organizational environment in healthcare contexts. They stress the importance of strong leadership in improving employee happiness and loyalty, especially in demanding fields such as healthcare. Research has sought to investigate how organizational justice plays a key role in connecting responsible leadership with employees' intentions to leave the company. The research aims to fill this gap by exploring how perceptions of fairness can impact employees' choices to stay or depart from their organizations. Finally, this study helps us better grasp how leadership and employee behavior interact within healthcare management. Improving the understanding of dynamics [1].

Organizational justice is essentially associated with the psychosocial behaviors of employees in organizations. In addition, organization justice impacts employees' work performance and promotes positive attitudes among employees. Some theories have shown that organizational justice can influence employees' commitment at work as well as their commitment to the organization [2]. Employee engagement is the most fundamental and predominant factor for the growth of organizational revenue and advocates customer satisfaction with the company and the product [3]. Employee engagement is correlated with the characteristics of loyalty and commitment to the company, and volunteered passion involves contributing to the company and constructive behavior at work to obtain the organization's growth and success [[4]]. These engaged behaviors from employees and the willingness to work beyond actual performance for the organization's effectiveness are more in-demand necessities in existing competent and modern businesses. Organizational citizenship behavior is the specific mannerism that evolves from the effect of employee engagement, which improves an individual's commitment to work, to the recognition that individual engagement in organizational citizenship behavior can increase team-level work engagement. This employees' constructive work engagement with the organization is referred to with a term called "Organizational Commitment". Organizational commitment of employees and employees' organizational citizenship behavior characteristics increase the organization's growth and sustainability in the market [4].

Leaders in the healthcare industry should assess employee levels of organizational citizenship behavior, among other factors, to take appropriate measures against negative elements and promote constructive ones. They are able to increase productivity, loyalty to the organization, work satisfaction, and employee engagement as a result. This study will inform the engagement levels of employees, assisting them in forecasting their commitment to the organization, their satisfaction, their intention to leave, and their ability to develop their competencies. The current study will help organization managers take the right preventative steps by identifying components related to organizational justice. Additionally, it could offer guidance to scholars who wish to conduct more research on this subject.

The study's primary goals are as follows to:

- Explore the facets of organizational justice, citizenship behavior, and employee engagement
- Investigate the links among employee engagement, organizational citizenship behavior, and organizational justice
- Create a conceptual framework that employs organizational justice as a predictor of employee engagement and citizenship behavior

METHODS

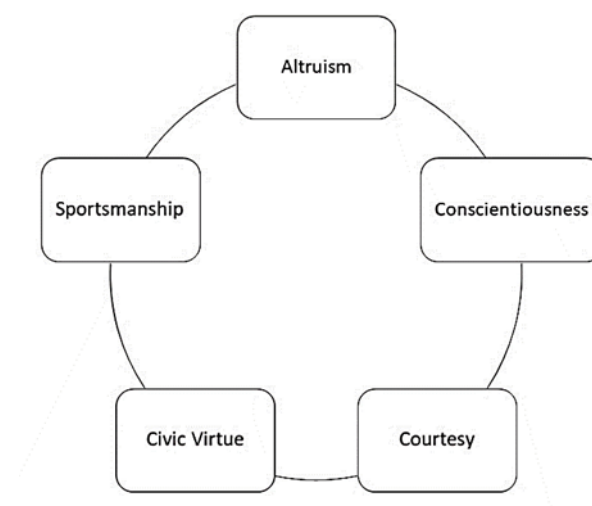
The study utilized secondary materials, including books, blogs on websites, white papers, expert interviews, and scientific journal articles. Terms such as organizational citizenship behavior, organizational justice, employee engagement, organizational effectiveness, and search engines were used to identify relevant literature. The material reviewed was used to help build the framework. The conceptual study on organizational justice in healthcare settings employed a narrative

review approach, synthesizing insights from various empirical studies and theoretical frameworks to explore the relationships between organizational justice, organizational citizenship behavior (OCB), and employee engagement. The review covered literature from the past two decades, focusing primarily on studies published between 2000 and 2023, to ensure a comprehensive understanding of contemporary issues and trends in the field. Key databases utilized included PubMed, Wiley Online Library, and ResearchGate, chosen for their extensive collections of peer-reviewed articles related to healthcare and organizational behavior. This selection was aimed at capturing a wide array of perspectives on how perceptions of fairness—distributive, procedural, and interactional—affect employee attitudes and behaviors in healthcare environments. The review highlighted significant findings that link organizational justice to improved employee morale, productivity, and ultimately, patient care quality, laying a solid foundation for future empirical research in this critical area.

ORGANIZATIONAL CITIZENSHIP BEHAVIOR

In adopting the term organizational citizenship behavior, there is no defined statement for organizational citizenship behavior, but interpretations of organizational citizenship behavior strongly persist in terms of its central progress in terms of employees' citizenship behavior and voluntary commitment to the organization. Organizational citizenship behavior does not mean that employees engage in formal work in the organization. Several studies have shown that positive behavioral approaches such as organizational citizenship behavior have a considerable effect on an organization's effectiveness. More specifically, the present study Nienaber & Martins (2020) [5] shows that top MNC organizations are highly proficient and obtain positive attention from their customers through employees' organizational citizenship behavior. These obligating acts from individuals are not encountered from companies that force agreements or policies; rather, employees choose behavior from their own preferences to work in integrity and exceed support for organization effectiveness. Organizational citizenship behavior from employees is the main cause of job satisfaction and organizational justice. Organizational Justice is also an influencing factor for the representation of organizational citizenship behavior in employees [6]. Nienaber & Martins (2020) [5] interprets five critical aspects of organizational citizenship behaviors, such as altruism, courtesy, civic virtue, conscientiousness, and sportsmanship. Figure 1 represents the behavioral dimensions of organizational citizenship behavior.

FIGURE 1: DIMENSIONS OF ORGANIZATIONAL CITIZENSHIP BEHAVIOR



Altruism: Altruism is a feature of employees' concerns to support coworkers and provide necessary and supportive help in their work-related responsibilities and difficulties. In situations such as providing the required mental support to new colleagues due to their distressed workloads, they are encouraged to enhance their identity and exhibit a cooperative attitude in the team that nurtures team coordination [1].

Conscientiousness: Conscientious behavior is the act of employees disciplining themselves without the lead of authorities or rules and is conserved to maintain flexible engagement to compensate for the organization's necessities. With respect to this reason, they are willing to work for additional hours apart from their usual timings, and this considerate behavior is integrated with dedicated and determined support to the organization [1].

Courtesy: The term "courtesy" refers to the alertness and attentiveness of an individual to sustain their disciplined behavior and manifesting only professional decisions and interactions. Courteous related behaviors at work, including alerting others before commencing an activity, alerting others in organizations about risky behavior, and taking precautionary measures to mitigate the negative impacts of issues, are all examples of courtesy-based knowledge [2].

Civic Virtue: This virtue is responsible for considering the organization's policies and committing to the company's regulations and functionalities. Moreover, it concerns an organization's reputation, which is composed of sincerity and respect toward the organization. This virtue involves actions such as regular participation in organizational meetings and conferences, awareness of organizational changes and updates about organizational developments. Moreover, they possess interpersonal connections with their colleagues [1].

Sportsmanship: The act of sportsmanship is illustrated by employees who deal with unfavorable situations and decisions by organization employees, but they tend to avoid conflicts and, further, extract themselves from coworkers' annoyance from unpredicted embarrassment [2].

Organizational citizenship behavior (OCB) refers to voluntary employee actions that are not part of their formal job requirements but contribute positively to the organization's functioning. It encompasses various dimensions, including altruism, where employees assist colleagues; courtesy, which involves preventing work-related issues; sportsmanship, characterized by maintaining a positive attitude despite challenges; civic virtue, reflecting active participation in organizational governance; and conscientiousness, indicating a commitment to exceeding performance expectations. In the healthcare sector, OCB is particularly vital, as it enhances teamwork and improves patient care outcomes, fostering a collaborative environment essential for effective healthcare delivery. Overall, OCB is linked to increased organizational effectiveness and employee engagement, making it a critical area of focus for healthcare management [3].

A career in the healthcare industry necessitates close relationships and positive company with patients and necessitates taking part with several members of the medical staff as well as team coordination. In this way, the organizational citizenship behavior of health care professionals drives the workplace with a reliable environment, job fulfillment and highly productive well-being and perceives a benevolent connection with colleagues by increasing the practice of cooperatively sharing information and helping each other. Organizational citizenship behavior-dependent factors foster collaborative communication among managers, employees, and health professionals and enhance the positive operation of the industry [4]. Employees who do not exhibit organizational citizenship behavior, such as assisting, informing, accommodating, or appreciating the organization, engage in conflict, provide subpar services, and fail to share among team members. This could make healthcare workers less committed to the organization and make them less satisfied with their jobs. If employees are not engaged with organizational citizenship behavior, the existing theory [4] strongly interprets this behavior as leading to job engagement and commitment toward the organization, resulting in a high degree of job termination in the organization.

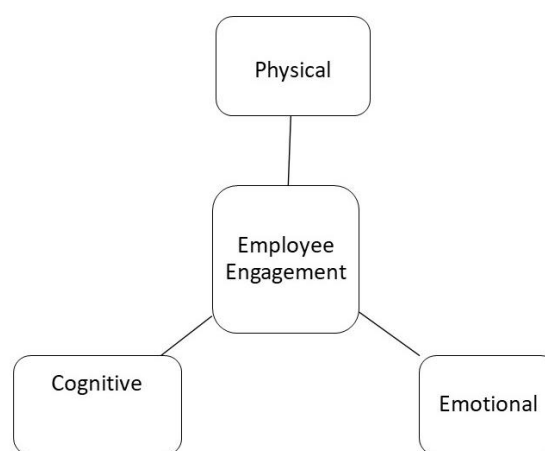
EMPLOYEE ENGAGEMENT

The prevailing study by Nienaber & Martins (2020) [5] has mentioned employee engagement as an "employee's volunteered interest and loyalty in providing a dedicational work performance to organization by means of physically, cognitively and emotionally at the work". Accordingly, an organization's exclusiveness in terms of job reliance, leadership patterns, structure and innovation in the job are the keys to accommodating employees' devotional willingness at work. Three additional psychology-related conditions were created as a result: (1) meaningfulness, which means recognition in the job role, autonomy at work and thought-provoking work design; (2) safety, which is an aspect of social structure that promotes employee trust; and (3) availability, which is the perception of ease of access either physically or psychologically

and ensures the availability of resources. Employees' engagement in an optimistic commitment to the organization is assured by employees' favorable effects on the organization's provisions.

Employee engagement refers to the emotional commitment and active involvement of employees in their work and organization. It encompasses the enthusiasm and dedication that employees exhibit toward their roles, which significantly influences their performance and overall job satisfaction. High levels of employee engagement are associated with increased productivity, lower turnover intentions, and enhanced organizational citizenship behaviors. The study emphasized that fostering a supportive work environment characterized by organizational justice can further enhance employee engagement, leading to positive outcomes for both employees and the organization. Ultimately, engaged employees are more likely to contribute positively to their workplace, improving overall organizational effectiveness [6]. The prior study Nienaber & Martins [5] has noted the dimensions of employee engagement (EE) and listed three main factors perceived as having a major role in employee engagement, namely, physical, cognitive, and emotional factors. Figure 2 represents the dimensions of employee engagement.

FIGURE 2: EMPLOYEE ENGAGEMENT DIMENSIONS



Physical Engagement: This can be explained as the link between increased feelings of confidence and the ability to expend both mental and physical energy at work. When completing their jobs, people exert a certain amount of physical and mental effort. Research has provided examples of employees who, at the time, had a high degree of personal commitment and characterized their job as "floating around."

Cognitive Engagement: To be engaged at the cognitive level, employees must be conscious of the aims and objectives of their employer as well as the level of performance necessary to contribute most effectively to them. Research has also focused on the importance that people place on their job, with the hypothesis that greater knowledge fosters better creativity and confident judgment.

Emotional Engagement: Employees' emotional connections with their enterprises set the stage for their emotional participation. A firm must determine how to make individuals sense of belonging at work to build good relationships. This will motivate them to support the company's vision and core values. Positive interpersonal interactions, teamwork, and the culture of an organization are a few examples of strategies cited as enhancing people's feelings of security and dependability.

Employee engagement is interpreted as a state or condition in which employees are acquired to expose their enthusiasm, passion, energy and dedication at work in addition to employees' reliable commitment to the organization [7]. Other theories recognize employee engagement as an individual choice or preference in illuminating the loyalty and dedication associated with the elements of the job role, organization, managers, and coworkers. As indicated in the existing study by Schieman et al. (2020) [8] has stated that employee engagement is caused by reflections of favored

feelings about the company and predictions of adapting to nature in inconveniences; individuals in EE have proceeded to reform the consequences of solving them rather than withdrawing them. Employees' involvement, commitment, and work performance are closely related to the success of an organization's objectives. To drive employee engagement in organizations, organizations' adoption to provide their best efforts is essential to enhance the efficient operation of the business. Necessary actions can be promoted to offer a healthy psychological climate, decent conditions, the resources needed to do the job, and organizational support. Employee engagement is linked with employees' personal involvement and job fulfillment and employees' positive views of the organization and work. Employees will work better when they recognize positive and safe working places, such as being addressed with respect, having opportunities to advance their careers, earning enough compensation and acknowledgment for excellent work, and engaging in optimistic leadership practices. In health care organizations, every leader's ultimate goal is to be concerned with healthcare professionals and their improvements in caring for patients. Like employees in other industries, health workers also have similar rights to deserve a secured workplace and positive physical and mental support at work. A hospital can potentially have a hazardous work environment, similar to any other place of employment. Research from the Harvard School of Public Health revealed a significant correlation between employee safety and engagement [9]. The standard of patient care and safety can significantly improve when healthcare personnel are highly engaged. However, a significant shift is required for it to occur. Proceeding to the impartment of equal attention in emphasizing the health and safety of patients, concentrating on the wellbeing of healthcare employees is also a dynamic factor in acquiring employee engagement in the health care sector.

ORGANIZATIONAL JUSTICE

Several health care institutions are currently facing difficulty in retaining their employees and upholding organizational justice among healthcare workers. Organizational Justice has been regarded as a predictor of employees' behaviors at any workplace. Employees' loyalty and commitment to the organization can be influenced by the organization's contribution to organizational justice. Organizational justice is the belief that is perceived from the organization's attention to the business and employees. It is correlated with fairness conduct with employees by organizations [10].

In a literature review, Alheety [11] has emphasized the importance of organizational justice as a predictor of both organizational citizenship behavior (OCB) and employee engagement. The research aims to analyze how organizational justice dimensions (distributive, procedural, and interactional justice) influence employee behaviors in organizations. The process includes a thorough examination of the literature to combine current research and frameworks concerning organizational justice and its consequences. The results suggest that OCB and employee engagement are strongly impacted by perceptions of fairness, implying that employees who believe that they are being treated fairly are more inclined to exceed expectations in their work. Nevertheless, the study highlights a lack of empirical research focused on these connections in various organizational environments, particularly in non-Western regions. This highlights the importance of additional research on how different cultural environments can impact perspectives on fairness and resulting actions by employees.

Rahman and Karim's research investigated the significant impact of organizational justice on organizational citizenship behavior (OCB) by considering work engagement as a mediating factor in their literature review [12]. The main goals of the study involve examining the effects of the distributive, procedural, and interactional dimensions of organizational justice on work engagement and OCB. The process includes a quantitative method that uses surveys to gather information from employees in different industries, which is then examined with statistical techniques to discover connections between the factors. The results show a strong link between views on fairness at work and both work commitment and OCB, implying that employees are more inclined to contribute positively to their organization when they believe that they are being treated fairly. However, the study highlights a deficiency in the current literature regarding the intermediary function of job engagement in this association, specifically in varied organizational environments. This emphasizes the importance of conducting additional empirical research to investigate these dynamics and confirm the suggested connections in various sectors and cultural environments.

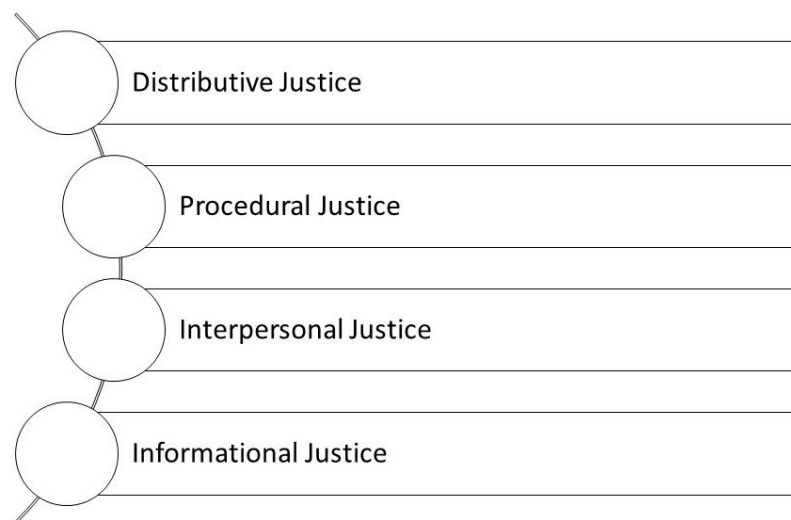
In general, people having organizational justice will react to unjust circumstances and proceed with their actions with justice to solve these circumstances. The four aspects of organizational justice are procedural, interpersonal, distributive, and informational. The following is a short affirmation of interpersonal and informational justice.

Earlier theories have not focused on informational and interpersonal perceptions of organizational justice but have been conversed with interactional justice [13]. Notably, former researchers have integrated informational and interpersonal justice into the dimensions of organizational justice. Later, contemporary researchers included informational and interpersonal justice in the dimensions of organizational justice [14]. Organizational justice is the organization's ability to promote individuals' justice and equity among all employees. At the core, it is influenced by the involvement of wise decisions in company regulations and the ability to conduct fairness while treating employees. Distributive, interactional, procedural and informational justice covered the dimensions of organizational justice. Figure 3 represents the dimensions of organizational justice.

Organizational justice encompasses three main aspects. Distributive justice refers to the perceived fairness of the outcomes received by employees, such as pay, promotions, and benefits, in relation to their contributions and inputs. The procedural justice aspect focuses on the fairness of the processes and procedures used to make decisions. It emphasizes consistency, transparency, and impartiality in how decisions are made. Interactional justice involves the quality of the interpersonal treatment that employees receive during decision-making processes. It highlights the importance of respect, dignity, and effective communication in interactions between management and employees [15].

Together, these dimensions influence employee attitudes and behaviors within organizations.

FIGURE 3. ASPECTS OF ORGANIZATIONAL JUSTICE



Distributive Justice: Distributive Justice is sentenced by individuals' inclination from organization outcomes such as pay, rewards, benefits, promotions, position allocations, and job estimations, which are established with fairness and equity [16]. Individuals' judgments of having received a sufficient number of worthwhile and equitable results are the components of distributive justice. Distributive justice refers to an organization's apparent justness in allocating resources [17]. Distributive justice has been identified on the basis of equity; justness to employees is conducted on the basis of individuals' efforts and accomplishments at work, but it is not linked on an equal basis, i.e., similar considerations to all workers, who fail to consider their determinations in work. Other methods of distributive justice exist in Rawls' theory of justice, and the concepts of utilitarianism, egalitarianism, and libertarianism are the most notable ideas among other perceptions. The philosophy of being utilitarian facilitates rightful actions tending to promote happiness to the individual [18]. The egalitarianism principle focuses on treating people equally and ensuring their accessibility to the required resources and opportunities with an uphold of equality. The principle of liberalism reflects the virtue of regulating freedom to an individual [19]. Similarly, the view of distributive justice depends on individual decisions that lead to acts of equality, equity, freedom, and judiciousness among employees.

Procedural Justice: Procedural justice conducted by Koodamara has referred to employees' perceptions of the ability of organizational procedures to achieve organizational outcomes [20]. These processes are the evaluation factors for operating distributive justice and validate that the outcomes are fair and consistent. In most cases, procedural justice corresponds to a decision-making process that is utilized by individuals and is more directly tied to the individual's evaluation or the structural aspects of an organization. Individuals become less loyal to the organization, are less satisfied with the products and services it provides and are more likely to leave if the decision-making process is not open and transparent. When individuals who hold the same position are offered different compensation and salaries, individuals inside organizations may perceive a lack of distributive justice, which may lead to a decline in both their performance and their satisfaction with their jobs.

Interpersonal Justice: Interpersonal justice is the perception of employees related to behavioral outcomes [21]. This concept stems from the fact that it incorporates emotions into the dynamics of interaction, which is interpersonal justice and is a crucial sign of social interaction, which occurs between employees and managers. Since interpersonal justice is social in essence and personally connected, it is the central predictor of positively exchanged behaviors among employees. Interpersonal justice refers to organizations' attentive awareness of employees' emotions and personalities. This is also relevant to how coworkers and supervisors treat each other as well as how managers treat members of their teams. Setting up rules of conduct is essential to ensure that employees are handled with utmost respect and that the firm is recognized as a just and secure workplace.

Informational Justice: Informational justice is displayed from the organization's ability to provide reliable and viable information to employees. In further collectivism-based Eastern countries theories, interactional justice contributed significantly more to employees than did other aspects of Organizational Justice. The shared information proposed by higher officials is related to mindfulness and is approachable with respect to employee concerns. Informational justice examines whether a procedure or rationale is accurately conveyed when providing information and may thus have a significant influence on how decisions are made and, moreover, build trust and enhance reliable connections with subordinates. Emphasizing messages on the basis of speed, precision, and sincerity are also important factors in ensuring informational justice. Informational justice determines the satisfactory and reachable provision of information from an organization to employees [22].

CONCEPTUAL FRAMEWORK

The preceding study conducted by Kheiri et al. [23], a conceptual framework for understanding organizational justice has predicted that organizational citizenship behavior (OCB) and employee engagement in the healthcare sector is built on three primary dimensions: distributive justice, procedural justice, and interactional justice. Distributive justice pertains to the perceived fairness of outcomes, such as pay and promotions, ensuring that employees feel adequately rewarded for their contributions. Procedural justice focuses on the fairness of the processes through which decisions are made, emphasizing consistency, transparency, and ethicality in decision-making. Interactional justice involves the quality of interpersonal treatment employees receive from management, highlighting respect, dignity, and effective communication. Together, these dimensions create an environment where employees who perceive fairness are more likely to engage positively with their organization, exhibit higher levels of OCB, and demonstrate greater employee engagement, ultimately enhancing overall organizational effectiveness in the healthcare sector.

Organizational justice, a predictor of organizational citizenship behavior

The conventional research conducted by Alheety [11] have found a positive relationship between individuals' perceptions of organizational justice and organizational citizenship behavior, and several studies have shown that organizational justice significantly affects employees' organizational citizenship behavior. It has also been theoretically proven in theories such as social change theory, fairness theory, and equity theory. It also observed that employees are more likely to voluntarily engage in organizational citizenship behavior when they feel they are being treated fairly by their colleagues and leaders within the organization. Employee job satisfaction and determined support to the organization are characterized by the willingness to perform for added services. Therefore, they are more likely to support and help

their coworkers in the growth of the organization; simultaneously, individuals' organizational citizenship behavior can effectively affect team performance. Studies have shown that the development of organizational citizenship behavior among employees is driven by the execution of the organizational justice of the organization.

However, with an individual's subjective perception of unjust treatment, they may decide to counteract the unfair by limiting the input. They do not frequently choose inputs that are directly related to work productivity because doing so may reduce their future compensation. A previous study by Alheety [11] has revealed that, with the exception of procedural justice, other dimensions of organizational justice impact organizational citizenship behavior among nurses. In contrast, Jameel has revealed that three other components of organizational justice undertaken in the workplace effectively acquired organizational citizenship behaviors among Iranian nurses [24]. In accordance with the findings of healthcare organizations in Pakistan, practices of organizational justice in organizations strongly impact organizational citizenship behaviors among nurses. Another study conducted by [25] Chegini has reported that several health care institutions perceived the effect of organizational justice on employees' organizational citizenship behavior.

Organizational justice, a predictor of employee engagement

Several researchers reported that distributive, procedural Justice had a favorable association with EE. A prevailing study Mengstie [21] has revealed that distributive justice and procedural justice strongly impact turnover intentions among workers in the health care industry. Many healthcare professionals leave the organization because of the organization's lack of organizational justice among employees. Another study by Lambert et al. (2020) [16] has assessed employee engagement in relation to organizational justice and revealed that organizational justice had a positive effect on employee engagement. Moreover, the results of the analyzed studies revealed that organizations resulted in high productivity and a high rate of customer satisfaction from the implementation of proper organizational justice practices. Further theories have shown that organizational justice is a provoking action to conceive of employee engagement among employees and ensure that organizational objectives are accomplished effectively through employees' high-quality performance and engagement with customers. As mentioned in the existing study O'Connor & Crowley-Henry (2019) [26], conducted in countries such as India, Pakistan, and Egypt have reported similar findings on the positive relationship between organizational justice and employee engagement. Moreover, the findings of the study revealed strong associations among distributive justice, work engagement and organizational involvement. The prevailing studies by Chegini [25] have examined the association between nurses' organizational commitment and their effectiveness in terms of work performance, including job satisfaction, and the analysis revealed a positive impact on nurses' organization commitment in the case of job-satisfied nurses. Interpersonal justice is positively related to employees' organizational commitment, yet the study indicated that organizational justice and organizational commitment are not connected directly; however, the study revealed that job satisfaction plays a mediating role in the positive correlation between organizational justice and employee engagement. Furthermore, among the aspects of organizational justice, procedural justice has a major impact on the job satisfaction of employees. Moreover, perceptions of fairness and reliable organizational regulations improve the range of job satisfaction among nurses. Distributive justice is positively correlated with both the work engagement and organizational citizenship behavior of employees in health care sectors. In another study on the subject, organizational justice was demonstrated to have a favorable relationship with employee engagement. Therefore, organizational justice improves nurses' self-efficacy and increases the probability of positive effects on nurses' job satisfaction; moreover, organizational justice processes can influence employee engagement among nurses. Similarly, it stated that organizational justice has a positive connection with the engagement of employees in her research on the healthcare industry.

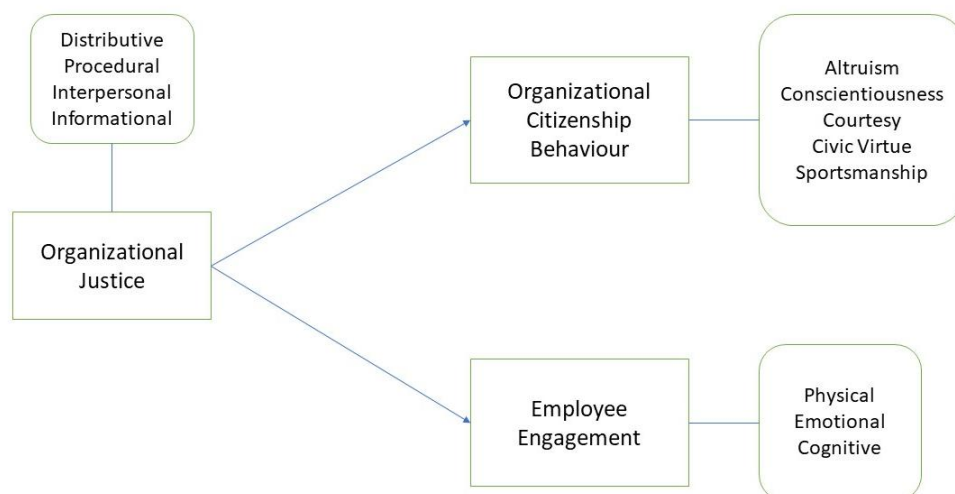
Employees are more inclined to be willing to engage in the job that they do for an organization if they believe that the processes that are used to assess performance are fair. This means that employees believe that the ways in which decisions are made within an organization appear to be in alignment with the procedures followed by the organization. When employees are said to have experienced interactional justice, they perceive that the way in which their superiors and coworkers engage with them is fair and just. Individuals are more likely to want to follow the directions of a supervisor who treats you with the required respect and dignity, and individuals are also more inclined to work collectively with

their colleagues to achieve the goals of the organization, thereby becoming increasingly involved in the work that they are assigned to when they have coworkers and supervisors who treat you with such dignity and respect.

Organizational citizenship behavior and employee engagement

A prevailing study Uddin et al. (2019) [27] has revealed that organizational citizenship behavior plays a significant role in individual work performance and team performance. Both organizational citizenship behavior and employee engagement are likely to indicate similar aspects of volunteer behavior. Several studies have considered organizational citizenship behavior as a part of employee engagement, where organizational citizenship behavior, specified as service-role volunteer behavior, and employee engagement are considered combined roles of service-role and in-role volunteer behavior. The findings revealed higher levels of organizational citizenship behavior participation among employees at travel companies. Several studies have shown that organizational citizenship behavior is a predictor that influences employee engagement and team performance in organizations. The preceding study Grego Planer (2019) [28] have shown that organizational commitment influences organizational citizenship behavior, suggesting that organizations should develop organizational justice actions for employee commitment to enhance organizational citizenship behavior among employees. Furthermore, the study also confirmed that employee engagement can be influenced by organizational commitment; ultimately, employees' OCB increases among employees. Hence, individual employee engagement impacts team performance through volunteer cooperative behavior toward the team. A previous study Shen et al. (2023) [29] has assessed the organizational citizenship behavior of nurses in terms of associations among work engagement, interpersonal engagement, and benevolence in leadership. The findings revealed that a benevolent leadership style among head nurses affects work and team engagement. The study suggested that head nurses improve benevolent leadership quality to enhance organizational citizenship behavior among nurses. Another study reported that emotional assistance from head nurses assessed nurses through work engagement. In addition, the findings point to the existence of a positive and substantial association between engagement in one's job and helping with behavioral changes among nurses. The results of these studies show that a considerable positive connection between organizational citizenship behavior and employee engagement enhances organizational effectiveness.

FIGURE 4. CONCEPTUAL FRAMEWORK [23]



The conceptual framework presented in this study (Figure 4) demonstrates that aspects of organizational justice, which include distributive, informational, procedural, and interpersonal justice, act as predictors of the intellectual and social affective dimensions of employee engagement, as well as the altruism, civic virtue, courtesy, sportsmanship, and conscientiousness dimensions of organizational citizenship behavior. According to previous findings, the function of organizational justice as a predictor variable leads to improvements in organizational effectiveness, productivity, work satisfaction, and long-term commitment on the part of employees.

RESEARCH GAP

The research gap identified in Alheety (2020) [11] highlights the need for further exploration into the specific dimensions of organizational justice and their distinct impacts on organizational citizenship behavior. Additionally, comprehensive studies examining how contextual factors influence these relationships, particularly in diverse organizational settings, are lacking. The research gap identified in Ali (2021) [19] highlights the need for further investigation into the specific factors influencing knowledge sharing among undergraduate students, particularly in diverse educational contexts. Additionally, comprehensive studies examining the interplay between personal, social, and institutional factors that affect students' willingness to share knowledge are lacking.

The research gap identified by Chegini 2019 [25] emphasizes the need for further exploration of the interplay between organizational commitment, job satisfaction, organizational justice, and self-efficacy, specifically among nurses in diverse healthcare settings. Additionally, studies examining how these factors influence each other over time and their combined effects on nursing performance and retention highlights the need for further exploration of the mediating role of organizational justice in the relationship between responsible leadership and employee turnover intention, specifically within the healthcare sector. Additionally, studies examining how different dimensions of organizational justice may impact this relationship across various healthcare settings are lacking.

The research gap Lambert [16] highlights the need for further investigation into the specific effects of distributive and procedural justice on job satisfaction and organizational commitment among correctional staff across different correctional environments. Additionally, studies examining how these forms of organizational justice interact with other variables, such as work-related stress and staff turnover intentions, are lacking. The research gap Rahman [12] emphasizes the need for further investigation into the specific mechanisms through which organizational citizenship behavior (OCB) contributes to company growth and development. Additionally, studies examining the contextual factors that may influence the relationship between OCB and organizational outcomes across different industries are lacking.

DISCUSSION

The research and review on organizational justice as a predictor of organizational citizenship behavior and employee engagement in the health sector emphasizes the critical role that perceptions of fairness play in influencing employee behavior and engagement levels. Organisational justice refers to perceived fairness in workplace processes, interactions, and outcomes. It is categorized into three dimensions: distributive justice and procedural justice. Interactional justice. Research indicates that higher levels of perceived organizational justice correlate positively with employee engagement. Engaged employees are more likely to exhibit OCB, which includes going beyond their formal job roles to contribute positively to the organization. This relationship is particularly significant in healthcare settings where employee morale directly impacts patient care quality [30].

OCB is essential in health care, as it encompasses voluntary behaviors that enhance organizational effectiveness. Employees who perceive high organizational justice are more inclined to engage in OCBs, such as helping colleagues, being involved in extrarole activities, and advocating for the organization. This behavior not only improves team dynamics but also fosters a supportive work environment, which is crucial for managing the high-stress conditions often found in healthcare. Transparent communication ensures that employees are informed that the decision-making process can enhance their perception of procedural justice. Recognition programs that acknowledge employees' contributions can improve feelings of distributive justice. Equipping leaders with skills to foster inclusive environments can enhance interactional justice [31].

Despite the positive correlations, challenges remain. Higher turnover rates in healthcare, exacerbated by burnout and stress, can undermine efforts to cultivate engagement and OCB. Organizations must address systematic issues such as workload management and provide adequate support systems to retain engaged employees. This discussion underscores

the necessity for healthcare leaders to recognize the intricate link between justice perceptions, employee engagement, and organizational citizenship behaviors to drive performance and improve patient outcomes effectively [32].

PRACTICAL IMPLICATIONS

The practical implications of organizational justice as an indicator of organizational citizenship behavior and employee engagement in the healthcare sector emphasize various consequences for healthcare organizations. By highlighting the significance of perceived organizational justice, healthcare leaders can cultivate a fairer and more transparent workplace, which is essential for increasing employee trust and morale. Adopting equitable policies and practices can enhance organizational citizenship behavior, prompting employees to exceed their job expectations, which in turn enhances patient care and overall organizational performance. Moreover, fostering a culture of equity can increase employee involvement, resulting in reduced turnover rates and increased job satisfaction for healthcare workers. Emphasizing organizational justice not only aids employees but also enhances patient outcomes and improves overall effectiveness within the healthcare industry.

Furthermore, focusing on the aspects of organizational justice, distributive, procedural, and interactional can assist healthcare leaders in customizing their approaches to address the unique needs of their staff, leading to a more dedicated and driven team.

CONCLUSION

This study emphasizes the critical role that perceptions of organizational justice play in influencing employee behavior and engagement in healthcare settings. Research highlights that when healthcare professionals perceive fairness in organizational processes, such as resource distribution and interpersonal treatment, they are more likely to exhibit positive behaviors, including organizational citizenship behavior (OCB) and higher levels of engagement. This relationship underscores the importance of implementing policies that foster a fair work environment to increase employee satisfaction and commitment. The study calls for healthcare organizations to prioritize organizational justice in their human resource management strategies, as doing so can lead to improved employee morale, reduced turnover intentions, and ultimately better patient care outcomes. The originality of this research lies in its focus on the unique dynamics within the healthcare sector, providing valuable insights for both academic and practical applications in enhancing organizational effectiveness.

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EVALUATION OF COMPETENCE LEVELS OF HEALTHCARE MANAGEMENT GRADUATES BY EMPLOYERS

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ABSTRACT

The competencies and skills that healthcare management graduates must have need to be constantly updated due to the dynamism of the healthcare industry. Understanding employers' perspectives on graduates' professional competencies, which provide employment opportunities for healthcare management graduates, can provide valuable insights to both universities and students. The aim of this study is to determine how the professional competency levels of healthcare management graduates are evaluated by employers, to identify the key attributes sought in graduates. Semi-structured face-to-face interviews were conducted with 10 participants identified using a criterion sampling method. The research group consisted of human resources managers working in private hospitals. A qualitative research method was employed in the study, and analysis of the data revealed five themes. The findings can provide guidance for curriculum updates in universities and employment processes in hospitals.

KEYWORDS

Employment, healthcare management, professional competence

INTRODUCTION

Healthcare management, a specialized discipline within management science, incorporates finance, strategic planning, human resources management, information technology, and quality control. Its objective is to organize healthcare institutions effectively, ensuring the delivery of services with high effectiveness, quality, efficiency, and sustainability [1]. It is also defined as the process of planning, organizing, mobilizing, and controlling financial and human resources for the supply of health services to protect and improve the health levels of individuals and societies [2]. A high-performing and effective healthcare system also requires effective healthcare management [3]. Those responsible for implementing this effective management are healthcare managers.

A healthcare manager is defined as someone who graduates from faculties/schools of universities offering undergraduate education in departments such as "Healthcare Administration," "Healthcare Management," "Healthcare Institution Management," "Healthcare Administration," or "Healthcare Facility Administration." Their title is Healthcare Manager / Healthcare Administrator [4]. The job description of healthcare managers was made in 9 articles in the Official Gazette (Türkiye) dated May 22, 2014 [5].

It is important that healthcare managers have the qualifications to perform their duties. Because central examinations are required for employment in public institutions, these qualifications are even more critical for the private sector, which offers a wide range of opportunities for healthcare managers. The aim of this study is to evaluate the general situation of healthcare management graduates, who will be employed in the private sector, in Türkiye by human resource managers.

HEALTHCARE MANAGEMENT AND EMPLOYMENT

The number of universities offering undergraduate education in healthcare management has increased over the years. Correspondingly, the number of graduates has also risen significantly. While the number of graduates was 581 between 2012 and 2013, it increased nearly fivefold by 2022, despite a slowdown in its growth rate by 2018 [1]. However, in a study conducted with 255 healthcare management graduates, it was found that 58.8% of the graduates were not employed, while approximately 41% of those who were employed were employed in their field, with an employment rate of 66.7% [5]. For students currently enrolled in or graduating from the healthcare management department, it is essential to know what the actual competence needs of the sector are, considering the low employment rates. To accurately identify these needs, evaluations from human resources managers who provide employment in the field are crucial.

METHODS

A qualitative research method was used in this study and was planned as a case approach. The purpose of qualitative research is to reveal experiences and understandings [6]. A case study involves the comprehensive investigation of various factors related to a situation, such as the environment, individuals, duration, or events, aiming to determine their effects on the situation and how they are affected by it [7]. Case studies also seek to include multiple perspectives, making it possible to highlight areas of consensus and conflict [8].

As the research aims to determine the competencies of graduates, human resources managers, who play a key role in the employment of graduates, have been consulted. Since recruitment processes in public hospitals proceed through centralized exams, only human resources managers working in private hospitals were included in the study. Interviews were conducted with 10 human resources managers working in private hospitals. Since 10 in-depth interviews are considered sufficient for homogeneous populations [9], the study was limited to 10 participants, as data saturation was deemed to have been reached. Participants included in the research were determined using criterion sampling, as a purposive sampling method that focuses on similarities and narrows the differences [10]. The information on the research participants is seen in Table 1. The interviews were conducted between January and May 2023.

Ethical approval for the study was obtained from the Üsküdar University Non-Interventional Research Ethics Committee on December 30, 2022.

TABLE 1: INFORMATION ABOUT THE PARTICIPANTS

Participant Code	Gender	Experience
P1	Woman	20 years
P2	Woman	5 years
P3	Man	13 years
P4	Woman	5 years
P5	Woman	15 years
P6	Woman	10 years
P7	Man	7 years
P8	Man	15 years
P9	Woman	20 years
P10	Woman	15 years

DATA COLLECTION

The literature review was conducted to establish the theoretical background and develop questions for one-on-one interviews. Based on this review, researchers created a semi-structured interview form with the questions. The questions included are as follows:

1. Which areas within hospitals do you employ healthcare management graduates the most?
2. What are the competencies most needed in the field of healthcare management?
3. Considering the competencies of healthcare management graduates, what are their strengths and areas that need improvement?
4. As a healthcare manager, what can you say about the future of the healthcare management profession?

General information about the study was provided to the participants before the interviews, and appointments were requested. They were informed that voice recorders would be used as data collection tools and that the interviews would be listened to only by the researchers and that confidentiality would be ensured by encrypting their names. The interviews were conducted face-to-face at locations and dates determined by the participants. The duration of the interviews ranged from 20 to 40 minutes. With participants' verbal consent, the interviews were recorded using audio recording devices.

DATA ANALYSIS

Content analysis was used to analyze the data obtained in this study. The audio recordings were transcribed into written format by the researchers on a computer after the interviews. The audio recordings were listened to and read again by the researchers to increase the reliability and validity of the transferred data. NVivo 14 software was utilized for analysis. The raw data sets were imported into NVivo 14, and content analysis was conducted. Initially, the data sets were read, and elements relevant to the purpose of the research were coded in the "codes" section of NVivo 14. Different codes were then grouped under specific categories. These categories were examined in terms of conceptual similarities and differences, related ones were grouped together, and main themes were identified.

RESULTS

After analyzing the participants' statements, five themes have been identified. These themes are as follows: graduate employment unit, required professional competencies in graduates, strengths of graduates, weaknesses of graduates, and perspectives on the present and future of the profession.

RESULTS OF THE GRADUATES' EMPLOYMENT UNIT THEME

Given that graduates can play critical roles in managing and improving the complex structure of the healthcare sector, the units in which graduates are employed after graduation are important both for hospitals and for graduates to achieve their career goals.

All participants expressed that graduates were employed in any administrative unit within the hospital as needed. However, some participants have stated that it is necessary for graduates to work at the lowest administrative levels of healthcare institutions to have the competence to take on critical roles, and therefore, the highest employment rate is in inpatient services units. When participants responded to questions about employment, they also expressed their opinions about the career paths of the participants. Some participants criticized this situation by expressing their belief that especially new graduates can assume managerial roles without experience. Another topic mentioned by the participants in this context was promotion. They stated that health management graduates could take part in higher levels because of their achievements. Sub-themes, codes, quotations and the number of participants expressing their thoughts on the **sub-themes (N)** and their **frequencies (F)**, are shown in Table 2.

TABLE 2: INFORMATION ON THE GRADUATES' EMPLOYMENT UNIT THEME

Sub-Themes	Codes	Quotations	N	F
Patient services unit		"We honestly see starting inpatient services as more appropriate since it is the foundation of the job." (P3)	9	16
All administrative units in the hospital		They can be employed in all administrative levels involving management. In reality, they are. They could. There's no obstacle to this." (P6)	10	19
Career path of graduates				
	Experience	"When they graduate from university, people seem to think as if they'll just 'put me in the chair as a manager.'" (P1)	6	21
	Promotion	"So, the hierarchy goes like this: patient advisor, counter team leader, patient services supervisor, assistant manager of patient services, manager, and up to the level of directorship. Moreover, lateral transitions are also possible." (P9)	9	28

RESULTS OF THE COMPETENCIES REQUIRED IN GRADUATES THEME

The success of healthcare management graduates in obtaining positions and contributing effectively to the sector, increases with the competencies they have. These competencies are important not only for the individual employment of graduates but also for various issues such as the efficient operation, sustainability, quality, policy development, improvement of healthcare service delivery, and enhancement of public health in healthcare systems. Participants have expressed these competencies in two different ways: as individual and professional competencies.

Participants emphasized individual competencies they seek in graduates as self-confidence, discipline, self-awareness, patience, and openness to learning. The most frequently mentioned topics by participants were openness to learning and self-awareness. Codes, quotations and the number of participants expressing their thoughts on the codes and their frequencies, are shown in Table 3.

TABLE 3: INFORMATION ON THE INDIVIDUAL COMPETENCIES SUB-THEME

Sub-Theme	Codes	Quotations	N	F
Individual competencies				
	Discipline	"What will set you apart from others? Well, it will be your self-confidence." (P6)	4	8
	Self-awareness	"Let them do their internships in that direction in order to specialize, get to know themselves, and let us get to know them." (P9)	4	14

	Patience	"Patience is necessary. They will see the rewards of these in the later stages. Patience, communication, and dedication are the criteria that should be present in people who want to do this job." (P8)	6	12
	Confidence	"What will set you apart from others? Well, it will be your self-confidence." (P6)	3	13
	Openness to learning	"They should be open to self-improvement, open to learning, constantly following innovations in terms of technology and science because the system is constantly renewing itself in some way. It is very important for us that they have these competencies." (P4)	8	14

Participants also mentioned computer knowledge, leadership qualities, teamwork proclivity, knowledge of legislation, knowledge of foreign languages, following innovations, management skills and communication elements as the professional competencies that graduates should have. The most frequently mentioned issue under this sub-theme was communication skills. Codes, quotations and the number of participants expressing their thoughts on the codes and their frequencies are shown in Table 4.

TABLE:4 INFORMATION ON THE PROFESSIONAL COMPETENCIES SUB-THEME

Sub-Theme	Codes	Quotations	N	F
Professional competencies				
	Computer skills	"If their computer usage is good, if they can use Excel, Word, PowerPoint effectively, then it will take them just a few days to learn another program." (P5)	2	2
	Teamwork	"I think the most important thing is to be someone with a high sense of teamwork." (P2)	5	7
	Leadership trait	"If they are going to work in management, they need to strengthen their leadership qualities a bit." (P10)	4	7
	Regulatory information	"They should know the healthcare system, they should know the Ministry of Health's strategic plans, that's very important. There is a guideline for private hospitals, you know. All healthcare management graduates should know this." (P7)	6	8
	Foreign language	"There are very few healthcare management graduates who can actively use a foreign language they know. So, I think foreign language proficiency is a very important competency." (P6)	6	11
	Innovation tracking	"They need to be very open to innovation." (P5)	7	12
	Management skill	"Management is essentially a matter of character. Not everyone can be a manager; it requires having the skills to manage people." (P9)	8	26
	Communication	"Communication is everything; the healthcare sector is a service sector that requires communication with patients, with staff. Everyone is	9	32

		<i>working with people. Since they are not working with machines, they should try methods to improve their communication." (P8)</i>		

RESULTS OF THE STRENGTHS OF GRADUATES THEME

Knowing the strengths of healthcare management graduates and their ability to use these qualities are important for them to be effective and successful professionals in the sector. Participants discussed the strengths that differentiate healthcare management graduates from other candidates and expressed their views on sub-themes as sectoral motivation and familiarity, suitability of course content, and technological knowledge. Sub-themes, codes, quotations and the number of participants expressing their thoughts on the codes and their frequencies, are shown in Table 5.

TABLE 5: INFORMATION ON THE STRENGTHS OF GRADUATES THEME

Sub-Themes	Quotations	N	F
Course content suitability	<i>"A person graduating from healthcare management becomes proficient in many ways in every field. They learn to do calculations, analyses, the human resources process... It's already a separate course shown over two terms. Patient rights, patient services, quality processes are all part of the curriculum, so someone graduating from healthcare management can already work in all these areas." (P4)</i>	7	11
Sectoral motivation and familiarity	<i>They come with an advantage. When you graduate from a very specific field like healthcare management, you've essentially already made a decision to pursue a career in healthcare. Yes, they might not have decided on the specific field, but they've decided to be within the healthcare sector and they start focusing on this field. That's why their motivation towards the sector is high." (P6)</i>	8	17
Technology knowledge	<i>"Now, if we come to their strengths, I can definitely say technology." (P3)</i>	5	6

RESULTS OF WEAKNESSES OF GRADUATES THEME

It is important for people to be aware of their weaknesses for continuous self-improvement and a more effective career management. People who are aware of their weaknesses and try to strengthen these areas will both experience how to cope with difficulties professionally and increase their personal satisfaction. In this context, participants expressed the aspects of healthcare management graduates that are open to development under the headings of education-based deficiencies, individual deficiencies and the weakness in sector-university cooperation.

Participants mostly focused on the lack of career goals and lack of self-awareness as individual deficiencies. They also expressed the graduates' negative view to patient services, lack of concentration and lack of communication. Among the education-based deficiencies, the participants mostly focused on the lack of internship experiences and mentioned the following topics: insufficient foreign languages, lack of field knowledge, misdirection of the academy and insufficient technology knowledge.

The last topic mentioned by the participants regarding the weaknesses of graduates was the weakness in sector-university cooperation. Sub-themes, codes, quotations and the number of participants expressing their thoughts on the codes and their frequencies, are shown in Table 6.

TABLE 6: INFORMATION ON THE WEAKNESSES OF GRADUATES' THEME

Sub-Themes	Codes	Quotations	N	F
Individual deficiencies				
	Lack of career goals	"As far as I see, there are no people in the current environment who have high promotion goals." (P10)	4	10
	Lack of self-awareness	"Unfortunately, we are not in a good situation overall. In other words, we lack communication skills, foreign language skills, a previous internship and knowing what we want to start an institution." (P6)	3	10
	Negative view to patient services	"You know, it happens like this, I am a graduate of healthcare management. "For example, they want to start directly as a manager, not inpatient services, or they want to start directly as a manager." (P3)	6	9
	Lack of concentration	"Environmental conditions, technological advancements, work focus, individualization processes, and economic downturns are all distracting factors. We can clearly observe this in the people who come to us." (P2)	1	2
	Lack of communication	"Unfortunately, we are generally not in a good state. We lack communication skills, foreign language proficiency, prior internship experience, and clarity on what we want when applying to an institution." (P6)	4	8
Education-based deficiencies				
	Misdirection of the academy	"Because, unfortunately, our friends who receive training also have theoretical conflicts with the training they receive in some things. There are certain differences between what he sees in theory and the education he receives at school. To give an example, someone who does not come into contact with a patient, does not really see him with his own eyes, but only tries to do what he hears and what is explained to him. More precisely, a managerial candidate. Because he doesn't see this, because he hasn't experienced it, he can be kind of stunned at that moment. He may not be able to choose his answers correctly. Experience is very important for this." (P8)	5	6

	Lack of field knowledge	"Now, it is very unlikely that a person in an institution can be told that you are actually suitable for purchasing, that is, a new graduate with no experience/no internship experience can make such a determination and evaluate him/her in that field." (P6)	7	11
	Lack of internships	"At least one internship experience. For example, they say that it coincided with the pandemic and we could not do an internship. So, of course, this situation becomes less preferable." (P10)	6	13
	Insufficient technology knowledge	"I took numerous courses, from finance to cost accounting. However, we could have learned more about technology. For example, emerging fields like artificial intelligence were never covered. The curriculum could have included more technology-focused courses." (P4)	2	2
	Insufficient foreign language	"There are many deficiencies in the field of foreign languages. So maybe this is the general problem of our country." (P1)	6	11
Weakness in sector-university cooperation		"This is why education at university is important. If the managers working in the field have a voice in those universities, they can tell them about the real life in the field." (P9)	5	8

RESULTS OF THE PRESENT AND FUTURE OUTLOOK OF THE PROFESSION THEME

In order to make a situation assessment regarding the employment of healthcare management graduates, perspectives on both the current problems faced by healthcare management graduates and the expectations and opportunities for the future of the profession are important. With this information, it will be possible for graduates to strengthen their current positions in business life and shape their decisions regarding career paths correctly. This situation was also expressed by the participants, and the last theme determined was about the present and future outlook of the profession. In this context, participants expressed their opinions under the headings of excess quantity, positive progress, suggestions and low wages. Codes, quotations and the number of participants expressing their thoughts on the codes and their frequencies are shown in Table 7.

TABLE 7: INFORMATION ON THE PRESENT AND FUTURE OUTLOOK OF THE PROFESSION THEME

Sub-themes	Quotations	N	F
Excess Quantity	"There were serious problems in finding experienced and educated managers in the sector. But it was few at that time. In other words, it was a handful of people who did this job properly. But now there are thousands of graduates, thousands of people." (P6)	5	7
Positive Progress	"In other words, the future of the healthcare management profession is very bright, it is a right professional group, and the successful healthcare management graduates will continue their lives as mid-to-senior level managers in hospitals in the future. Those	9	29

	<i>who fail will continue their processes as technical personnel at a certain level." (P7)</i>		
Suggestions	<i>"Analytical thinking and stress management, especially in the health sector, whether it is a graduate or student of health management, is very important. Candidates should be develop their solution-oriented aspect rather than problem-oriented aspect." (P3)</i>	6	14
Low wages	<i>"Unfortunately, we are financially lower than other sectors." (P4)</i>	4	5

DISCUSSION

As a result of this study, it was determined that healthcare management graduates are employed in all administrative units in hospitals, but especially new graduates are preferred primarily in the patient services unit so that they can master hospital processes.

Consistent with our research findings, when we look at the results of a study conducted with 255 healthcare management graduates, it was determined that 35.3% of healthcare management graduates working as civil servants and 34.8% of healthcare management graduates working as contracted personnel worked in the secretary position [5]. It is believed that working in the patient service unit will help new healthcare management graduates learn about the hospital, observe, and obtain experience quickly. Patient services need more staff often. The human resources managers we interviewed said the patient services unit is seen as a human resources pool, that other administrative units try to fill personnel shortages with people from the unit, and that healthcare management graduates are preferred. Inexperienced and new graduates should view the patient services unit as an opportunity to gain experience and demonstrate their skills.

In this study, the most wanted individual competence in a healthcare management graduate by the participants was determined as openness to learning. At the same time, patience, self-awareness, discipline and confidence are among the individual competencies mentioned. The most frequently mentioned topic within the scope of the theme of competencies sought in graduates was communication. Management skills, innovation track, knowledge of foreign language, regulatory information, teamwork, leadership traits and computer skills were also mentioned as professional competencies sought by the participants. Similar to our research, a gradual weight evaluation ratio analysis study determined the performance criteria for health institution managers, including learning, human relations and communication skills, decision-making, and teamwork [11]. Within the scope of another study carried out to determine the qualifications sought in the field of medical accounting expertise in Turkey, advertisements containing the phrase "medical accounting specialist" were searched on five different career sites. When the 24 job postings were examined, communication and teamwork, up-to-dateness, openness to innovation and learning, management and leadership, self-confidence, automation and mastery of office programs were among the sought-after qualifications [12]. In another study investigating the employability skills of healthcare managers, a survey was conducted to a total of 38 managers working in senior healthcare management positions in New South Wales regarding the employability skills of new graduates, and the topics such as teamwork, written and verbal communication skills and self-awareness were rated by the participants. was among the topics mentioned. In parallel with our study, this study also stated that the most important employability criterion for new graduates is communication skills [13]. In another study where focus group interviews were held with middle and senior managers, communication skills and relationship management were among the basic duties that managers should fulfill [14]. In the light of this information, it can be said that healthcare management graduates' being open to learning and having strong communication skills will positively affect employment rates.

This study's participants indicated healthcare management graduates' strengths are sectoral motivation, familiarity, course material fit, and technology expertise. A study of 150 students in health institution management and health

institution management found that 50% were satisfied with their departments and had high expectations and motivation for the department and courses [15]. Research in Italian public health schools found that motivation was one of eight critical qualities [16]. According to other studies [17,18], healthcare management students were satisfied with their departments. Similar outcomes as our study. Thus, student happiness with their departments and employer evaluation of high sectoral motivation in graduate employment overlap.

Participants in this study assessed healthcare management graduate employees' individual and education-based limitations. The inability to know oneself and lack of career goals were the most common personal flaws. Other topics included an unfavorable opinion of patient services, poor communication, and lack of concentration. Similar to our study, a study examined the relationship between healthcare management graduates' self-efficacy and their employment status, finding that those with a profession had higher self-efficacy [5]. In light of these results, it can be said that it is a disadvantage for graduates to want to become managers immediately without gaining experience. Strong communication skills are indispensable features in this professional group that deals with people. At the same time, knowing oneself and having realistic career goals will increase one's motivation in business life.

Lack of internships was the most common education-related deficiency. A survey of 145 healthcare management students found that they believed a good internship would boost their business performance [19]. A qualitative study of 12 healthcare management graduates in Turkey found that healthcare management education needs a quality application process and that there is a lack of practice [20]. Participants reported a lack of field knowledge, foreign language abilities, misdirection by the academy and lack of technology knowledge. In another study of 86 healthcare managers in the Western Mediterranean region, human resources management, financial management, and accounting were the most obvious deficiencies of healthcare managers trained in health institutions, as well as information technologies, health law, quality accreditation, financing, health economics, and health policy. In the same research, "managers who receive healthcare management training are sufficient to find solutions to the problems encountered in the field." 53.5 percent of managers said they agreed. Managers added, "The involvement of people who have not received healthcare management training in hospital management causes waste of resources and managerial deadlocks." Key findings include 32.6% agreeing and 33.7% strongly agreeing [21].

The opinions of most human resources managers, to whom we asked their opinions about the present and future of the profession, were positive, and the most frequently mentioned topic in this theme was the positive progress of the healthcare management department. Apart from this, the topics of excess quantity and low wages were among the other issues mentioned by the participants. In another study in which the educational and academic structure of the healthcare management department was examined in line with our study, it was stated that the biggest shortcoming of the department was the inability to plan for the future and the lack of appropriate employment of graduates, and it was stated that the necessary measures should be taken to reduce the current quotas and avoid overcrowding rather than ensuring a quantitative increase [22]. This result appears to coincide with the important issues emphasized by the human resources managers in our study.

CONCLUSION

Healthcare management graduates have many hospital career options, according to our study. As a career starter, the patient services unit can provide experience. Hospital human resources managers appreciate healthcare management graduates who are open to learning and have good communication abilities. Hospital management needs to adapt to rapid change in every field. Healthcare management graduates are also preferred over other graduates due to their sector understanding and education.

It was emphasized that on-site internships throughout university education should be more efficient and successful. Active internships will help graduates learn about the field and plan their careers. To gain a large proportion of health tourism, Turkey must immediately address graduates' foreign language skills. In university departments, hiring qualified academics

with healthcare management experience will solve the problem of misdirection by the academy. Healthcare management schools should consider these and other proposals to boost graduate employment and quality.

Authorship Declarations

Authors declare that they contributed to the drafting, design, collection and interpretation of the necessary study of the study.

Conflicts of Interest

The authors declared that they have no conflict of interest with any person or institution related to the study.

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THE IMPACT OF OPENING A PRIVATE HOSPITAL EMERGENCY DEPARTMENT ON THE HOSPITAL AND PATIENT CHARACTERISTICS

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ABSTRACT

INTRODUCTION

Australian public hospital emergency departments (EDs) are under increasing pressure with higher patient volumes, failure to meet triage target times and increased ambulance wait times. Further, there is limited literature exploring how the opening of an ED affects Australian hospitals. This study focuses on Hollywood Private Hospital (HPH), a large private hospital in Western Australia which opened their ED in November 2021. The research aimed to examine how the introduction of the ED influenced the hospital's service demands and resourcing.

METHOD

This study investigated hospital inpatient characteristics including admissions, clinical deterioration episodes, deaths, after-hours theatre activity and companion care hours. The investigation compared the periods 01 January to 30 June 2021 (2021) and 01 January to 30 June 2022 (2022) to identify differences pre and post the ED opening.

RESULTS

Overall, the number of inpatient admissions was similar from 2021 to 2022 (31,061 and 31,706 respectively). However, there was a statistically significant change in the admission type with a decrease in elective admissions (925.2 in 2021 and 880.4 in 2022 ($p < .001$)) and an increase in emergency admissions (67.4 in 2021 and 111.1 in 2022 ($p < .001$)). A significantly higher incidence rate of rapid response calls was reported in 2022 compared to 2021 ($p = .043$), nonetheless there was no difference in the incidence rates of cardiac arrest ($p = .445$), code blacks ($p = .600$) or patient deaths ($p = .880$). From 2021 to 2022 there was an increase in both after-hours theatre procedures (6.6% to 9.0%; $\chi^2 = 50.9$ $p < .001$) and median companion care hours (Md = 32.5 to Md = 56.3; $U = 2.3$, $p = .021$).

IMPLICATIONS

The opening of the HPH ED resulted in increased after-hours and emergency related admissions with a co-occurring increase in companion hours. These impacts necessitate significant resourcing investment such as revised staffing models and rosters, additional recruitment, and change management.

KEYWORDS

private hospital, emergency department opening, patient acuity, resourcing

INTRODUCTION

Australian public hospital emergency departments (EDs) are under increasing pressure with rising presentations and failure to meet triage target times. In Western Australia (WA), from July 2021 - December 2021 there were an average of 61,193.67 monthly attendances at Perth metropolitan public hospital EDs with less than 80% of Triage 2 attendances seen within the recommended timeframe of 10 minutes [1]. Additionally, in many jurisdictions (including WA), ambulance ramping and metropolitan response times are an increasing problem [2].

In WA there are three main tertiary hospital catchment areas – north, south and east metropolitan health services. This research related to Hollywood Private Hospital (HPH), a private hospital located in the North Metropolitan Health Services (NMHS) catchment with over 950 licensed beds providing comprehensive adult services excluding obstetrics and major trauma. HPH is located adjacent to Sir Charles Gairdner Hospital (SCGH), a leading Australian public tertiary hospital with over 600 beds and a busy emergency department [3]. HPH opened an ED (HPH ED) on 1 November 2021 which provided another option for emergency care to patients with private health cover, particularly within the NMHS catchment.

There is limited literature on the impact on an Australian hospital of opening an ED; the majority of studies are International [4-14]. Patient choice of healthcare providers is a complex topic, influenced by both patient and provider characteristics [15]. Studies demonstrate that both distance [16, 17], and wait times in public EDs [18], are relevant variables.

On a background of significant public hospital demand, the proximity of HPH ED to SCGH and the service needs and resourcing changes necessitated by HPH ED (including establishment of on-call rosters, after-hours procedural access, establishment of an Acute Admissions Unit and additional staffing requirements), a key question was to understand how HPH ED opening impacted on the rest of HPH by describing and understanding key patient related impacts. Understanding this impact is important to facilitate planning by other private and public healthcare operators considering opening emergency services. It was hypothesised that hospital activity would increase, particularly in key specialties such as general medicine and general surgery (which are the main reasons for admitted patient care according to Australian Institute of Health and Welfare (AIHW) data for admitted patient activity), [19] as would after-hours activity, and that patient acuity would also rise. Additionally, there were questions around any impact the opening of HPH ED had on public services at neighbouring SCGH, although it was not within the scope of this study to access or analyse data captured by SCGH.

METHODS

This study firstly investigated the patient cohort presenting to HPH ED from 01 January to 30 June 2022. Secondly a comparison of HPH hospital cohorts pre and post the ED opening on 01 November 2021 was performed encompassing all inpatient admissions (day and overnight) from 01 January to 30 June in both 2021 (2021) and 2022 (2022).

Ethical approval was obtained from the Ramsay Health Care WA / SA Human Research Ethics Committee.

MEASURES

ED data was extracted from the hospital Patient Administration System (PAS), specifically the Meditech Universal Patient Admission Report and the Evolution Report. Data was compiled by the business analyst team and comprised patient demographics including age, gender and postcode together with patient disposition (admitted, discharged, transferred). Patients could be represented multiple times within the period.

Hospital data was extracted for companion care hours, rapid response calls, cardiac arrests, code black, after hours theatre procedures, hospital admissions, patient acuity, and medical specialities.

Companion care hours (CCH) were extracted from records from the Clinical Services department of the Hospital and formed its own dataset. CCH data was deidentified and aggregated, and comprised the time required for a staff member to provide CCH over a patient's admission due to reasons including dementia, delirium, confusion, agitation and high falls risk. The data was collected by the clinical services officer and compiled by the principal researcher. CCH were grouped into <24 hours, 24-72 hours, 73-168 hours, and >168 hours.

Incident data was extracted from the hospital incident reporting database (RiskMan) and Safety and Quality Unit records and formed its own dataset. Rapid Response Call (RRC) incidents were defined as any episode of patient clinical deterioration where the rapid response team attended. Cardiac Arrest incidents were defined as the absence of pulse and respiratory effort, and unconsciousness, necessitating the commencement of resuscitation. Code Black incidents were defined as the activation of a code due to a person threatening or attempting to harm themselves or someone else requiring attendance or assistance from security staff. For calculation of the relevant rates, see Appendix 1.

Procedural data was extracted from the hospital PAS, specifically the Meditech procedural report, and formed its own dataset. After-hours procedures were determined as weekdays 1900 – 0700 hours, and anytime on Saturdays, Sundays and public holidays. Each case was classified as during hours or after-hours.

Patient hospital data was extracted from a Universal Patient Admissions Report run from the PAS which amalgamates server data. Data included average length of stay (LOS) (bed days), admissions, medical specialty areas (Appendix 2), patient deaths and patient admission location for each of the study years. Patient admission location was categorised as admitted from own home, transfers from non-acute care areas of HPH, transfers from the neighbouring tertiary hospital SCGH, and other (combined categories of <0.1%). Patient admissions were categorised as elective, emergency and other. It also included data on Charlson Comorbidity Index (CCI), which was used as a measure of patient acuity and was derived from an approximated score using patient comorbidities which is produced in a business analyst report (Appendix 3). Patients could be represented multiple times within the year period and/or across years.

STATISTICAL ANALYSIS

Emergency Department patient age was described using mean (M), standard deviation (SD), median (Md), and minimum (min) and maximum (max). Patient age was also categorised as <25 years, 25-64 years and ≥ 65 years and described using frequency (f) and percent (%). Patient disposition and catchment were described using f, %. This dataset was analysed using Excel version 16.82.

CCH, CCI, and LOS was described using M, SD, Md, 25th to 75th interquartile range (IQR), and min and max, with normality assessed as necessary using the Shapiro Wilk test. CCH (categorised), patient admission location, deaths, and medical specialities was described using f and percent %.

Differences in CCH from 2021 to 2022 were assessed using the independent samples Mann-Whitney U test (U) with the standardized test statistic and 2-sided p-value reported. Categorized CCH year differences were assessed using a Fisher-Freeman-Halton Exact Chi square (χ^2) tests with exact 2-sided p-value reported.

Comparison of 2021 to 2022 incidence rates of Rapid Response Calls, Cardiac Arrests, Code Black, deaths, after-hours procedures, patient admission location and admission type were determined using the online Medcalc version 22.017 procedure which reports the incidence rate and incidence rate difference with Poisson 95% confidence intervals (CI) and p-value. Rate is the ratio between the occurrence of interest and total exposed patients for each outcome, reported $\times 1000$. The incidence rate ratio (ratio of the two rates $R1/R2$) is reported with its 95% CI and associated p-value with a significant p-value indicating that the ratio incident rate ratio is significantly different from 1 (which is the case when the rates are equal) [20].

Differences in whether a procedure was during hours or after-hours for 2021 and 2022 were assessed using a Pearson Chi square (χ^2) tests with exact 2-sided p-value reported. Additionally, for the subset of after-hours procedures only, a between specialty area and year effect was examined (Fisher-Freeman-Halton Exact χ^2 test with Monte Carlo 2-sided p-value) to accommodate cell counts less than five.

Hospital patient 2021 and 2022 datasets were merged and a negative binomial with log link generalised estimating equations (GEE) used to assess the effect of year and speciality, including a year x speciality interaction, on outcomes CCI and average LOS. Patients were treated as a repeated measure. Tests of model effect p-values estimated marginal means, and 95% Wald CI were reported or graphically depicted.

Each dataset was analysed separately using IBM SPSS version 29.0 unless otherwise stated [21].

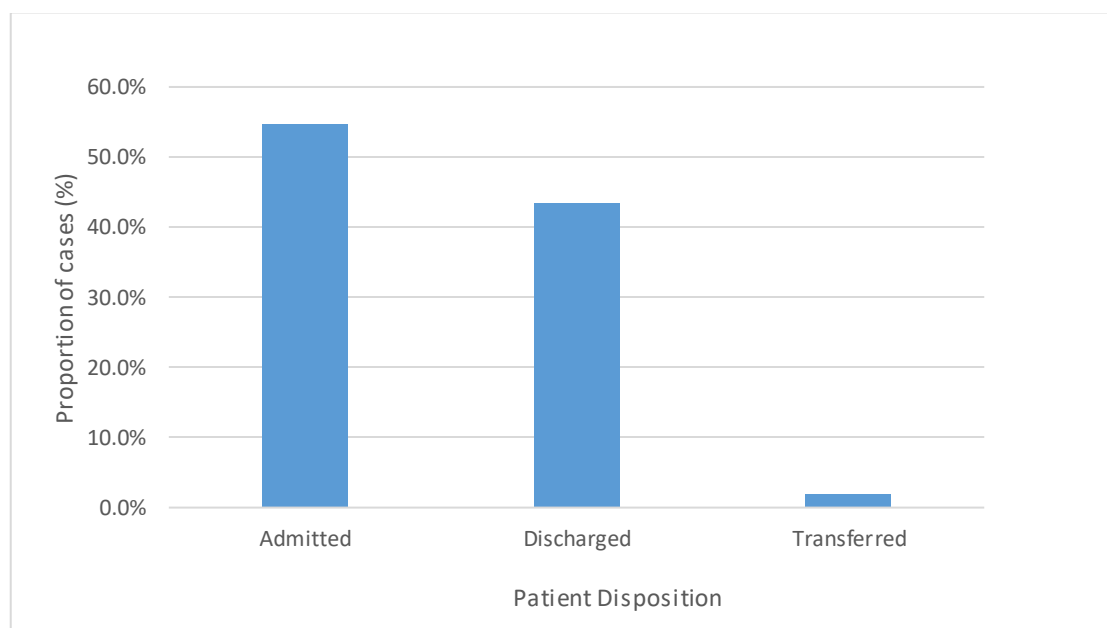
RESULTS

EMERGENCY DEPARTMENT

There were 5,815 presentations to HPH ED from 01 January to 30 June 2022, with approximately 32 presentations/day. There was an admission rate of 54.72% with 43.37% of patients discharged and 1.87% transferred (Figure 1). Disposition data was not captured for 0.03% of presentations.

The patient M_{age} was 63.5 years ($Md=68.0$, $SD 21.9$, range 3-103 years). Patient presentations according to age-groups comprised 7% aged <25 years, 37.64% aged 25-64 years, and 55.36% aged ≥ 65 years. Additionally, 74.22% of patients were from the NMHS catchment (Appendix 4) of which SCGH is the main tertiary hospital [22].

FIGURE 1. EMERGENCY DEPARTMENT PATIENT DISPOSITION 01 JANUARY TO 30 JUNE 2022



HOSPITAL

Companion Care Hours

CCH were reported for 68 patients in 2021 and 119 patients in 2022 (Table 1). There was a total of 5,404.75 CCH in 2021 and 15,934.75 in 2022. Median CCH were significantly higher in 2022 ($Md=56.3$) compared to 2021 ($Md=32.5$) ($U=2.3$, $p=.021$). When CCH groups were considered, no significant difference was detected between years 2021 and 2022 ($\chi^2=6.02$, $p=.109$) although 2022 depicted lower counts of <24 and 24-<73 CCH and higher counts of 73-168 and >168 CCH (Figure 2 and Table 1).

FIGURE 2. PROPORTION OF CASES IN EACH COMPANION CARE HOURS GROUP FOR 2021 AND 2022.

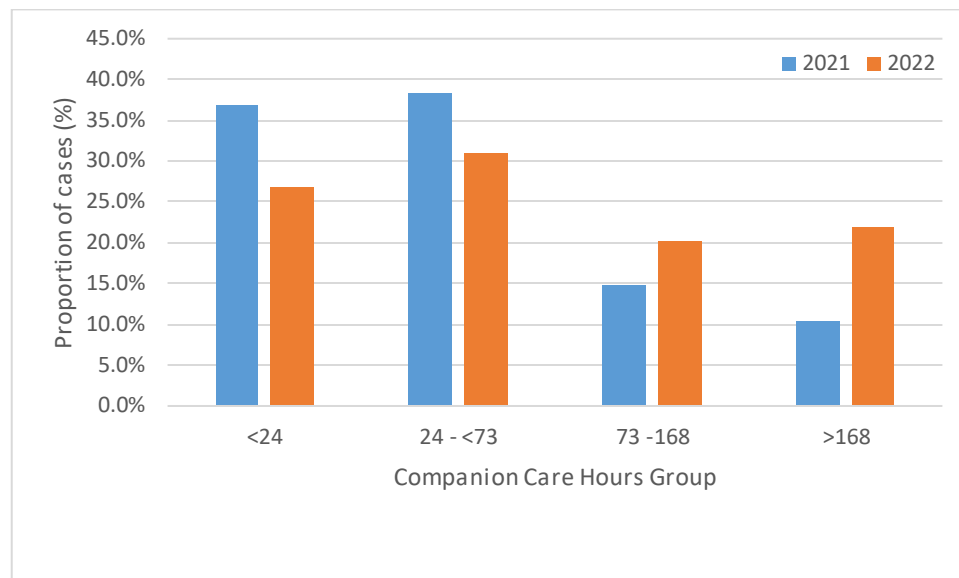


TABLE 1. COMPANION CARE HOURS SUMMARIES FOR 2021 AND 2022.

Companion Care Hours *	2021	2022
Mean (SD)	79.5 (139.9)	133.9 (201.8)
Md (IQR)	32.5 (14.3-74.3)	56.3 (18.0-147.0)
Min - max	4.0 - 801.0	3.5 - 1,218.5)
Companion Care Hour Groups	f (%)	f (%)
<24 hours	25 (36.8%)	32 (26.9%)
24 - <73 hours	26 (38.2%)	37 (31.1%)
73 -168 hours	10 (14.7%)	24 (20.2%)
>168 hours	7 (10.3%)	26 (21.8%)
Total (n)	68 (100%)	119 (100.0%)

Note. IQR = 25th and 75th percentiles f = frequency %=percent;

* statistically significant difference between 2021 and 2022 (U=2.3 p=.021)

Incident rates

Incident rates for RRC, cardiac arrests and code black are summarised in **Error! Reference source not found..** A significantly higher incidence rate of RRCs was reported in 2022 compared to 2021 (p=.043). No significant differences were detected in the incidence rates of cardiac arrests (p=.445) or code blacks (p=.600).

TABLE 2. RAPID RESPONSE CALL, CARDIAC ARRESTS AND CODE BLACK INCIDENCE RATES SUMMARY TABLE AND COMPARISON.

	Observed events	Occupied Bed days	Incidence Rate (x1000)	95% CI Incidence Rate (x1000)	p-value
Rapid Response Calls					
2021	240	92,716	2.59	2.27 to 2.94	
2022	271	87,480	3.10	2.74 to 3.49	
Incidence rate difference			0.51	0.02 to 1.00	.043*
Incidence rate ratio			1.20	1.00 to 1.43	.043*
Cardiac Arrests					
2021	10	92,716	0.11	0.05 to 0.20	
2022	13	87,480	0.15	0.08 to 0.25	

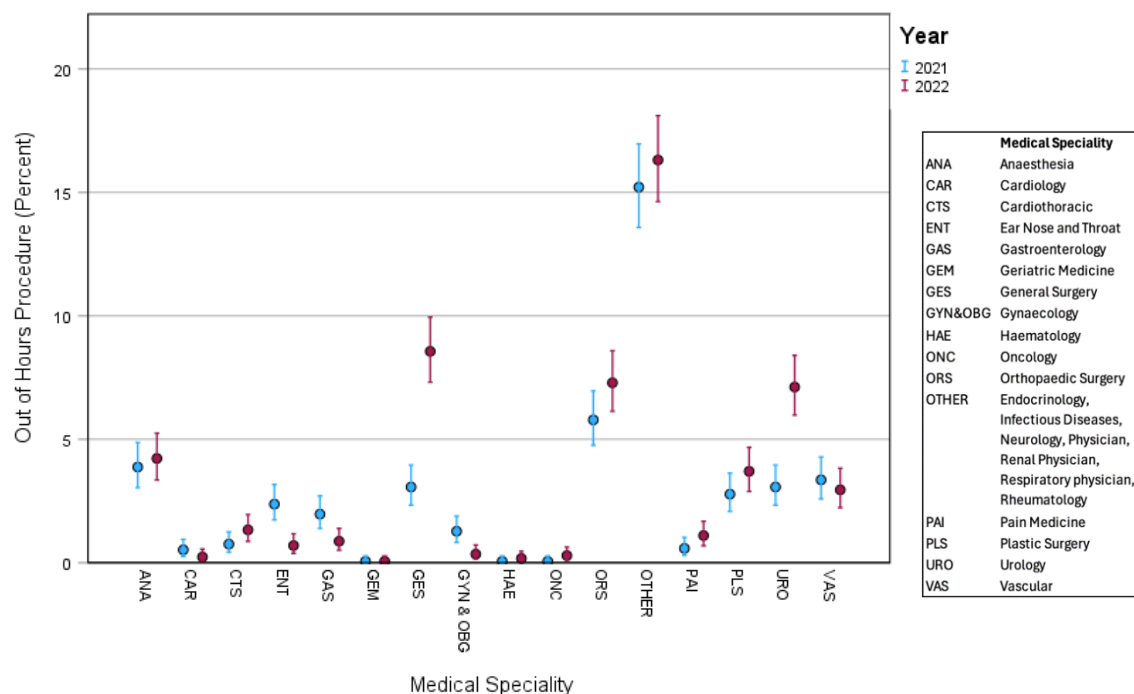
Incidence rate difference			0.04	-0.06 to 0.15	.444
Incidence rate ratio			1.38	0.56 to 3.51	.454
Code Black					
2021	10	92,716	0.15	0.08 to 0.25	
2022	16	87,480	0.18	0.10 to 0.30	
Incidence rate difference			-0.03	-0.15 to 0.09	.600
Incidence rate ratio			0.83	0.37 to 1.81	.606

Note. CI = confidence intervals; * **bolded** indicates a statistically significant difference in rates.

After-hours theatre procedures

More after-hours theatre procedures occurred in 2022 than 2021 ($n=1,113/12,407, 9.0\%$; $n=873/13,251, 6.6\%$; $\chi^2=50.9$ $p<.001$) (Table 3). The proportion of specialty areas reporting after-hours theatre procedures are depicted in Figure 3 with a significant between-group difference detected ($n=1,986, \chi^2=110.6$ $p<.001$). Notably in 2021, lower proportions of theatre procedures were reported for General Surgery (GES) ($n=53/873, 6.1\%$ versus $n=148/1,113, 13.3\%$) and Urology specialties (URO) ($n=53/873, 6.1\%$ versus $n=123/1,113, 11.1\%$).

FIGURE 3. PERCENTAGE OF OUT OF HOUR PROCEDURES BY SPECIALTY AREA



Note. Percentage with 95 percentile confidence intervals

TABLE 3. THEATRE AFTER HOURS PROCEDURES

	After Hours Procedures	Procedures	Incidence Rate	95% CI	p-value
Theatre					
2021	873	13,251	65.9	61.6 to 70.4	
2022	1,113	12,407	89.7	84.5 to 95.1	
Incidence rate difference			-23.8	-30.6 to -17.0	<.0001*

Note. Rate is the ratio between after hours procedure and total procedures; ***bolded** indicates statistically significant incident rate difference $p<.05$.

Patient admissions

In 2021 there were 31,061 presentations by 21,712 patients with one-third of cases representing repeat attendances ($n=9,349$ cases, 30.1%). In 2022 there were 31,706 presentations by 21,503 patients with one-third repeat attendances ($n=10,203, 32.2\%$). There were 3,425 patients represented in both the 2021 (15.8%) and 2022 (15.9%) cohorts.

Patients were equally represented in sex for both 2021 (Female=10,684 49.2%; Male=11,028 50.8; U=0) and 2022 (Female=10,539 49.0%; Male=10,963 51.0%; U=1 <.01%). In 2021 and 2022 patient age ranged from 6 to 104 years (M= 59.0 SD=17.5 Md=62.0 IQR 48-72 years and M= 59.5 SD=17.8 Md=62.0 IQR 48-73 years respectively).

The combined dataset included 62,767 presentations. CCI, average LOS, admission location, admission type and deaths presentation data are summarised in Table 4. For CCI, the GEE model reported a statistically significant effect for specialty ($p<.001$), however, no significant effects were detected for year ($p=.770$) nor a year x specialty interaction ($p=.147$) (Figure 4). For LOS the GEE model reported a significant effect for specialty ($p<.001$), a significant year x specialty interaction ($p<.001$), however, no significant effect was observed for year ($p=.650$) (Figure 5).

Patient admission location incidence rates (x1000) were examined with a significant difference detected for transfers from the neighbouring SCGH where the incidence rate was 11.8 in 2021 and 3.1 in 2022 ($p<.001$); and for other (11.5 and 7.5 respectively, $p<.001$). There was a total of 367 transfers from SCGH in 2021, but only 97 transfers in 2022. No significant incident rate differences were detected for own home ($p=.138$) or transfers from non-acute areas of HPH ($p=.166$) (Table 4).

Admission type (elective, emergency and other) was examined with a significant difference detected for elective where the incidence rate (x1000) was 925.2 in 2021 and 880.4 in 2022 ($p<.001$); emergency where the incidence rate was 67.4 in 2021 and 111.1 in 2022 ($p<.001$), but no significant difference for other (7.4 in 2021 and 8.5 in 2022 ($p=0.119$)) (Table 4).

TABLE 4. HOSPITAL AND PATIENT ACUITY MEASURES

	2021	2022
N	31,061	31,706
Charlson Comorbidity Index		
Mean (SD)	2.4 (2.4)	2.5 (2.4)
Md (IQR)	2.0 (1.0 – 3.0)	2.0 (1.0 – 3.0)
Min - max	0 - 20	0 - 20
Length of stay (days)		
Mean (SD)	2.0 (3.6)	2.1 (3.7)
Md (IQR)	1.0 (1.0 – 1.0)	1.0 (1.0 – 1.0)
Min - max	1 – 104	1 - 95
Admission location (f, %)		
Own home ¹	30,107 (96.9)	31,103 (98.1)
Transfer from non-acute area of HPH ²	231 (0.7)	267 (0.8)
Transfer from SCGH ^{3*}	367 (1.2)	97 (0.3)
Other ^{4*}	356 (1.2)	239 (0.8)
Admission type (f, %)		
Elective^{5*}	28,739 (92.5)	27,915 (88.0)
Emergency^{6*}	2,092 (6.7)	3,521 (11.1)
Other⁷	230 (0.7)	270 (0.9)
Deaths (f, %)		
Death with autopsy	4 (<0.1)	3 (<0.1)
Death without autopsy	130 (0.4)	132 (0.4)
Total deaths	134 (0.4)	135 (0.4)

Note.

¹ Incidence rate difference between 2021 and 2022 $p=.138$

² Incidence rate difference between 2021 and 2022 $p=.166$

³ Incidence rate difference between 2021 and 2022 $p<.0001$

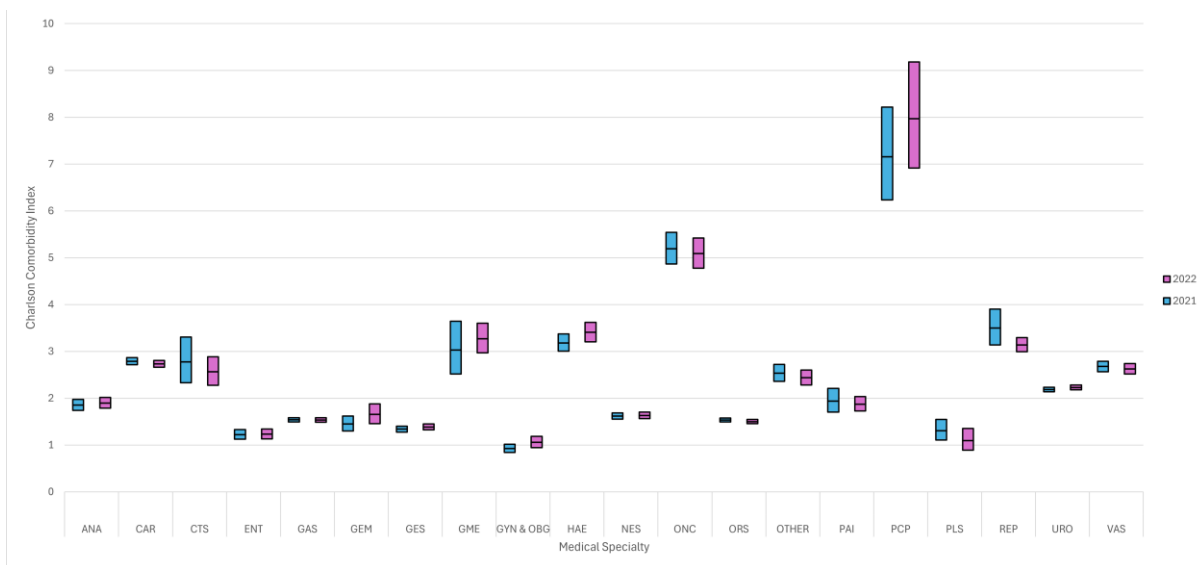
⁴ Incidence rate difference between 2021 and 2022 $p<.0001$

⁵Incidence rate difference between 2021 and 2022 $p < .0001$

⁶Incidence rate difference between 2021 and 2022 $p < .0001$

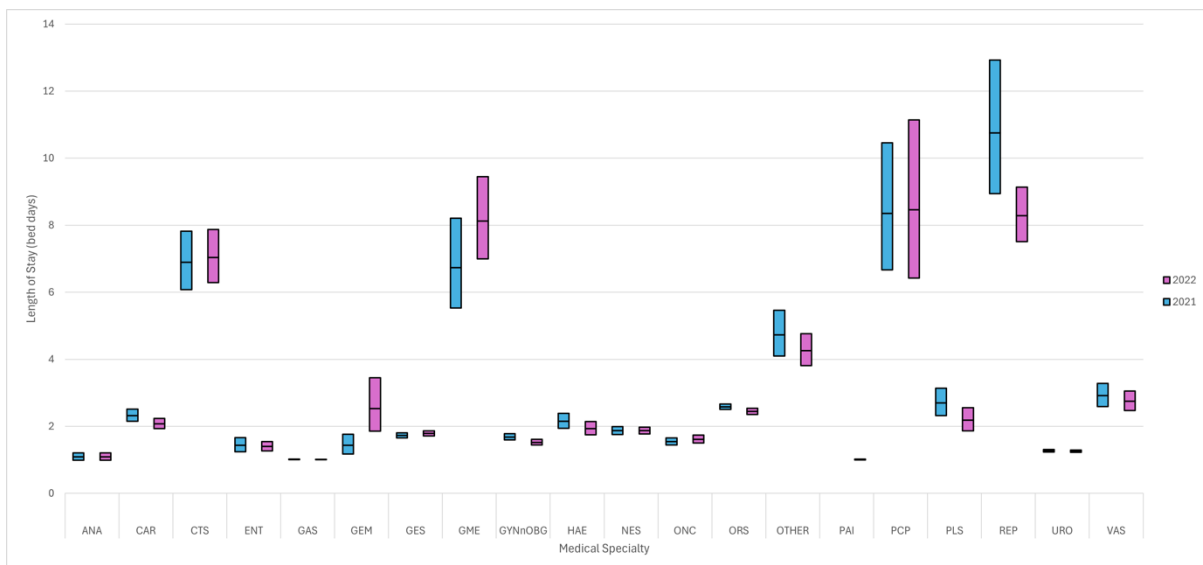
⁷Incidence rate difference between 2021 and 2022 $p = .119$

FIGURE 4. CHARLSON COMORBIDITY INDEX FOR EACH SPECIALTY BASED ON GENERALISED ESTIMATING EQUATIONS MODEL.



Note. Results are based on the Generalised Estimating Equations model and report estimated marginal means with 95% Wald confidence intervals. No significant Bonferroni corrected post hoc differences for each specialty between 2021 and 2022 in the generalised estimating equation model were detected.

FIGURE 5. LENGTH OF STAY FOR EACH SPECIALTY AND YEAR BASED ON GENERALISED ESTIMATING EQUATIONS MODEL.



Note. Results are based on the Generalised Estimating Equations model and report estimated marginal means with 95% Wald confidence intervals. No significant Bonferroni corrected post hoc differences for each specialty between 2021 and 2022 in the generalised estimating equation model were detected.

Specialty area admissions and deaths are described, with admission rate differences p -values reported at Table 5. Most specialties reported a significant difference in admission incidence rate (x1000) between 2021 and 2022. Significant changes included higher admission rates in 2021 for Gastroenterology from 129.3 in 2021 to 115.9 in 2022 ($p < .001$), General medicine 12.3 to 10.1 ($p = .008$), Gynaecology 28.2 to 22.3 ($p < .001$), Neurosurgery 59.0 to 53.3 ($p = .002$), Orthopaedics 136.3 to 116.2 ($p < .001$), Plastic surgery 7.2 to 5.2 ($p = .001$), Urology 135.6 to 124.3 ($p < .001$) and Vascular 28.0 to 25.2 ($p < .001$) respectively. Lower admission rates were reported in 2021 for Geriatric medicine from 9.2 in 2021 to 11.5 in 2022 ($p = .005$), General Surgery 91.5 to 96.9 ($p = .030$), Haematology 71.2 to 84.1 ($p < .001$), Oncology 134.0 to 142.7 ($p = .003$), Pain management 5.3 to 12.1 ($p < .001$), Rehabilitation 11.1 to 30.6 ($p < .001$), and Other specialties 32.1 to 43.2 ($p < .001$) respectively.

The number of patient deaths were similar in 2021 (f=124, 0.4%) and in 2022 (f=129, 0.4%) (Table 5). No significant difference in death incidence was detected between 2021 and 2022 for any specialty, or for the sample as a whole (one death for every 250 patients in 2021, one death for every 246 patients in 2022, p=.880) (Table 6).

TABLE 5. SPECIALTY AREA ADMISSIONS AND DEATHS FOR 2021 AND 2022 PERIODS.

	2021 (n=31,061)				2022 (n=31,706)				Admission Incidence difference
Specialty	Admission s f	%	Deat hs f	%	Admissions f	%	Deaths f	%	p-value
Anaesthesia	585	1.9			608	1.9			0.756
Cardiology	1,600	5.2	5	0.3	1,604	5.1	6	0.4	0.609
Cardiothoracic Surgery	134	0.4			158	0.5	2	1.3	0.219
Ear Nose Throat	1,004	3.2			943	3	2	0.2	0.066
Gastroenterology	4,015	12.9			3,675	11.6			<.0001*
Geriatric Medicine	285	0.9			364	1.1	1	0.3	.005*
General Surgery	2,843	9.2			3,071	9.7	2	0.1	.030*
General Medicine	382	1.2	8	2.1	319	1	4	1.3	.008*
Gynaecology	877	2.8			708	2.2			<.0001*
Haematology	2,212	7.1	18	0.8	2,666	8.4	11	0.4	<.0001*
Neurosurgery	1,833	5.9			1,689	5.3			.002*
Oncology	4,163	13.4	23	0.6	4,526	14.3	23	0.5	.003*
Orthopaedics	4,234	13.6			3,683	11.6			<.0001*
Pain Management	165	0.5			382	1.2			<.0001*
Palliative	83	0.3	53	63.9	67	0.2	53	79.1	0.152
Plastic Surgery	224	0.7			165	0.5			.001*
Rehabilitation	344	1.1	5	1.5	970	3.1	14	1.4	<.0001*
Urology	4,211	13.6			3,940	12.4			<.0001*
Vascular	870	2.8	1	0.1	799	2.5	1	0.1	<.0001*
Other	997	3.2	11	1.1	1,369	4.3	10	0.7	<.0001*

Note. Other includes specialties Endocrinology, Infectious diseases, Neurology, Physician, Renal Physician, Rheumatology and Respiratory Physician.

Blank cells for deaths (%) indicate no deaths were reported for that specialty.

Admission incidence difference compares the admissions for that speciality in 2021 compared to 2022. The significance result is reported for the incidence rate difference. * **bolded** indicates statistically significant incidence rate difference p<.05.

TABLE 6. DEATH INCIDENCE RATES PER MEDICAL SPECIALTY SUMMARY TABLE AND COMPARISON.

	Patient Deaths	Patients	Incidence Rate (x1000)	95% CI (x1000)	p-value
Cardiology					
2021	5	1,600	3.1	1.0 to 7.3	
2022	6	1,604	3.7	1.3 to 8.1	
Incidence rate difference			-0.6	-4.7 to 3.4	.766
Cardiothoracic surgery					
2021	0	134	0	0 to 27.5	
2022	2	158	12.7	1.5 to 45.7	
Incidence rate difference			-12.7	-31.7 to 6.4	.193
Ear Nose Throat					
2021	0	1,004	0	0 to 3.7	
2022	2	943	2.1	0.3 to 7.7	
Incidence rate difference			-2.1	-5.0 to 0.7	.145
Geriatric Medicine					
2021	0	285	0	0 to 12.9	
2022	1	364	2.7	0.1 to 15.3	
Incidence rate difference			-2.7	-8.8 to 3.3	.376
General Surgery					
2021	0	2,843	0	0 to 1.3	
2022	2	3,071	0.7	0.1 to 2.4	
Incidence rate difference			-0.7	-1.6 to 0.3	.174
General Medicine					
2021	8	382	20.9	9.0 to 41.2	
2022	4	319	12.5	3.4 to 32.1	
Incidence rate difference			8.4	-11.0 to 27.9	.397
Haematology					
2021	18	2,212	8.1	4.8 to 12.9	
2022	11	2,666	4.1	2.1 to 7.4	
Incidence rate difference			4.0	-0.3 to 8.4	.071
Oncology					
2021	23	4,163	5.5	3.5 to 8.3	
2022	23	4,526	5.1	3.2 to 7.6	
Incidence rate difference			0.4	-2.6 to 3.5	.777
Palliative					
2021	53	83	638.6	478.3 to 835.2	
2022	53	67	791.0	592.5 to 1034.7	
Incidence rate difference			-152.5	-423.1 to 118.1	.269
Rehabilitation					
2021	5	344	14.5	4.7 to 3.4	
2022	14	970	14.4	7.9 to 24.2	
Incidence rate difference			0.1	-14.7 to 14.9	.989
Vascular					
2021	1	870	1.1	<0.1 to 6.4	
2022	1	799	1.3	<0.1 to 7.0	
Incidence rate difference			-0.1	-3.4 to 3.2	.952
Other					
2021	11	997	11.0	5.5 to 19.7	

	Patient Deaths	Patients	Incidence Rate (x1000)	95% CI (x1000)	p-value
2022	10	1,396	7.2	3.4 to 13.2	
Incidence rate difference			3.9	-3.7 to 11.5	.319
Total Sample					
2021	124	31,061	4.0	3.3 to 4.8	
2022	129	31,706	4.1	3.4 to 4.8	
Incidence rate difference			-0.1	-1.1 to 0.9	.880

Note. Rate is the ratio between patient deaths and total patients.

DISCUSSION

PRINCIPAL FINDINGS

ED cohort and admission rates

Compared to Australian Institute of Health and Welfare (AIHW) data for public EDs nationally for 2021 -2022, HPH ED had an older patient cohort (46% AIHW patients aged 25-64 years versus 37.64% HPH, 21% AIHW patients aged ≥ 65 years versus 55.36% HPH) and higher admission rate (28% AIHW versus 54.72% HPH) [23].

Contributing factors to the admission rate likely include the age of patients presenting to HPH ED (the AIHW data notes a higher admission rate of 52% for patients ≥ 65 years), and also the nature of HPH ED being private.

Impacts on patient acuity

The opening of HPH ED demonstrated an overall impact on HPH patient acuity including higher median CCH, increased rate of RRCs and more after-hours theatre activity, particularly among the general surgery and urology specialities. Given that HPH transitioned from a model where acute admissions were only accepted before 2200 hours, to a hospital with a 24-hour ED, this was not surprising.

Regarding the general hospital cohorts, however, there weren't consistent increases as expected in admission numbers, LOS and CCI across the hospital cohorts as a whole from 2021 to 2022 or all specialty groups where this had been hypothesised. General medicine, was one of the key areas predicted to be affected (19), however the number of admissions significantly declined from 2021 to 2022. However, significantly higher admission rates in other specialties were noted following opening of HPH ED including geriatric medicine, general surgery and rehabilitation. Although the number of admissions was similar across HPH from 2021 to 2022 (31,061 and 31,706 respectively), there was a significant change in the admission type from 2021 to 2022 with a decrease in elective admissions and an increase in emergency admissions highlighting a change in patient acuity.

Origin of patient admissions

The number of transfers from neighbouring SCGH declined significantly from 2021 to 2022, coupled with the fact that 74.22% of patients presenting to HPH ED were from NMHS catchment, suggests that SCGH patients were electing to present to HPH directly rather than the historical pathway of attending SCGH ED for emergency care prior to transfer to HPH. This aligns with literature suggesting that hospital distance and public ED wait times are impactful on patient choice. However, this was an indirect measure only and the specific impact on SCGH ED was not explored in this study.

Strengths and Limitations

There is minimal Australian literature available on the impact of opening an ED, particularly a private ED. This study presents new insights for a private hospital setting following a significant change to patient flows via opening of a private ED. These findings, however, should be considered in light of study limitations.

Coronavirus-19 is a confounding variable that significantly impacted the hospital during the study periods. Government-stipulated community lockdowns in WA in 2021 and 2022 negatively affected hospital activity (24). The effect appeared to be greater in the 2022 period based on budgeted hospital activity versus actuals following opening of the WA border in March 2022 due to surgical restrictions, high levels of community spread, staff furloughing and patient behaviours. This may explain to some degree why higher admission numbers weren't seen consistently across specialty groups and HPH as a whole. CCH was aggregated, hence patients with multiple case entries could not be identified limiting analysis. Regarding after-hours procedure data, weekend lists were included in the definition of after-hours procedures, however it is likely they represented a mix of planned booked lists or emergency lists. Additionally, it was not within the scope of this study to access or analyse data captured by the adjoining tertiary hospital SCGH.

MEANING OF THE STUDY

The study highlights the impacts a private hospital may experience following opening of an ED. Opening an ED in a private hospital will require significant resourcing and service changes to restructure a hospital that is used to a large volume of elective work to effectively resource and support an ED.

Change Management

Significant investment was required to engage with hospital staff and medical specialists to effectively support and resource the HPH ED. The establishment of medical, surgical and anaesthetic on-call rosters, after-hours procedural area access, and preparation of the wards to accept admissions overnight of acute and undifferentiated patients was a drastic cultural change and it was important not to underestimate the time and investment that these changes require.

Patient Flow

Patient flow became less predictable and more difficult to manage with HPH ED. To assist flow, in October 2022 an Acute Admissions Unit was established with 24-hour dedicated junior doctor cover, and an electronic hospital bed management system was introduced across the whole hospital.

Patient Acuity

Due to the increased patient acuity, medical staffing changes were required. This included increased staff in a number of specialties, review of after-hours staffing, implementation of an on-call roster for junior doctors, and additional recruitment of intensive care registrars to permit extra seniority in the hospital overnight.

Additionally, the increase in CCH necessitated a comprehensive review of the model of care for these patients. In 2023, patients with companions began to be cohorted to a designated area of the hospital to facilitate enhanced patient care.

Opening an ED was a new experience for HPH. Whilst some impacts were predicted, others were unforeseen. Despite this, HPH remained agile and responsive and acted quickly to implement supports such as reviewed staffing models and an acute assessment unit as challenges arose.

FUTURE RESEARCH

A key unanswered question relates to the direct impact of a private ED opening on a neighbouring tertiary hospital. Future research could explore trends in emergency department presentations between the public and private hospital and evaluate the role of private health insurance cover on patients' choice of hospital for emergency care.

A longitudinal analysis post coronavirus-19 would help to disentangle any potential confounding by government imposed restrictions on health services and evaluate the impact of ED opening on CCH, increased after-hours theatre activity, admission type and RRCs to determine whether these changes are sustained, and potentially increase further, over a longer period.

CONCLUSIONS

The opening of the HPH ED resulted in increased after-hours and emergency related admissions with a co-occurring increase in companion hours. These impacts necessitate significant resourcing investment such as revised staffing models and rosters, additional recruitment, and change management.

ETHICAL APPROVAL

Ethical approval for this research project was obtained from the Ramsay Health Care WA / SA Human Research Ethics Committee (Project ID: 2023/PID/0003, HREC ID: 2023/ETH/0000)

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CONFLICT OF INTEREST DECLARATION

The Author(s) declare(s) that there is no conflict of interest.

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APPENDIX 1 – CALCULATION OF RAPID RESPONSE CALL, CARDIAC ARREST AND CODE BLACK RATES

Rates were calculated as follows:

RRC Rate = number of rapid response calls / occupied bed days (overnight AND day only) x 1,000

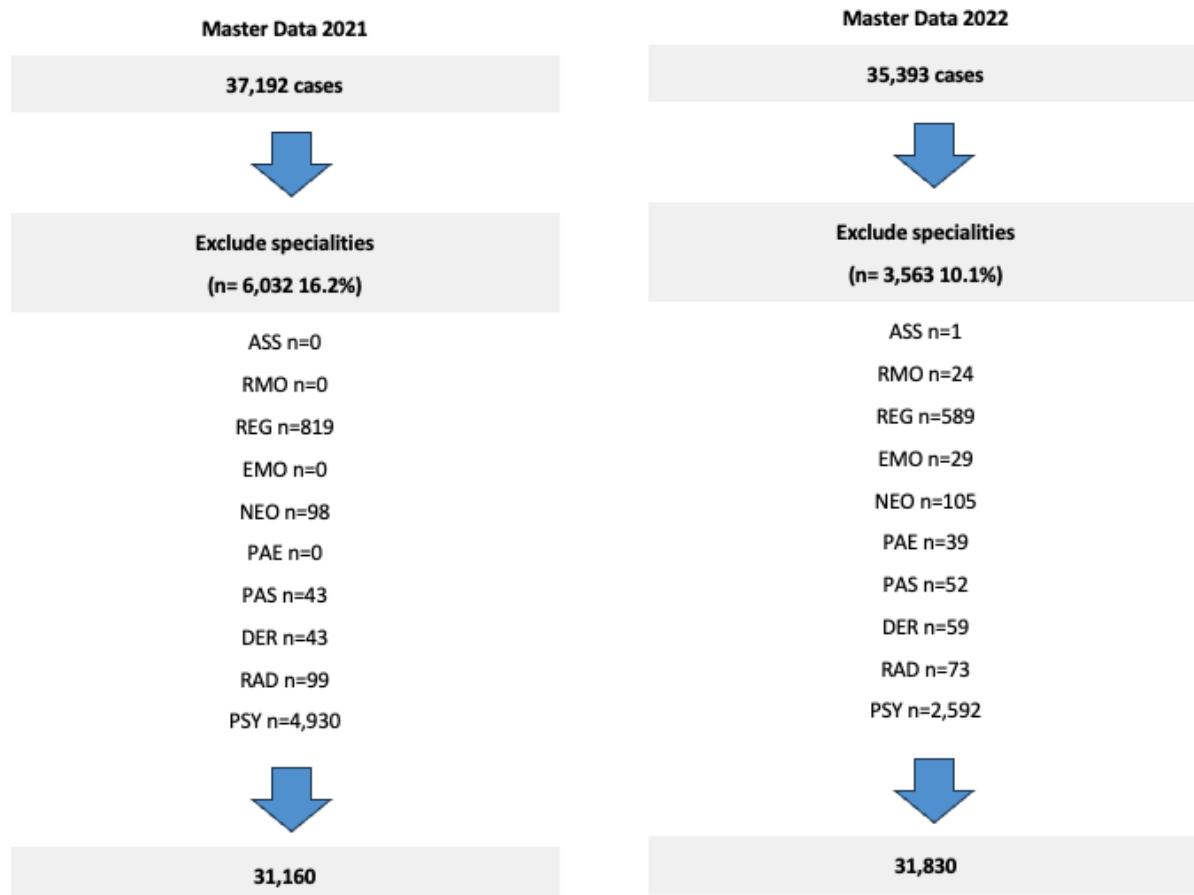
Cardiac Arrest Rate = number of patients experiencing a cardiac arrest / occupied bed days (overnight AND day only) x 1,000

Code Black Rate = number of Code Blacks / occupied bed days (overnight AND day only) x 1,000

APPENDIX 2 – SPECIALTY INCLUSIONS AND EXCLUSIONS

Specialty terminology was derived from the Patient Administration System report. Specialties considered for all hospital admission datasets were Anaesthesia, Cardiology, Cardiothoracic Surgery, Ear Nose Throat, Gastroenterology, Geriatric Medicine, General Surgery, General Medicine, Haematology, Neurosurgery, Gynaecology, Oncology, Orthopaedics, Pain Management, Palliative, Plastic Surgery, Rehabilitation, Urology, Vascular and Other. Other medical specialties included Endocrinology, Infectious Diseases, Neurology, Physician, Renal Physician, Respiratory Physician, Rheumatology.

Specialties excluded from this study were Assisting Surgeon, Dermatology, Emergency Medical Officer, Neonatology, Paediatrics, Paediatric Surgery, Psychology, Radiology and Registrar (see Flowcharts below).



APPENDIX 3 - CHARLSON COMORBIDITY INDEX

The business report approximates the score using the comorbidities that are available in the coded data under Australian Coding Standards which includes both active conditions such as neoplasms, as well as chronic conditions which are always coded when documented including Peripheral Vascular Disease, Cerebral Infarcts where deficits are ongoing, HIV as per ACS 0102 "HIV/AIDS" and chronic conditions as per ACS 0003 "Supplementary Codes for Chronic Conditions". Specifically, this includes the following chronic conditions: Chronic Heart Failure, Dementia, Chronic Obstructive Pulmonary Disease, Liver Disease, Diabetes Mellitus, Hemiplegia, Chronic Kidney Disease. The score was then adjusted to include an age component by adding a score for age as follows: 0 for <50 years; +1 for 50-59 years; +2 for 60-69 years; +3 for 70-79 years; +4 for ≥ 80 years.

APPENDIX 4- NORTH METROPOLITAN HEALTH SERVICE CATCHMENT DEFINITION

The North Metropolitan Health Service was defined as the following postcodes: 6005-6012, 6014-6038, 6050, 6059-6062, 6064-6067, 6077-6078 and 6090 (22).

EVALUATION OF DERMATOLOGY TREATMENT SATISFACTION TOWARDS HOSPITAL REPUTATION AMONG CHRONIC SKIN DISEASE PATIENTS AT AN EASTERN INDONESIAN REFERRAL HOSPITAL

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ABSTRACT

INTRODUCTION

Chronic skin disease poses a major challenge due to the complexity of these diseases and the variety of symptoms require a highly individualized approach to diagnosis and long-term treatment. This study aimed to evaluate the factor of treatment satisfaction moderated with recurrency towards hospital reputation among patients with chronic skin disorder utilizing the modified Dermasat questionnaire with six variables (treatment effectiveness, convenience of use, impact on daily living, medical care information, treatment side effect tolerable) and an additional variable (physician communication).

METHODS

Based on improved patient satisfaction moderated with recurrency towards hospital reputation, a questionnaire survey was conducted among 179 patients at a referral hospital in East Indonesia. The relationship of patient satisfaction, recurrency, and hospital reputation was verified via SmartPLS® version 4.1.0.2.

RESULTS

The majority of the respondents were female from the productive age 18-39 years old (46%), mostly housewives with a senior high school qualification as their educational background level (51.4%). All six factors and moderation with recurrency (towards treatment effectiveness and physician communication) were significant (P -value <0.05) towards overall patient satisfaction. The strongest relationship is demonstrated by physical communication and tolerance of treatment side effects with patient satisfaction. Furthermore, overall patient satisfaction was significantly associated positively with hospital reputation (P -value=0.000).

CONCLUSIONS

Six variables were found that were related to skin disease patient satisfaction. Overall patient satisfaction is significantly associated positively with the hospital's reputation, indicating a higher overall patient satisfaction will increase the hospital's reputation which can encourage patient trust and compliance in the long term.

KEYWORDS

chronic skin disease, dermatology, hospital reputation, treatment satisfaction, referral

INTRODUCTION

Chronic skin diseases (e.g., psoriasis vulgaris, atopic dermatitis, contact dermatitis, and/or seborrheic dermatitis), often pose a significant challenge due to the complexity of these diseases and the variety of symptoms require a highly individualized approach to diagnosis and treatment, making them even more challenging [1]. Globally, an estimated 20-25% of the population is affected by chronic, non-communicable inflammatory skin disease, with each disease with its prevalence rate ranging from an orphan disease to 10-30% in certain populations, i.e., atopic dermatitis in the pediatric population [2]. The exact number of chronic skin diseases in Asia, specifically Indonesia, is yet to be reported. For example, as an overview, a recent epidemiological study on psoriasis reported a 0.38 percent prevalence in Indonesia [3].

Chronic inflammatory skin diseases affect physical, material, social, and psychological aspects of a person's life, impairing health-related quality of life and subsequently impacting health care quality [1]. Pathologically, chronic inflammatory skin diseases lead to the activation of the immune system, inducing mood changes that resemble sickness behaviors and overlap with the behavioral symptoms of depression, such as anhedonia, anorexia, and social withdrawal [1,4]. Phenotypically, chronic inflammatory skin disease may also lead to a lower quality of life underlain by the disfigurement, stigmatization, or repulsion of the skin disease, especially when the lesions cover a considerable area of the skin, i.e., external genitalia and exposed areas, such as face and palms [5]. This phenomenon is closely faced in our study area.

Chronicity of a disease has been highlighted as one of the factors in patient satisfaction as it is a multifaceted concept with several determining factors, i.e., 1) health care-provider related factors (technical care and interpersonal care), 2) physical environment, 3) access (accessibility, availability, and affordability), 4) organizational characteristics (continuity of care, and outcome of care), and 5) patient-related factors (age, gender, education, socio-economic status, marital status, race, religion, geographic characteristics, visit regularity, length of stay, health status, personality, and expectations. Additionally, in terms of dermatology, compliance with long-term treatment is often a problem, given the persistence required for topical therapy, phototherapy, and/ or systemic therapy [4, 6-8].

Along with the beneficial effects of a treatment, specifically a long-term treatment, the side effects of the treatment used, such as corticosteroids and biologics, add another layer of complexity to the management of these diseases [6]. Significant psychological impacts, including social stigma, depression, and anxiety, also worsen patients' conditions and reduce their quality of life [8]. Limited access to specialists, especially in rural areas or developing countries, often delays appropriate diagnosis and treatment, resulting in suboptimal care. Patient satisfaction is an important element in evaluating the quality of health services [9,10]. In the context of hospital services, patient satisfaction not only reflects clinical effectiveness and safety but also influences public perceptions of the hospital's reputation [11].

Referral may be defined as any process in which health care providers at lower levels of the health system, who lack the skills, the facilities, or both to manage a given clinical condition, seek the assistance of providers who are better equipped or specially trained to guide them in managing or to take over responsibility for a particular episode of a clinical condition in a patient. Referral hospitals are essential in providing quality health services for several reasons, such as high specialization and competence, advanced facilities and technology, efficient case management, research, and education [12]. A quality of health services will hopefully increase its preference among patients and, subsequently, its reputation. A study published in 2022 reported that the reputation of the hospital is significant in ensuring the patient's loyalty. Patient loyalty can be crucial in important health outcomes, e.g., treatment compliance/ adherence and increasing satisfaction [13].

In the field of dermatology, it is essential to assess the effectiveness of the treatment interlinked with satisfaction, a substantial parameter influencing the quality of life and therapeutic compliance. One of the instruments used to measure overall satisfaction was DermaSat, which consists of treatment effectiveness, convenience of use, impact on daily living, medical care information, and treatment side effects toleration [14]. For more relevant modeling, DermaSat was

developed by converting global satisfaction into overall patient satisfaction and then adding other important variables in patient evaluation, namely physician communication [15].

To the best of our knowledge, this study is the first to recruit outpatient chronic skin disease patients and to utilize a specific dermatology treatment satisfaction questionnaire to evaluate the satisfaction towards hospital reputation in Indonesia. Our study aims to assess the factor of treatment satisfaction among patients with chronic skin disorders utilizing the modified Dermasat questionnaire, specifically, with an additional variable (physician communication) from another questionnaire, for a contribution to improving healthcare quality strategies in hospitals and healthcare workers and provide recommendations to emphasize better policies, specifically in the area being researched (treatment effectiveness, convenience of use, impact on daily living, medical care information, treatment side effect tolerable, overall patient satisfaction, and hospital reputation), in improving health services for patients with chronic skin diseases at a referral hospital in Indonesia, especially in the Sulawesi region.

METHODS

STUDY DESIGN

This research is survey research with quantitative data analysis. The data was obtained from respondents who were treated at the skin polyclinic at the referral hospital. The survey was conducted in 2023 in a Sulawesi, East Indonesia referral hospital. A total of 200 questionnaires were distributed. In the survey, questionnaires were distributed on-site and were recovered within a limited time. A total of 179 valid questionnaires were recovered.

MEASUREMENT INSTRUMENTS

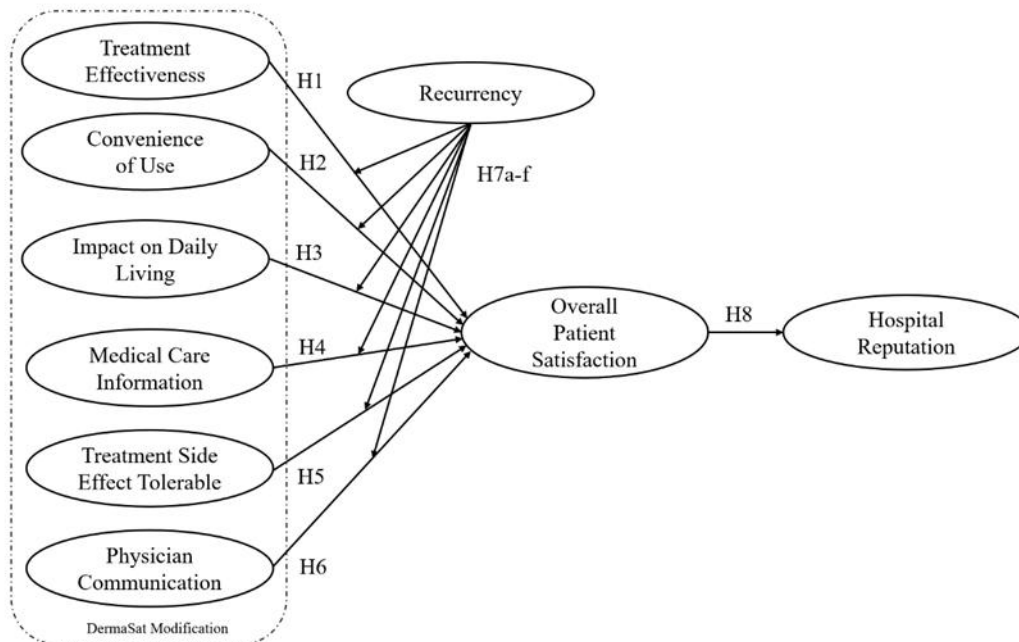
The structured questionnaire with closed questions was used to measure the interval scale using a 1-5 Likert points. The questionnaire items were obtained from previous studies, as seen in Table 1. This questionnaire was adapted from previous studies and translated from English to Bahasa Indonesia by a professional linguist. Specifically for recurrence, two options are given, where the first option (rare) is if the patient's recurrence occurs less than 3 times in 3 months, and the second option (frequent) is if the recurrence occurs more than 3 times in 3 months. The questions were assessed by an expert panel consisting of three academics to ensure face validity. After receiving input from the expert panel, improvements were made to the question sentences so that respondents could better understand them. A conceptual framework was prepared with several hypotheses, as in Figure 1.

TABLE 1: INSTRUMENT QUESTIONNAIRE SOURCES

Constructs	Conceptualized Definition	Scale References
Treatment effectiveness	Patient's opinion associated with the medication received	Ruiz et al. (2010)[14] Likert scale 1-5
Convenience of use	Patient's feelings towards the convenience and treatment compliance	
Impact on daily living	Association between received medication and patient's daily activity	
Medical care information	Clarity of information received by patients regarding the disease and medication to be received	
Treatment side effect Tolerable	Impact of perceived feeling towards the received medication	
Physician communication	Patient's opinion towards the doctor's way of communication and professionalism and informing information towards patient	Gremigni, Sommaruga and Peltenburg (2008)[15] Likert scale 1-5

Overall patient satisfaction	Satisfaction is the level of state that a person feels, which is the perceived result (in this case, treatment) in relation to one's expectations	Renzi et al. (2001)[16] Likert scale 1-5
Hospital reputation	Patient's assessment of hospital that are well recognized for quality services, through their own experience and the results of treatment received	Pilny and Mennicken (2014)[17] Likert scale 1-5

FIGURE 1: CONCEPTUAL FRAMEWORK



RESPONDENTS

The targeted population of this study was patients who visited the Dermatology and Venereology outpatient departments of a referral hospital in Sulawesi, East Indonesia. Respondents were taken purposively based on several criteria. The patients must be registered at the outpatient department in 2023, and have attended the outpatient department for at least three months or thrice, aged 17 years and over. Exclusion criteria were patients currently experiencing an infectious skin disease or having a history of catastrophic events, e.g., cancer, stroke, or chronic kidney disease. Respondents were fully conscious and agreed to fill out the questionnaire.

The minimum number of samples in the PLS-SEM multivariate study was calculated using power analysis by using G*power (version 3.1.9.7) software where f^2 was set at 0.15, alpha 0.05, power 90%, and the number of predictors was eight variables, resulting in a minimum sample requirement of 136 [18,19]. Sampling was conducted in October-December 2023 by distributing questionnaires directly to prospective respondents. Previously, informed consent was given, and it was explained that filling out the questionnaire was voluntary and anonymous.

STATISTICAL ANALYSES

The PLS-SEM approach was chosen for its ability to test complex models in explanatory survey research. The PLS-SEM approach was advised when the study focused on the model's predictive capability [20,21]. SmartPLS® version 4.1.0.2 was used for the PLS-SEM analysis, as it offered a bootstrapping menu for significance testing [22]. PLS-SEM's main procedure was based on two types of models: measurement (outer model) and structural model (inner model). The measurement model assessed the validity and reliability of the relationships between indicators and constructs. The significant relationship between each construct in the research model was analyzed using the structural model.

ETHICAL APPROVAL

The study proposal has received ethical review and clearance from Pelita Harapan University (Reference Number: 019/M/EC-M/Vb/2023).

RESULTS

This research was conducted on 179 respondents who met the criteria in this study. The profile of the respondents who participated in the study is presented in the demographic profile (Table 2).

TABLE 2: RESPONDENT PROFILE

Categories	Frequency (n)	Percentage (%)
Sex		
Female	106	59.2
Male	73	40.8
Age group (years old)		
18-29	40	22.3
30-39	42	23.5
40-49	38	21.2
50-59	30	16.8
60-69	29	16.2
Occupation		
University student	10	5.6
Public sector worker	19	10.6
Private sector worker	39	21.8
Housewife	51	28.5
Entrepreneur	15	8.4
Retired	14	7.8
Not working	16	8.9
Others	15	8.3
Educational background level		
Elementary school	9	5
Junior high school	18	10.1
Senior high school	92	51.4
University/ Postgraduate	60	33.5
Marital status		
Not married	37	20.7
Married	138	77.9
Divorced	4	2.2
Latest visitation		
<6 months	137	76.5
>6 months	42	23.5
Duration of treatment		
1-6 months	67	37.4
6-12 months	47	26.3
>12 months	65	36.3
Treatment seeking intensity/ recurrency		
Seldom	94	52.5
Often	85	47.5

Symptoms complained		
Erythematous macules	93	51.9
Erythematous papules	18	10.1
Dry skin	18	10.1
Scales	22	12.3
Others	28	15.6
Insurance type		
National insurance	171	95.5
Private insurance	1	0.6
Out-of-pocket/ personal	7	3.9

The majority of the respondents were female (59%). Most respondents were from the productive age of 18-39 years old (46%). The majority of the patients were housewives (28.5%), with a senior high school as the educational background level (51.4%).

This study's outer loading (OL) findings eliminated one indicator (COU3) outside the set value limit of 0.708. Subsequently, all indicators are deemed reliable for measuring every research item. Construct reliability was tested by evaluating the composite reliability (CR) and Cronbach's alpha (CA) values. All constructs in this study were found to be greater than 0.7 and did not exceed the upper limit of 0.95, indicating that CR is acceptable (Table 3). The average variance extracted (AVE) value was greater than 0.5 for each construct, accounting for at least 50% of the variance items in the model, deemed convergence validity.

TABLE 3: CONSTRUCTS VALIDITY AND RELIABILITY

Variable	Code	Construct	OL	CA	CR	AVE
Treatment effectiveness	TRE1	The medication I am using or taking relieves my skin disease	0.907	0.800	0.836	0.714
	TRE2	I feel better now than I did before starting the treatment	0.852			
	TRE3	I think that my skin disease is now well under control	0.771			
Convenience of use	COU1	I find it easy to apply or take the medication in its present form	0.960	0.922	0.927	0.928
	COU2	The dosage for taking or applying the medication is convenient for me	0.966			
Impact on daily living	IDL1	After the medication, I feel I can do more daily activities without disturbance relating to my skin disease	0.951	0.877	0.908	0.801
	IDL2	After the medication, I can perform my daily activities like the usual	0.839			
	IDL3	After the medication, I feel in a better mood	0.892			
Medical care information	MCI1	I received useful information needed about my medication concerning my skin disease	0.799	0.845	0.850	0.766
	MCI2	I received clear information about the benefit of my medication	0.930			
	MCI3	I received clear information about the side effects of my medication (e.g., stomach issue)	0.892			
Treatment side effect Tolerable	TSE1	The side effects of the medication interfere with my work or occupation	0.915	0.885	0.952	0.806
	TSE2	The side effects of the medication interfere with my leisure and free time activities	0.901			

	TSE3	The side effects of the medication interfere with my daily activities/ task	0.877			
Physician communication	PYC1	I feel my doctor listen to my complains and communicate in an easily manner	0.838			
	PYC2	The doctor gave me the opportunity to ask questions about my skin disease	0.924			
	PYC3	The doctor was able to reassure me that my skin disease could be treated	0.898	0.848	0.902	0.690
	PYC4	The doctor showed a professional attitude during my care	0.631			
Overall patient satisfaction	OPS1	In general, I feel satisfied with the treatment I received at the Dermatology and Venereology outpatient department	0.821			
	OPS2	The service at the Dermatology and Venereology outpatient department is in line with my expectations	0.821	0.872	0.875	0.723
	OPS3	I feel satisfied with the result of the treatment received	0.864			
	OPS4	I feel satisfied with the attitude shown by the doctors and nurses at the Dermatology and Venereology outpatient department	0.894			
Hospital reputation	HPR1	I feel that this hospital prioritizes a patient-centered care	0.838			
	HPR2	In my opinion, this hospital deserves to be the first choice for patients	0.859	0.828	0.845	0.743
	HPR3	This hospital has demonstrated superior quality services	0.888			

OL: Outer loadings, CA: Cronbach's alpha, CR: composite reliability, AVE: average variance extracted; TRE: treatment effectiveness; COU: convenience of use; IDL: impact on daily living; MCI: medical care information; TSE: treatment side effect tolerable; PYC: physician communication; OPS: overall patient satisfaction; HPR: hospital reputation

The heterotrait-monotrait ratio (HT/MT) was known to be more accurate in identifying discriminant issues and used to determine the discriminant validity test. All the constructs in this study's validity test had values less than 0.9 (Table 4), which led to the conclusion that every indicator in the research model had been adequately discriminated against to enable the measurement of each construct.

TABLE 4: HETEROTRAIT-MONOTRAIT RATIO (HTMT) – MATRIX

Variable	COU	HPR	IDL	MCI	OPS	PYC	RCY	TSE	TRE	RCYxPYC	RCYxTSE	RCYxMCI	RCYxIDL	RCYxOPS	RCYxTRE
COU	1														
HPR	0.488	1													
IDL	0.318	0.721	1												
MCI	0.369	0.709	0.430	1											
OPS	0.666	0.820	0.431	0.700	1										
PYC	0.373	0.465	0.154	0.489	0.711	1									
RCY	0/131	0.330	0.692	0.169	0.111	0.075	1								
TSE	0.491	0.642	0.422	0.548	0.707	0.447	0.278	1							

Evaluation of Dermatology Treatment Satisfaction towards Hospital Reputation among Chronic Skin Disease Patients at An Eastern Indonesian Referral Hospital

TRE	0.81	0.7	0.4	0.6	0.8	0.4	0.1	0.5						
	7	51	38	15	10	12	87	29						
RCY x	0.15	0.2	0.1	0.2	0.3	0.4	0.0	0.2	0.1					
PYC	6	15	32	93	39	06	16	21	30					
RCY x	0.26	0.4	0.4	0.3	0.2	0.1	0.4	0.5	0.2	0.455				
TSE	5	22	18	25	99	88	41	45	35					
RCY x	0.22	0.4	0.3	0.5	0.3	0.2	0.2	0.3	0.2	0.594	0.625			
MCI	1	04	44	02	09	47	70	20	39					
RCY x	0.22	0.4	0.7	0.2	0.1	0.0	0.8	0.3	0.2	0.139	0.580	0.513		
IDL	0	5	45	83	83	64	42	36	44					
RCY x	0.47	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.3	0.334	0.539	0.456	0.420	
COU	7	66	76	33	30	44	21	82	26					
RCY x	0.38	0.4	0.3	0.3	0.3	0.1	0.3	0.2	0.4	0.345	0.575	0.589	0.540	0.790
TRE	2	35	81	05	24	47	82	99	21					

TRE: treatment effectiveness; COU: convenience of use; IDL: impact on daily living; MCI: medical care information; TSE: treatment side effect tolerable; PYC: physician communication; OPS: overall patient satisfaction; HPR: hospital reputation

Previously, the inner variance inflation factor (VIF) was used to assess common method bias (CMB) resulting from measurement bias. This study's findings indicate that all constructs have an inner VIF below 3.3, implying that no common method bias issue is found in this model [23].

This research model shows that the OPS R² was 0.788, categorized as strong explanatory power, while the HPR variable R² was 0.507, categorized as moderate-to-strong explanatory power. The PLS_predict procedure was used to evaluate the predictive ability of the overall model [20,21]. Furthermore, the cross-validated predictive ability test (CVPAT) approach was carried out to assess a model's predictive capacity (Table 5) [24]. The results of this research show a comparison of PLS-SEM with the average indicator (IA). Then, compared to IA, the linear model (LM) shows a negative value, which means the error value is lower in PLS-SEM, whereas LM has a positive value found, and the model has adequate predictive ability.

TABLE 5: CROSS VALIDATED PREDICTIVE ABILITY TEST (CVPAT)

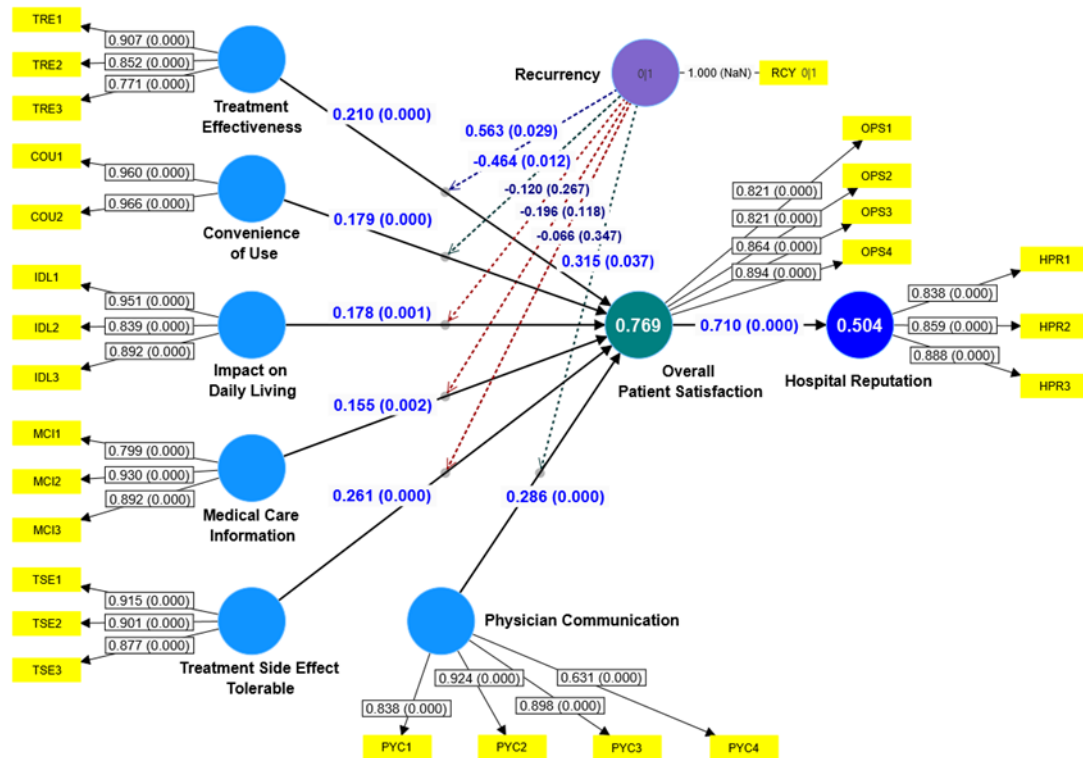
Variable	PLS-SEM vs. Indicator Average (IA)		PLS-SEM vs. Linear Model (LM)	
	Average loss difference	P-value	Average loss difference	P-value
Hospital reputation	-0.160	0.000	0.114	0.000
Overall patient satisfaction	-0.226	0.000	0.013	0.214
Overall model	-0.198	0.000	0.056	0.000

According to the results of hypothesis testing using the bootstrapping feature (Table 6 and Figure 2), ten hypotheses were accepted based on the criteria of P-value <0.05 and confidence interval (CI) of 5% and 95% in the direction of the hypotheses. However, hypotheses H7c, H7d, and H7e did not meet the significance requirements, and thus, they were not supported.

TABLE 6: SIGNIFICANCE & COEFFICIENTS

Hypotheses		Std. Coefficient	P-values	CI		Result	f2
				Lower 5%	Upper 95%		
H1	Treatment effectiveness → Overall patient satisfaction	0.210	0.000	0.110	0.309	Hypothesis supported	0.063
H2	Convenience of use → Overall patient satisfaction	0.179	0.000	0.091	0.261	Hypothesis supported	0.051
H3	Impact on daily living → Overall patient satisfaction	0.178	0.001	0.080	0.272	Hypothesis supported	0.061
H4	Medical care information → Overall patient satisfaction	0.155	0.002	0.070	0.244	Hypothesis supported	0.051
H5	Treatment side effects tolerable → Overall patient satisfaction	0.261	0.000	0.179	0.342	Hypothesis supported	0.142
H6	Physician communication → Overall patient satisfaction	0.286	0.000	0.216	0.358	Hypothesis supported	0.220
H7a	Recurrency x Treatment effectiveness → Overall patient satisfaction	0.563	0.029	0.119	1.089	Hypothesis supported	0.047
H7b	Recurrency x Convenience of use → Overall patient satisfaction	-0.464	0.012	-0.838	-0.172	Hypothesis supported	0.053
H7c	Recurrency x Impact on daily living → Overall patient satisfaction	-0.120	0.267	-0.426	0.186	Hypothesis not supported	0.003
H7d	Recurrency x Medical care information → Overall patient satisfaction	-0.196	0.118	-0.427	0.100	Hypothesis not supported	0.010
H7e	Recurrency x Treatment side effect tolerable → Overall patient satisfaction	-0.066	0.347	-0.344	0.211	Hypothesis not supported	0.002
H7f	Recurrency x Physician communication → Overall patient satisfaction	0.315	0.037	0.049	0.621	Hypothesis supported	0.031
H8	Overall patient satisfaction → Hospital reputation	0.710	0.000	0.665	0.754	Hypothesis supported	1.018

FIGURE 2: INNER MODEL



The result also shows that OPS has a large effect size on HPR with an f^2 value of 1.018. This indicates that overall patient satisfaction has a large effect size. At the same time, physician communication has a moderate size effect on overall patient satisfaction.

DISCUSSION

The purpose of this study was to assess factors that can affect overall patient satisfaction in chronic skin disease patient services at a referral hospital. Key findings from this study indicate that overall patient satisfaction has a strong relationship with hospital reputation. The more satisfied patients are, the more positive their perception of the hospital will be, which will encourage compliance with the treatment given by the doctor. Another key finding is that physician communication has a greater influence than other factors, followed by treatment effectiveness.

The results of this study provide strong empirical evidence supporting the significant relationship between patient satisfaction and hospital reputation in the context of chronic skin disease treatment. The six variables—treatment effectiveness, convenience of use, impact on daily living, medical care information, treatment side effects, and physician communication—all contribute meaningfully to overall patient satisfaction, with physician communication and treatment side effects being the strongest predictors. The moderation analysis reveals that recurrence has a nuanced effect, strengthening the link between treatment effectiveness and patient satisfaction while positively moderating physician communication. These findings are critical as they highlight the importance of clinical efficacy, communication, and patient-centered care in fostering trust and building the hospital's reputation. This insight can guide public hospitals in enhancing the quality of care for chronic conditions, especially in a long-term treatment setting, ultimately improving patient retention and hospital performance.

This study shows that communication must be a concern for doctors who practice skin outpatient departments so that interactive, informative, and more persuasive communication can occur so that the disease can be cured/ underwent remission; this result was obtained from a lower mean in descriptive items. The importance of physician communication was consistent with a previous study [15]. Therefore, the Dermasat instrument, when implemented, should be integrated with the communications element, following the modification done for this study. Physician communication in health care

involves a communication skill centered on the patient, positively impacting patient satisfaction, treatment compliance, and self-management [25]. Physician communication also occurs between patients with skin disease in the outpatient department, not limited to explaining but also to empathizing and motivating the patient to heal, which may exert a positive feeling among patients with chronic skin disease.

Treatment effectiveness revealed that good outcomes from care or treatment tend to increase patient satisfaction. When a treatment effectively decreases a symptom of a disease, improves the health condition, or increases the quality of life of a patient, this will directly contribute to the patient's positive perception of the care received. A chronic skin disease will require a longstanding and continuing treatment; therefore, an effective treatment will yield a great outcome and subsequently increase overall patient satisfaction [26].

Convenience of use, in terms of treatment received by a patient, refers to how easy and practical a treatment or care is to be used or implemented by a patient or health care provider. This concept includes several aspects, e.g., the practicality of medical equipment, availability of an easy-to-take drug formulation, and simplicity in carrying out treatment procedures [27]. The result of this study aligns with the study from Qian et al. (2020), that ease of use of the drug is a crucial factor in the perception felt by a patient, which may influence the degree of satisfaction of a patient in a hospital [28]. Impact on daily living, in terms of treatment received by a patient, refers to how the treated condition or disease influences a patient's daily activities. This aspect includes the ability to work, social interaction, physical activity, and general daily living [14]. The result of this study is confirmed by a study done by Meule et al. (2020), who reported a significant increase in the quality of life among patients with mental disorders during treatment, and this change was associated with a change in depression symptoms [29]. When a treatment can overcome a patient's symptoms or improve the patient's functionality, this will tend to impact overall patient satisfaction positively.

Medical care information may be defined as the comprehensiveness and consistency of information, influencing the efficiency, quality, and secureness of a diagnosis and treatment [30]. The result of this study aligns with a study by Zhang et al. (2020), who stated that the outcome perception of patients' visits to health care and patient communication with the professional healthcare provider were the most important variables associated with the satisfaction of patients at an outpatient department in China [31]. Patients will generally feel satisfied when given a detailed explanation concerning their disease. Apart from the information regarding their disease, patients will be required to know how the received treatment will impact the course of the disease, how to use the treatment, side effects that may arise, and preventive measures to prevent the side effects.

The treatment side effect is a concerning treatment complication that may result in decreased quality of life and earlier cessation of treatment and negatively impact the treatment outcome [32]. Long-term treatment and compliance are required to avoid recurrences in chronic skin disease. However, this compliance will be reduced by the side effects. Effective, informative education is crucial in increasing patient adherence to taking medication. A systematic study by Aljofan (2023) highlighted that patient unintentionally falls into the nonadherence category of therapy-related factors due to their misunderstanding of treatment, particularly when given complex regimens, resulting in improper timing of drug administration or administration of numerous medications at frequent or unusual times during the day. Therefore, the patient should be provided with all necessary and essential information, including the name of the medication, its purpose, the rationale for choosing it, the dosing frequency, when it should be taken, how long it should be taken, and any potential adverse effects (their likelihood of occurring, whether they will resolve without intervention, and how the treatment plan may change if they do not resolve) [33].

This study supports the concept of quality of healthcare by Donabedian (1988) and indicates that structure and process are the core of a quality outcome [10]. The findings of this study highlighted that competent structural resource and communicative skills, i.e., effective information exchange, establishing good interpersonal relations, overcoming patient concerns, and utilizing a patient-centered associated with patient satisfaction and health outcomes. The theoretical implementation of the current study is to strategize comprehensive management for chronic skin disorder based on the outcome process by Donabedian, where the interconnected structure of six measurable variables, i.e., treatment

effectiveness, convenience of use, impact on daily living, medical care information, treatment side effect tolerable, physician communication should be integrated. This proposed study model has a significantly adequate explanatory and predictive value for replication for future studies.

To complement the findings of this study, future researchers could explore the impact of cultural and socio-economic factors on patient satisfaction and hospital reputation, particularly in diverse regions. Additionally, conducting longitudinal studies would provide valuable insights into how patient satisfaction and hospital reputation evolve, especially in chronic skin disease management cases. Further research could also investigate the role of telemedicine in enhancing physician-patient interactions, potentially broadening the scope of physician communication as a critical factor in patient satisfaction. Finally, expanding the study to include other chronic conditions could enhance the generalizability of the findings across different patient populations.

CONCLUSION

In conclusion, this study highlighted that treatment effectiveness and physician communication have a significant positive relation toward overall patient satisfaction. A higher perception of each described variable yielded a higher overall patient satisfaction. Another important highlight is the moderated recurrency variables, which are significantly associated positively with treatment effectiveness, physician communication, and significantly associated negatively with convenience of use. However, recurrency needs proof of the impact on daily living, medical care information, and treatment side effects toleration. Overall patient satisfaction is significantly associated positively with hospital reputation, indicating that higher overall patient satisfaction will increase the hospital reputation, which can encourage patient trust and compliance in the long term. This can be an input for policies to improve the health status of chronic skin patients.

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FACTORS INFLUENCING CUSTOMER SATISFACTION IN HEALTH INSURANCE: A COMPREHENSIVE STUDY IN BENGALURU, INDIA

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ABSTRACT

OBJECTIVE:

This paper focuses on the multifaceted dimension of customer satisfaction in health insurance within Bengaluru city. Bengaluru city is a metropolis in India with a diversified population with diverse insurance preferences, and healthcare requirements. Through this comprehensive study, we strove to analyze the impact of demographic features and health insurance benefits on customer satisfaction.

METHODS:

We have gathered data using a structured questionnaire. Chi-square and logistic regression tests were conducted using R – Program to understand which factors influence consumer satisfaction in Health Insurance (HI).

SUMMARY:

This research investigates the factors influencing customer satisfaction in health insurance (HI) in Bengaluru, India, a city with diverse healthcare needs and insurance preferences. Using statistical tools like Chi-square and Logistic Regression in R, the study identifies key demographic and policy-related factors affecting satisfaction.

RESULTS:

Occupation ($p < 0.01$), family income ($p < 0.001$), health insurance type ($p < 0.05$), and 'Is affected by COVID-19 previously' ($p < 0.05$) features are statistically significant. Claim settlement ratio ($p = 0.004$), co-payment percentage ($p = 0.034$), network hospitals coverage ($p = 0.018$), tax benefits ($p = 0.015$), and waiting periods ($p = 0.020$) were found to be influencing factors of HI customer satisfaction.

CONCLUSION:

This customer satisfaction study enables policymakers and insurance service providers to understand the dynamics of the customer. The government, HI providers and researchers can use these results to plan new HI policies and improve customer satisfaction in HI.

KEYWORDS

Customer satisfaction, purchase decision, Health Insurance, logistic regression

INTRODUCTION

Only 38% of India's population is covered under different health insurance (HI) including government-sponsored and private health insurance policies [6]. The health insurance penetration rate is very low and has to reach all of the citizens of India for a better healthy nation. The Rotileanu and Onişor study [13] identified the need for private health insurance to complement the limited coverage of public health packages, especially during crises like the COVID-19 pandemic. It also highlights the importance of enhancing customer satisfaction. The customer satisfaction is a primary factor for any business success, thus many businesses consider customer satisfaction as the primary driver of their business growth and try to keep their customers satisfied [5]. Therefore, understanding factors influencing customer satisfaction in the area of the health insurance industry has become important for insurance providers, policymakers, and researchers.

In this modern era with more technological advances in health care, more awareness of health, growing expenses of health care, most of the customers who have greater health care needs but often struggle with the affordability of HI [9]. "Out-of-pocket payments" may create a barrier to healthcare system utilisation, which is particularly crucial in the oldest population segments [11] and recently co-payment for each claim is imposed to avoid the fraud claims, with all these people considering health insurance as a vital shield for medical expenses.

The COVID – 19 pandemics had a significant impact on the overall insurance sector in India. Medical emergencies experienced by people during the pandemic emphasized the significance of having adequate insurance coverage [7] While only 10% of people considered health insurance necessary before the outbreak of Coronavirus in India, this has now increased to almost 70% who consider it essential to protect themselves from unforeseen events [12].

The Concept of health insurance has grown beyond financial investment for tax saving. It serves as a safeguard against unforeseen medical emergencies. In recent years after COVID-19, the healthcare industry witnessed significant changes such as telehealth, video consultation, treatment protocols, regulatory frameworks, and technological advances. These changes forced the health insurance industry to design new plans, new features, and new competition. This encourages insurance providers to have enumerated insurance plan options to choose from based on customer social, cultural, economic, and individual preferences.

Consumers often struggle to select the best option when selecting HI plan from range of available choices. While it is theoretically sound to argue for the utilitarian value of providing individuals with a variety of options, considering the vast diversity in risk profiles and preferences, real-world observations in health insurance markets suggest the prevalence of choices that do not align with utility-maximizing behavior.[1]

According to Ong et al. [10] factors affecting satisfaction among PhilHealth members in the Philippines, finding that the most significant factor is Expectation (EX). Their study recommends employee training and policy improvements to enhance services for PhilHealth members Krishnan and Pai [8] in their study in Kerala, India, examined customer satisfaction dimensions in health insurance. It identified three dimensions: insurance agent-related factors, insurance company-related factors, and insurance policy-related factors. That study found that customer satisfaction with health insurance products is not dependent on gender, age, or nature of employment but noted that these demographic variables can influence specific factors within customer satisfaction, such as gender's impact on agent-related and policy-related factors. Further research is needed to explore how various demographic factors affect specific aspects of customer satisfaction

METHODS

DESIGN

We have selected the variables which all can affect the insured satisfaction and validated with the previous research. Costa-Font and Font-Vilalta [4] explained that age is an important variable affecting how likely customer wants health

insurance, but companies calculate insurance premiums based on age and screen them for medical claims, marital status were found in the Astari and Kismiantini [3] study; the income level variable was found in the Antwi and Zhao [2] study; other variables were selected based on their explainability of the dependent variable and the same was tested in this study.

Dependent variable: Insured satisfaction, whether a respondent was satisfied with a health insurance policy or not. If a response was yes (I'm satisfied with my health insurance plan) captured as one (1) and if a response was no (I'm not satisfied with my health insurance plan) captured as zero (0).

HYPOTHESIS

- H_0 : all categorical independent variables (age, marital status, occupation, family income, insurance type, and 'is affected with COVID-19') are not related to the dependent variable (insured satisfaction)
- H_1 : all categorical independent variables are related to the dependent variables.
- H_0 : all variables including insurance benefits doesn't fit the model.
- H_1 : all variables including insurance benefits fit the model.

TEST

All the tests listed below were conducted using the R – programming language.

- Descriptive statistics like frequency and percentage ratios were carried out along with the below-listed test.
- The Chi-square tests were carried out to test the relationship between insured satisfaction and individual independent variables.
- The binary Logistic Regression test was conducted to test the significance of each independent variable with respect to the dependent variable.

DATA COLLECTION AND SAMPLE

Data was gathered through surveys. The structured questionnaire was designed by a systematic review of existing health-insurance satisfaction surveys; it was pilot-tested among 30 respondents to ensure reliability and internal consistency (Cronbach's $\alpha=0.82$) and used to collect the required information and extended to around 500 individuals in Bengaluru, with 356 respondents having submitted the survey. Sample elements were selected using the snowball sampling technique. The research was done in strict adherence to the "Code of Ethics for Research" of Gandhi Institute of Engineering and Technology university, Odisha, as part of my Ph.D. program. The participation was voluntary, and informed consent was received from all the participants after detailing the research objectives, design, and academic purpose. To ensure their privacy, no personal identifiers were recorded, and all responses have been kept confidential. The information collected will be used purely for academic purposes. None of the information will be distributed to outside sources or reused beyond the scope of this project.

RESULTS AND DISCUSSION

Table 1 shows the number of observations and frequency of the study along with Chi-square results. The total number of observations for the study was 356 which is 71% of the overall sample selected for the study. More than 85% of respondents are below 45 years of age group, and respondents with single as a relationship status are less than 15%. If we analyse the total family income of the household around 33% of respondents have less than 5 lacks family income per year. Irrespective of their income, people hold health insurance as per our study 263 respondents were satisfied with their insurance policy.

TABLE 1: FREQUENCY AND PERCENTAGE FOR THE CATEGORICAL INDEPENDENT VARIABLES

Variable	value	Insured satisfaction		Chi-Square(p-value)
		Dissatisfied frequency (%) [N = 93]	Satisfied frequency (%) [N = 263]	
Age	1 - 35 years	30 (32.26%)	120 (45.63%)	8.733 (p>0.05)
	36 - 45 years	44 (47.31%)	112 (42.59%)	
	46 -50 years	1 (1.08%)	5 (1.90%)	
	56 - 60 years	16 (17.20%)	22 (8.37%)	
	60 years and above	2 (2.15%)	4 (1.52%)	
Marital status	Married	76 (81.72%)	229 (87.07%)	1.1961 (p>0.05)
	Single	17 (18.28%)	34 (12.93%)	
Occupation	Homemaker	5 (5.38%)	28 (10.65%)	15.59 (p<0.01)
	Private employment	40 (43.01%)	153 (58.17%)	
	Public employment	22 (23.66%)	45 (17.11%)	
	Self-Employment	19 (20.43%)	22 (8.37%)	
	student	7 (7.53%)	15 (5.70%)	
Family income	10 to 15 lacks	9 (9.68%)	54 (20.53%)	38.277 (p<0.001)
	15 lacks and above	15 (16.13%)	99 (37.64%)	
	2 to 5 lacks	49 (52.69%)	69 (26.24%)	
	5 to 8 lacks	11 (11.83%)	9 (3.42%)	
	8 to 10 lacks	8 (8.60%)	26 (9.89%)	
Health Insurance plan type	up to 2 lacks	1 (1.08%)	6 (2.28%)	4.665 (p<0.05)
	Corporate health insurance plan	48 (51.61%)	171 (65.02%)	
	Individual health insurance plan	45 (48.39%)	92 (34.98%)	
Is Affected with COVID-19	No	28 (30.11%)	117 (44.49%)	5.3039 (p<0.05)
	Yes	65 (69.89%)	146 (55.51%)	

Out of our sample, 60 % of respondents have corporate and 40 % of respondents have an individual insurance policy. Corporate policies are purchased and managed by corporates and apply for a larger group of employees hence, these corporate policies come with some additional features that are very expensive in individual insurance, thus 78 % of respondents among corporate policyholders are satisfied with insurance policy. The same satisfaction level among individual policyholders is 67%.

The results of the Chi-square test for the association between independent categorical variables and dependent variables are shown in the last column in Table 1. Computed values of age and marital status are greater than the chi-square critical value (at 5% significant value), so the null hypothesis for these variables was accepted and concluded that age and marital status are not related to health insurance satisfaction. Whereas the calculated Chi-square value is lesser than the critical value (at 5% significant value) for the occupation, family income, health insurance type, and 'Is affected by COVID-19 previously' hence concluded that all these categorical variables are related (dependent on each other) on insured person satisfaction by rejecting the null hypothesis.

BINARY LOGISTIC REGRESSION ANALYSIS

The dependent variable in the logistic regression is usually binary. That is, the response variable can have possible outcomes as 1 or 0 whereas the success of the outcome will always be denoted with a probability of 1 (one), or the failure of the outcome always be denoted with a probability of 0 (zero) Health insurance characteristics like tax benefits, waiting periods, network hospitals coverage, sub-limits like room rent, premium amount, co-payment percentage, claim settlement ratio of the respective company, and benefits like hospitalization cash and health check-ups were added in a structured questionnaire to gather which all are important for the respondent and influence his/her satisfaction level. All these binary responses of yes/no ('yes' coded as 1 and 'no' coded as 0) for each variable supplied to the logistic regression model. To test all these variable fits the model (H0).

TABLE 2: BINARY LOGISTIC REGRESSION ANALYSIS SUMMARY

Characteristic	Estimate	Std. Error	Wald	Pr (> z)	Odds Ratio	95% CI for Odds Ratio
Hospitalization cash	-0.321	0.358	-0.898	0.369	0.730	0.36, 1.47
Benefits like health check-ups	-0.443	0.377	-1.174	0.240	0.640	0.30, 1.34
Claim settlement ratio	-1.029	0.356	-2.895	0.004	0.360	0.18, 0.71
Co-payment percentage	0.676	0.319	2.117	0.034	1.970	1.06, 3.71
Network hospitals coverage	0.721	0.304	2.374	0.018	2.060	1.14, 3.77
Premium amount	-0.022	0.306	-0.073	0.942	0.980	0.53, 1.78
Recommended by family/ friend/ agent/ health care professional	-0.463	0.423	-1.095	0.274	0.630	0.27, 1.46
M Sub-limits like room rent	-0.527	0.339	-1.554	0.120	0.590	0.30, 1.15
Tax benefit	-0.835	0.343	-2.432	0.015	0.430	0.22, 0.84
Waiting period	1.285	0.552	2.328	0.020	3.620	1.31, 11.6

The results of the binary logistic regression analysis for variables influencing insured satisfaction are shown in Table 2, which provides estimates, standard error (S.E), Z value, p values, odd ratios, and 95% Confidence interval ratios. In this study, all these variables are treated as categorical variables. The Wald test is used to test the hypothesis for individual regression coefficients. The ratio of estimated coefficient and standard error is known as Wald test values. For example, the coefficient for the waiting period is 1.285 and the respective S.E is 0.552 and the Wald value is 2.328 as shown in Table – 2, the p-value for the same is 0.020 which is lesser than the standard critical p-value (0.05) hence waiting period is statistically significant. The Wald value suggests that the waiting period, tax benefit, network hospital coverage, co-payment percentage, and claim settlement ratio were statistically significant at the significance level of 0.05 for each variable. 'The network hospital coverage' odd ratio (OR) is 2.060 and the 95% confidence interval (CI) is 1.14, 3.14, and 'The claim settlement ratio' OR value is 0.360 and 95% CI is 0.18, 0.71 have a more significant impact on health insurance satisfaction than the 'Is plan recommended by family/friend/agent/health care professional' OR is 0.274 and 95% CI is 0.27, 1.146. 'The premium amount' (OR is 0.980, 95% CI 0.53, 1.78) is not at all significant impact on health insurance satisfaction whereas, 'tax benefit' (OR is 0.430 and 95% CI 0.22, 0.84) and 'co-payment percentage' (OR is 1.970, 95% CI 1.06, 3.71) are a more

significant impact on insured satisfaction. Health insurance benefits like 'Hospitalization cash' (OR is 0.730, 95 % CI 0.36, 1.47) and 'health check-up' (OR is 0.640, 95% CI 0.30, 1.34) is not have any significant impact on insured satisfaction whereas 'waiting period' (OR is 3.620, 95% CI 1.31 and 11.6) has a more significant impact.

KEY FINDINGS

1. Demographic Factors:

- Occupation ($p < 0.01$ $p < 0.01$),
- family income ($p < 0.001$ $p < 0.001$), and
- health insurance type ($p < 0.05$ $p < 0.05$) significantly affect satisfaction.
- A history of being affected by COVID-19 ($p < 0.05$ $p < 0.05$) also plays a role.

2. Policy-Related Factors:

- Claim settlement ratio($p = 0.004$ $p = 0.004$)
- Co-payment percentage($p = 0.034$ $p = 0.034$)
- Network hospital coverage($p = 0.018$ $p = 0.018$)
- Tax benefits($p = 0.015$ $p = 0.015$)
- Waiting periods($p = 0.020$ $p = 0.020$)

Demographic variables such as occupation and family income significantly influence customer satisfaction in health insurance, the perceptions of value and the accessibility of services play crucial roles in shaping customer experiences and satisfaction levels in health insurance. A policyholder's occupation influences their satisfaction with health insurance services in several ways such as access to employer-sponsored insurance, risk exposure and coverage needs, awareness and decision-making and financial stability. Occupation influences insurance awareness, access to best quality insurance products, and financial stability, while family income affects affordability, perceived value, and financial security. By recognizing these demographic influences, insurers can develop targeted strategies to enhance customer experience, improve insurance offerings, and ensure better access to health insurance services for various consumer groups.

IMPLICATIONS

- Policymakers and insurers can use these insights to design customer-centric HI policies.
- Emphasis on improving claim settlement processes, expanding hospital networks, and reducing waiting periods can enhance satisfaction.
- Tailored policies for different income groups and occupations may address diverse customer needs effectively.

CONCLUSION

Customer age and marital status have no impact on contrary occupation, family income, health insurance type, and 'Is affected by COVID-19 previously' has an impact on customer satisfaction. Respondents are ready to pay more premiums if required and looking for good network coverage, a better claim ratio, and less co-payment percentage. It's obvious that paying a one-time premium is a better option than paying more share (co-payment) for each claim.

People are not buying insurance policies because someone such as a friend/family member/ insurance agent/health care professional suggested or asked, they are more keen on insurance company network coverage and claim settlement ratios. Benefits offered by health insurance provider like 'hospitalization cash', and 'health check-ups' has no impact on customer satisfaction. Waiting period for pre-existing diseases is more important and it has a significant impact on insured satisfaction. Though it is one of the regulatory requirements, if insurance providers can provide options to reduce the waiting periods might be helpful for enhanced customer satisfaction.

Conflict of Interest

Authors advise that they have no conflicts of interest to disclose.

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THE IMPLEMENTATION OF GOOD HOSPITAL GOVERNANCE ON THE PROFESSIONAL PERFORMANCE OF NURSES

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ABSTRACT

Bureaucratic reform in Indonesia is a renewal effort to realize a good governance system as a specific practice model that supports nurses' empowerment and decision-making to influence policy, thus affecting their performance. The purpose of this study was to analyze the effect of hospital good governance implementation (i.e., participation, responsiveness, accountability) on the performance of nurses in RSUD Daya Makassar City, Indonesia.

This type of research uses a quantitative analytical survey with cross-sectional approach. A total of 101 nurses were sampled with a total sampling method for this study. Data collection was through questionnaires. Chi-square and multiple logistic regression were used for data analysis. There was a relationship between participation ($p = 0.025$), responsiveness ($p = 0.003$) and accountability ($p = 0.002$) with nurses' performance. Multiple logistic regression analysis showed that accountability had the strongest influence ($\text{Exp (B)} = 77.634$, $p = 0.006$).

This study concludes that in implementing good hospital governance, accountability is more effective in improving nurse performance. Nurses should be more accountable in their performance in caring for patients.

KEYWORDS

accountability, hospital good governance, health policy, nurses

INTRODUCTION

Good governance of public health and well-being is one of the most important components that belong to a framework that includes health as a human right and key dimensions of well-being and social justice [1]. The long journey of bureaucratic reform provides deeper learning towards structuring a better governance system. Bureaucratic reform refers to all aspects of improving government performance [2].

The public service sector is one of the health resources that requires attention to achieve good governance [2]. Good governance requires a set of interactive and synergistic policies that involve structural (i.e., health institution) and non-structural (i.e., community) parties to build collaboration [3].

Good governance is defined as a professional practice model that supports the empowerment and shared decision-making of health care workers to be accountable for influencing policies and care delivery processes. According to the Minister of Health Regulation No. 30 of 2019, hospitals as health care institutions should be able to provide and organize comprehensive health care services, which implies the need to apply good governance [4]. Therefore, the need for health services performance to apply good governance is the right choice to provide performance satisfaction [5].

Based on the Indonesian Law No. 44 of 2009 on Hospitals, Article 33 paragraph 1 states that every hospital must be an effective, efficient and accountable organization to achieve its vision and mission by implementing good hospital governance. This shows the importance of every hospital in Indonesia to implement hospital good governance to meet the needs of health services in the community [6]. Hospitals that implement good governance will have a good impact on service quality and increase patient satisfaction [7-9]. In order to provide these health services, hospitals need human resources to provide health services professionally [9,10]. Human resources are people who are employed in a company as a source of movers, thinkers and planners to achieve a goal in the organization [11] which can benefit policy makers and managers to take timely and integrated actions in any situation, including emergencies [12]. Good service can be experienced by patients from the appearance of health staff especially nurse includes friendliness, neatness, orderliness, care, diligence and conciseness [6,7].

Nursing performance is the activity of nurses to implement the authority of duties and responsibilities to achieve the main task of the profession in supporting the organizational vision [13]. According to preliminary observation from hospital secondary data reports and interview, there was a decrease of nursing performance in Makassar City Hospital 2022-2023 from 89.20% to 73.11%. Meanwhile, the results of researcher interviews with several nurses in this hospital found that there was still a lack of training or development programs for nurse performance although the hospital has considered implementing good governance. In addition, the performance can also be evaluated by service indicators such as Bed Occupancy Rate (BOR), Length of Stay (LOS), Turn Over Interval (TOI), and Bed Turn Over (BTO) [5]. The data from medical records of Makassar City Daya Hospital in 2022-2023 showed a decrease to 34.33%. Therefore, it can be suggested that the implementation of hospital governance may still need attention. Therefore, further analysis on the implementation of good governance in relation to nurse performance in this hospital should be investigated. Based on the preliminary finding that reported a lack of nurse performance the study aimed to investigate the influence of good governance on nurse performance at Daya Hospital Makassar City.

METHODS

STUDY DESIGN AND LOCATION

The method used in this study was an analytical survey with a cross-sectional approach. Makassar City Regional General Hospital, is located in the area of residential development and industrial areas in Makassar city, South Sulawesi, Indonesia [14].

POPULATION AND SAMPLING

The population in this study was 101 nurses in the inpatient unit in Daya Hospital. The sampling technique used was a non-probability sampling approach with total sampling method. Therefore, the enrolled sample was 101 nurses.

INSTRUMENTS AND PROCEDURES

The current study used a self-administered questionnaire adopted from previous studies [11,13,15,23] consisting of questions about nurse performance and good governance implementation indicators (i.e., participation, responsiveness, and accountability). Nurse performance ($\alpha=0.743$) was defined as nursing behaviors that describe their performance in providing nursing care for the recovery and well-being of patients. Participation ($\alpha=0.832$) was the involvement of nurses in decision making. Participation was based on freedom of association, expression, and participation. Involvement in the development of work plans and participation in training programs. Responsiveness ($\alpha=0.817$) was the ability to respond quickly and responsively to nurses' criticisms, suggestions, or problems on the inpatient unit. Accountability ($\alpha=0.821$) was

clarity in the implementation of duties, authority and responsibility of nurses' work reports, sanctioning nurses who make mistakes in the inpatient unit. The reliability of the questionnaires was assessed using Cronbach's alpha (α) test. The value equal to or greater than 0.70 was considered reliable. The scale was used Likert scale (1=strongly disagree – 5=strongly agree). The score was categorized based on the mean score. The score below the mean would be categorized as not or less, and the score above the mean would be positive.

Participants were given an explanation of the purpose of the research and asked to participate in the study. If they agreed, they had to sign a written informed consent. Participants were then given a self-administered questionnaire to complete for 10-15 minutes. The researcher would explain to the participants if there was an unclear question, without interfering with the answer. No compensation was given during the study and they were free to withdraw at any time.

ETHICS STATEMENT

The procedure in this study had received approval from the Research Ethics Commission of Faculty of Public Health, Hasanuddin University, Makassar, South Sulawesi, Indonesia, with approval number: 1288/UN4.14.1/TP.01.02/2024.

DATA ANALYSIS

The data obtained were analyzed using univariate, bivariate and multivariate models. Univariate analysis was used to obtain a descriptive picture of the characteristics of the respondents. Bivariate analysis was used to analyze the relationship between the variables of participation, responsiveness and accountability to nursing performance. In addition, multivariate analysis was conducted to analyze the most significant influence of variables on nurses' performance. Therefore, bivariate analysis was performed using chi-squared test and multivariate analysis was performed using multiple logistic regression. The Hosmer and Lemeshow test and Nagelkerke R-squared were used to ensure the fit and estimated power of the model. All data were entered and analyzed using IBM SPSS version 22 software at the 95% confidence level ($\alpha=0.05$).

RESULTS

TABEL 1: RESPONDENTS CHARACTERISTICS

Characteristics	n	%
Sex		
Male	7	6.9
Female	94	93.1
Age (Years)		
26 – 35	37	36.6
36 – 45	57	56.4
40 – 55	7	6.9
Education		
Diploma	31	30.7
S1	27	26.7
S2	1	1.0
S3	1	1.0
Nursing Profession	41	40.6
Total	101	100.0

Table 1 shows that most of the respondents in this study were female as many as 94 people (93.1%). Based on the age group, most of the respondents were 36-45 years old, namely 57 people (56.4%). Based on the last education, most of the respondent were nursing profession, namely 40 people (41.6%).

TABLE 2: BIVARIATE ANALYSIS FOR ASSOCIATION BETWEEN HOSPITAL GOOD GOVERNANCE IMPLEMENTATION FACTORS AND NURSE PERFORMANCE

Variables	Nurses Performance				Total		p value
	Not good		Good				
	n	%	n	%	n	%	
Participation							
Not good	4	33.3	8	66.7	12	100.0	0.025
Good	7	7.9	82	92.1	89	100.0	
Responsiveness							
Not responsive	5	41.7	7	58.3	12	100.0	0.003
Responsive	6	6.7	83	93.3	89	100.0	
Accountability							
Poor	6	85.7	1	14.3	7	100.0	<0.001
Enough	5	5.3	89	94.7	94	100.0	

Table 2 shows that there was a significant relationship between the variables of participation ($p=0.025$), responsiveness ($p=0.003$), and accountability ($p<0.001$) with nurse performance. A total of 82 respondents (92.1%) had good participation and good performance, 83 respondents (93.3%) had responsiveness and good performance, and 89 respondents (94.7%) had sufficient accountability and good performance.

TABLE 3: LOGISTIC REGRESSION TEST FOR MULTIVARIATE ANALYSIS

Variable	Hosmer and Lemeshow Test	p-value	Exp (B)	Nagelkerke R Square	Overall Percentage (%)
Participation	0.311	0.131	5.289	0.515	94.1
Responsiveness		0.931	0.863		
Accountability		0.006	77.634		

Table 3 shows that the Hosmer and Lemeshow value was 0.311 ($\text{sig} > 0.05$), which means that this model was suitable for use. Meanwhile, among the three variables simultaneously tested for their influence on nurse performance, accountability had a large effect ($\text{Exp (B)}=77.634$, $p=0.006$). Nagelkerke R-squared shows that the value was 0.515 (51.5%), which means that the independent variables in this study had an influence of 51.5% on the dependent variable. In addition, the total percentage value obtained a result of 94.1, which means that the accuracy of the analysis model in this study was 94.1%.

DISCUSSION

This study aimed to investigate the association between three indicators of good governance and nurse performance. It is found that participation, responsiveness and accountability had associated with nurse performance. Moreover, the accountability had significantly large effect on nurse performance.

Participation means that everyone has a voice in decision-making, based on freedom of association, freedom of expression and constructive participation, either directly or through representative institutions [15].

The results showed significant results between the performance of nurses with indicators of participation (Table 2). This indicates that the level of participation of nurses is sufficient. However, there are still count of some nurses did not participate in the program. The reasons are because they are contract workers. In addition, some nurses are also fresh graduates, therefore still lack of experience. However, this is not significant obstacle for the nurses to work well. In fact, they can volunteer for any participation. The more they participate, the more their performance increases. Twingg *et al.*

suggest that the nurse manager should provide care to his/her nurses through shared good governance [16]. This gives them more autonomy in practice, increases their self-esteem, and encourages them to pursue professional and personal development, thereby improving the working environment for themselves and their patients [17,18].

Harmony in the hospital environment will be an important motivation and capital for the hospital to achieve its goals [15]. Therefore, responsiveness of the health workers is required [18,19]. Responsiveness has been identified as a key component of good governance. Responsiveness is also an important issue for policymakers and managers. Responsiveness in health systems encompasses eight common dimensions: prompt attention, dignity, clarity of communication, autonomy, confidentiality, choice of provider, quality of basic facilities, and access to family and social support [3].

The result showed the association between the performance of nurses with responsiveness, which means the performance of nurses was quite responsive in the implementation of good governance at Daya Hospital Makassar City nurses. As part of responsiveness, nurses can collaborate with other health professionals and provide quality care as a form of responsiveness according to evidence-based and patient-centered [20].

Accountability is also defined as the ability to take responsibility for hospital policies. It is assumed that health workers should provide services with full responsibility and provide more opportunities to create a sense of satisfaction for patients. The implementation of accountability can make the organization more developed [21].

Improving health care is important to restore public trust in hospitals. In addition, it is very important to apply the principle of responsibility or accountability in the provision of health care services, especially in hospitals [22].

The results showed the significant relationship between nurse performance and accountability. Moreover, this indicator also showed a greater impact on performance. Rizky *et al.* stated that the principle of accountability is a hospital management framework that must ensure the strategic direction of a hospital, effective oversight of management, and accountability to the hospital and patients [23]. This principle has implications for the legal obligations of management, which are necessary to build trusting relationships with patients and hospitals. Therefore, the impact of this variable on nurse performance is very substantial.

The responsibilities of the nurses in this hospital are obvious. This is shown by them fulfilling their duties according to their competence. In addition, there are sanctions against neglecting responsibilities that help nurses be careful in doing their duty. The instruction from the nurse head manager is also clear for shift changes, making every nurse work according to schedule.

Accountability has a positive effect on organizational performance, which means that with increased accountability, hospital performance will increase. According to institutional theory, in order to maintain the continuity of the organization, it must be able to convince the public that the organization is accountable [22].

The application of accountability in the implementation of good hospital governance can be realized by taking responsibility for stakeholders, so that the management of the company becomes better and measurable, without being apart from the company's interest. It also ensures that all parts of the company and employees have adequate competence in accordance with their duties, responsibilities and roles in the company's business activities [24].

Therefore, accountability should be at the forefront of everyone being responsible for what they do. Nurses' performance on the accountability indicator will make nurses more accountable for their actions when treating patients. When errors or mistakes occur, nurses need to be able to explain and find solutions. Nurses who know they are accountable are more motivated to provide the best service. This has a positive impact on the quality of care patients receive.

CONCLUSION

This study concludes that accountability is a good hospital governance implementation indicator that has the most significant impact on nurse performance. Participation and responsiveness are also significant to nurse performance. These finding implies that nurses should be more accountable for their authority and duty in work and patient as well as pay attention to sanctions to avoid mistakes.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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DETERMINATION OF RELATED FACTORS AND CAREER PROBLEMS IN NURSING: A DESCRIPTIVE AND CROSS-SECTIONAL STUDY

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ABSTRACT

OBJECTIVE:

Career planning is a process empowered by the skills and experiences that enable the nurse to develop as a professional and achieve goals. Therefore, determining the factors affecting career planning is of great importance for the career development of nurses. This study aims to describe the career problems of nurses and the related factors in Türkiye.

MATERIAL AND METHODS:

The sample of the study consisted of 400 nurses working in Türkiye. To collect the data, the Introductory Characteristics Form and the Career Problems in Nursing Scale were utilised.

RESULTS:

Nurses' career problems scale mean total score was 79.06 ± 26.68 . Factors affecting nurses' career problems: educational status, institution, position, the working year, working hours, being willing and satisfied with the profession, personality structure, supporting the institution to make a career, burnout, and chronic fatigue.

CONCLUSION:

In the study, it was found that the career problems of nurses were at a moderate level. It is recommended to provide consultancy and training that nurse need in career planning and development. In this context, it is very important for nurse managers to give importance to the career development of nurses and to support the necessary nurses in this regard.

KEYWORDS

burnout, career, glass ceiling, nurses, problem, stress

INTRODUCTION

According to the World's Nursing 2020 report prepared in cooperation with the World Health Organization (WHO), International Council of Nurses (ICN), and Nursing Now; Nursing constitutes the largest occupational group in the health sector, accounting for approximately 59% of health professions. The global nursing workforce is 27.9 million, of which 19.3 million are professional nurses. In Türkiye; According to WHO data for 2019, 198,103 nurses are serving [1]. To achieve the

Sustainable Development Goals, it is important to improve health for all and empower the nurse workforce on the path toward universal health policies [2].

A career is defined as advancing in a chosen job and as a result of that earning more money, taking on more responsibility, gaining more status, power, and respect [3]. In working life, individuals want to choose a profession that suits their abilities, work for a long time in jobs related to the profession they have chosen, to make career plans in their fields by using the opportunities of education and development in their profession and to rise in the career ladder [4,5]. Career planning is a process that is strengthened with skills and experiences that enable the nurse to develop as a professional and achieve goals. The International Council of Nurses (ICN) has taken a leadership role in this field. In 2010, ICN published a working paper called "Career Planning and Development for Nurses", stating that "nurses' career development should be encouraged and supported by appropriate professional attitudes, education systems, workplace structures, and management attitudes" [6]. The insufficiency of nurse manpower/nurse turnover rate, which has been felt much more intensely in health services especially recently, and the fact that nurses tend to non-nursing areas make the issue of career development in nursing services much more important [7]. Career development is an important tool in the development of nurses as a professional profession [8]. The fact that hospital and nursing services managers work to improve career opportunities in the field of nursing services is effective in helping nurses to choose that hospital, and by directing them to evaluate opportunities for promotion by not leaving the organization, to do their jobs in a more motivated way, to increase job satisfaction, increase success and productivity [7,9]. For this reason, it is very important to determine the career problems experienced by nurses. Career problems are handled within the framework of very broad dimensions. While providing a good career opportunity to employees and giving importance to their career development is important for service quality, identifying career problems and taking measures against them also become a priority for institutions [10,11].

Career-related problems appear in the literature such as a glass ceiling, dual-career spouses, dual careers, moonlight problems, problems that arise in career stages, and work-family conflict, work stress, mobbing, and burnout, which have been discussed in career problems recently [12-15]. Nurses, who are at a very important point in health service delivery, are heavily exposed to all these factors [16]. Nurses who are compatible with work-family life and motivated in work life are important determinants of the quality of patient care [17]. In this context, the problems experienced by nurses should be determined to improve their work-life, motivation levels, and commitment [18]. In this way, it is possible to determine which subjects nurses have problems in their professional development and progress and to make plans to improve their working lives and to be supported. It is thought that determining the career problems experienced by nurses in nursing will contribute to the planning of reducing the stress and burnout levels experienced by nurses, thus increasing their job satisfaction, professional commitment, and motivation levels. However, determining the career problems of nurses will positively affect the development and progress of the profession. When national and international literature is scanned, some studies on nurses' career planning are seen [3,14,21]. However, no study focusing on nurses' career problems has been seen. For this reason, this study was conducted to determine the career problems of nurses and the related factors to them.

MATERIAL AND METHODS

Type of research: The research was conducted as descriptive and cross-sectional.

The universe and sample of the research: The population of the research consisted of 204,969 nurses. The sample size of the study was determined as at least 382 nurses with the sample calculation formula of the known universe [19].

$$S = \frac{Nt^2pq}{d^2(N-1) + t^2pq} =$$

$$\frac{204.969 \times (1.96)^2 \times (0.5) \times (0.5)}{(0.05)^2 \times 204.968 + (1.96)^2 \times (0.5) \times (0.5)} = 382$$

The sample of this study consisted of 400 nurses working in hospitals providing health services throughout Türkiye. The research was carried out between 01/06/2021-15/08/2021 and the Informed Voluntary Consent Form was obtained from the participants at the beginning of the online survey.

Procedure: The research was carried out with nurses working in university, state, and city hospitals providing health services throughout Türkiye. Data were collected through the questionnaire method (online linked) with all individuals in the sample who agreed to participate in the study.

DATA COLLECTION TOOLS

The Descriptive Characteristics Form and the Career Problems in Nursing Scale were used to collect the data for the study. *Introductory Characteristics Form:* It was prepared by the researchers in line with the literature [4,5,7,20]. The introductory characteristics form consists of 25 questions including age, gender, the working year, type of working institution, and factors affecting career problems of nurses.

Career Problems in Nursing Scale (CPNS): Çavmak et al. is a 7-point Likert-type scale consisting of four sub-dimensions [21]. Sub-dimensions of the scale; Stress and exhaustion consisting of 9 items, organizational pressure and occupational incompatibility consisting of 7 items, dual-career problem consisting of 3 items, and gender-related problems in career consisting of 4 items. The minimum score that can be obtained from the scale is 23 and the maximum score is 161. Increasing scores indicate that nurses perceive/experience the relevant dimension as a career problem. The Cronbach's alpha value of the original scale was 0.89. In this study, Chronbach's alpha value of the scale was calculated as 0.93.

EVALUATION OF DATA

The data obtained from the research were evaluated using the IBM SPSS 22.0 (Statistical Package for the Social Sciences) package program. Number, percentage calculation, and mean measures (minimum, maximum) were used in the evaluation of the data. As a result of the normality tests of the data, Student's t-test and/or Mann-Whitney U test were used for comparisons with two groups, and ANOVA and/or Kruskal-Wallis H test were used for comparisons with 3 or more groups. The statistical significance value was accepted as $p < 0.05$.

ETHICAL ASPECT OF RESEARCH

To carry out the research, ethics clearance was obtained from Tokat Gaziosmanpaşa University Social and Human Sciences Research Ethics Committee (No:08.06.2021/12:01). Data was collected online via Google surveys. The first page consists of an informed consent section explaining the purpose of the study, and those who gave consent were included. The Google survey is arranged so that the personal information of the participants is not visible.

RESULTS

FINDINGS REGARD NURSES' DESCRIPTIVE CHARACTERISTICS

The distribution of the individuals participating in the research according to some introductory characteristics is given in Table 1. It was determined that 78.25% of the participants were women, 72 % were between the ages of 18-35, and 77.25% were undergraduate graduates. It was determined that 55.25% of the participants were satisfied with working as nurses, 66.50% chose the nursing profession willingly and 86.00% of the nurses worked as service nurses. It was determined that 72 % of the nurses in the study could not fulfill their career-developing roles and 80 % of them did not support career development. Again, it was determined that 51.50% of the nurses experienced burnout, 52 % experienced chronic fatigue, 86.00% were not satisfied with their current position, and 81.25% needed training or counseling for career planning and career planning.

TABLE 1. DISTRIBUTION OF NURSES BY DESCRIPTIVE CHARACTERISTICS (N=400)

Characteristics	n	%
Gender		
Female	313	78.25
Male	87	21.75
Age (X=30.86±7.57)		
18-35	288	72.00
36-55	112	28.00
Marital status		
Married	186	46.50
Single	214	53.50
Educational Status		
Health vocational high School	26	6.50
License	309	77.25
Graduate	65	16.25
Employed Institution		
City Hospital	50	12.50
Faculty of Medicine (Training and Research Hospital)	231	57.75
Public Hospital	119	29.75
Assigned Unit		
Internal Units	127	31.75
Surgical Units	85	21.25
Intensive care	106	26.50
Operating room	27	6.75
Emergency Unit	33	8.25
Policlinic	22	5.50
Satisfaction with Working as a Nurse		
Yes	221	55.25
No	179	44.75
The state of choosing the profession willingly		
Yes	266	66.50
No	134	33.50
Working Year		
0-5 years	184	46.00
6-10 years	80	20.00
11-15 years	50	12.50
More than 15 years	86	21.50
Current Position		
Service Nurse	344	86.00
Responsible Nurse	33	8.25
Policlinic Nurse	17	4.25
Training Nurse	6	1.50
Weekly Working Hours		
0-40 hours	95	23.75
Between 41-50 hours	149	37.25
Between 51-60 hours	124	31.00
more than 61 hours	32	8.00

State of Being in a Stressful Structure		
Always	86	21.50
Sometimes	308	77.00
None	6	1.50
Institution's Career Support Status		
Yes	80	20,0
No	320	80,0
Experiencing Burnout		
Yes	206	51.50
No	12	3.00
Partially	182	45.50
The state of experiencing chronic fatigue		
Yes	208	52.00
No	20	5.00
Partially	172	43.00
Satisfaction with the Current Position		
Yes	56	14.00
No	344	86.00
Training status for career development and career planning		
Yes	124	31.00
In undergraduate education	76	19.00
Symposium/Conference	36	9.00
Internet	12	3.00
No	276	69.00
State of having a clear career goal		
Yes	294	73,5
No	106	26,5
Need for training or consultancy for career development and career planning		
Yes	325	81.25
No	75	18.75

FINDINGS REGARDING NURSES' NURSING CAREER PROBLEMS SCALE AND SUBSCALES

In Table 2, the mean scores of the Career Problems Scale in Nursing and its sub-dimensions are given. The total mean score of the scale was 79.06 ± 26.68 ; the stress and burnout sub-dimension mean score was 34.64 ± 12.30 , the organizational pressure and occupational incompatibility sub-dimension mean score was 21.65 ± 9.94 , the dual-career problem sub-dimension mean score was 9.85 ± 4.95 , gender-related problems in career sub-dimension score average was 12.92 ± 4.26 .

TABLE 2. CAREER PROBLEMS IN NURSING SCALE AND ITS SUB-DIMENSIONS MEAN SCORES (N:400)

Scale	$\bar{X} \pm Sd$	Min.	Max.
Stress and Exhaustion	34.64 ± 12.30	9	63
Organizational Pressure and Professional Incompatibility	21.65 ± 9.94	7	49
The Dual Career Problem	9.85 ± 4.95	3	21
Gender-Related Issues in Career	12.92 ± 4.26	4	28
Career Problems in Nursing Scale total score	79.06 ± 26.68	23	161

* Mean and SD were examined

FINDINGS REGARD NURSES' DISTRIBUTION OF NURSING CAREER PROBLEMS SCALE TOTAL AND SUBSCALE SCORES BY DEMOGRAPHIC CHARACTERISTICS

Table 3 shows the comparison of Nurses' Career Problems in Nursing Scale total and sub-dimensions score averages and some introductory features. It was found that the scale total score average and stress and exhaustion sub-dimension mean score of the nurses working in the medical faculty/ training and research hospital were higher than the nurses working in the city hospital and state hospital, and the difference was statistically significant ($p < 0.05$). It was found that the scale total score and sub-dimension mean scores of those who were not satisfied with working as nurses were higher than those who were satisfied with working as nurses, and the difference was statistically significant ($p < 0.05$).

It was determined that the scale total score average, dual-career problem sub-dimension score average, and gender-related problems in career sub-dimension score average of the participants who did not choose the profession voluntarily among the participants in the study were higher than the nurses who chose the profession voluntarily, and the difference was statistically significant ($p < 0.05$).

The scale total score average and stress and exhaustion sub-dimension score average of the nurses working 61 hours or more per week were found to be higher than those working between 0-40 hours, 41-50 hours, and 51-60 hours and the difference between them was statistically significant ($p < 0.05$).

It was determined that nurses who were always stressed had higher mean scores in the total scale score, organizational pressure, professional incompatibility sub-dimension, and gender-related problems in career sub-dimension compared to those who sometimes or never experienced stress. The differences between these groups were statistically significant ($p < 0.05$).

The scale total score average, organizational pressure, professional incompatibility, and gender-related problems in the career sub-dimension of the nurses who did not support a career in the institutions they worked for were found to be statistically higher than the nurses who supported the institution to make a career, and the difference between them was found to be statistically significant ($p < 0.05$).

It was found that the scale total score average and all sub-dimension score averages of the nurses who stated that they experienced burnout were statistically higher than the nurses who did not experience burnout and who experienced partial burnout, and the difference between them was found to be statistically significant ($p < 0.05$).

It was determined that the total score average of the scale, the average of the stress and exhaustion sub-dimension, the mean of organizational pressure and occupational incompatibility, and the sub-dimension of gender-related problems in the career of the nurses who stated that they experienced chronic fatigue were statistically higher than the nurses who did not experience chronic fatigue and partially experienced it. The difference between them was found to be statistically significant ($p < 0.05$).

TABLE 3. COMPARISON OF NURSES' CAREER PROBLEMS IN NURSING SCALE AND ITS SUB-DIMENSIONS TOTAL SCORE AVERAGES AND SOME INTRODUCTORY CHARACTERISTICS (N: 400)

	Career Problems in Nursing Scale Total Score Averages	Career Problems in Nursing Scale sub-dimensions			
		Stress and Exhaustion	Organizational Pressure and Professional Incompatibility	The Dual Career Problem	Gender- Related Issues in Career
		X±SD	X±SD	X±SD	X±SD
Educational Status					
Health vocational high School	76.99±25.76	31.88±10.61	22.73±9.61	9.11±4.80	13.26±5.47
License	77.49±25.53	34.12±11.97	20.84±9.35	9.81±4.89	12.71±5.75
Graduate	87.32±30.13	38.18±13.88	25.07±12.30	10.30±5.43	13.75±5.50
Test statistics	F=0.376 p=0.024	F=3.66 p=0.026	F=5.07 p=0.007	F=565 p=0.569	F=0.945 p=0.390
Employed Institution					
City Hospital	77.10±25.76	35.42±11.38	20.02±9.74	9.10±4.79	12.56±6.34
Faculty of Medicine (Training and Research Hospital)	82.65±27.83	36.56±12.91	22.90±10.66	10.14±5.19	13.04±5.76
Public Hospital	72.90±23.00	30.57±10.45	19.91±8.38	9.58±4.59	12.82±5.31
Test statistics	F=5.509 p=0.004*	F=9.80 p=0.001*	F=4.32 p=0.014	F=1.14 p=0.319	F=0.174 p=0.840
Satisfaction with Working as a Nurse					
Yes	71.24±23.92	30.87±10.49	19.61±9.80	8.90±4.67	11.84±5.51
No	88.70±26.68	39.28±12.81	24.16±9.70	11.01±5.10	14.25±5.64
Test statistics	t=-6.866 p=0.001*	t=-7.214 p=0.001*	t=-4.628 p=0.001*	t=-4.291 p=0.001*	t=-4.298 p=0.001*
The state of choosing the profession willingly					
Yes	76.32±24.84	33.46±11.85	21.19±9.62	9.33±4.67	12.33±5.33
No	84.42±29.21	36.82±12.82	22.58±10.74	10.90±5.40	14.11±6.23
Test statistics	t=-2.879 p=0.004*	t=-2.596 p=0.010	t=-1.305 p=0.193	t=-3.00 p=0.003*	t=-2.971 p=0.003*
Working Year					
0-5 years	75.64±24.38	33.98±11.40	19.96±9.64	9.49±4.79	12.19±5.55
6-10 years	80.90±22.10	34.90±12.30	20.64±9.24	9.50±4.70	12.25±4.50
11-15 years	81.98±26.91	35.47±13.14	22.65±9.35	10.23±5.02	13.62±5.86
More than 15 years	81.11±29.44	34.29±12.66	23.79±11.22	9.83±5.22	13.19±5.28
Test statistics	F=2.662 p=0.071	F=0.624 p=0.536	F=5.099 p=0.007	F=0.905 p=0.405	F=2.733 p=0.066
Current Position					
Service Nurse	78.80±26.91	34.31±12.32	21.72±10.04	9.76±4.95	13.00±5.76

Responsible Nurse	76.69±22.08	34.00±11.07	21.51±9.50	8.93±4.18	12.24±5.32
Policlinic Nurse	86.94±28.75	41.41±12.60	20.11±11.00	13.05±5.98	12.35±5.37
Training Nurse	94.99±22.54	44.50±14.84	24.00±5.65	12.50±3.53	14.00±1.41
Test statistics	F=0.826 p=0.480	F=2.276 p=0.079	F=0.177 p=0.912	F=2.993 p=0031	F=0.261 p=0.854
Weekly Working Hours					
0-40 hours	74.73±25.99	33.03±12.18	20.72±10.34	9.30±5.45	11.67±5.17
Between 41-50 hours	84.76±29.67	37.82±13.01	22.73±11.08	10.35±5.39	13.85±6.58
Between 51-60 hours	74.13±22.31	30.72±9.69	21.20±7.93	9.39±3.71	12.80±4.72
More than 61 hours	84.43±23.23	39.75±13.13	21.09±10.90	10.87±5.55	12.71±5.61
Test statistics	F=5.083 p=0.002*	F=10.600 p=0.001*	F=0.963 p=0.410	F=1.699 p=0.167	F=2.918 p=0.034
State of Being in a Stressful Structure					
Always	88.10±26.91	37.47±11.95	25.01±9.90	11.11±4.94	14.50±6.04
Sometimes	76.95±25.81	34.00±12.19	20.81±9.88	9.54±4.90	12.59±5.49
None	57.83±28.52	26.83±17.32	16.50±7.06	7.33±6.50	7.17±4.75
Test statistics	F=8.060 p=0.001*	F=3.965 p=0.020	F=6.918 p=0.001*	F=4.195 p=0.016	F=7.094 p=0.001*
Institution's Career Support Status					
Yes	69.40±27.37	32.45±12.84	17.46±9.93	8.61±5.63	10.87±6.83
No	81.47±25.99	35.18±12.12	22.70±9.76	10.15±4.75	13.43±5.76
Test statistics	t=-3.674 p=0.001*	t=-1.784 p=0.075	t=-4.277 p=0.001*	t=-2.503 p=0.013	t=-3.645 p=0.001*
Experiencing Burnout					
Yes	90.43±26.68	41.08±11.93	24.47±10.72	10.83±5.26	14.03±5.96
No	55.74±31.28	20.75±9.46	15.91±12.18	7.50±6.82	11.58±5.94
Partially	67.73±19.55	18.83±7.89	18.83±7.89	8.89±4.23	11.74±5.11
Test statistics	F=49.176 p=0.001*	F=85.953 p=0.001*	F=18.945 p=0.001*	F=9.117 p=0.001*	F=8.507 p=0.001*
The state of experiencing chronic fatigue					
Yes	89.20±27.37	40.77±12.72	23.94±10.98	10.52±5.28	13.95±6.06
No	65.69±29.44	24.30±9.11	18.35±13.04	9.30±6.38	13.75±5.94
Partially	68.35±19.55	28.42±8.12	19.26±7.43	9.09±4.27	11.56±4.90
Test statistics	F=36.952 p=0.001*	F=75.211 p=0.001*	F=12.051 p=0.001*	F=4.111 p=0.017	F=8.823 p=0.001*

* Student's t-test, Mann-Whitney U test, ANOVA and Kruskal-Wallis H test

DISCUSSION

Nurses face some problems while developing a career in the business environment. In this study, the problems that nurses face on the path of career development were examined and, in this context, our findings were discussed in the relevant literature.

The mean CPNS total score of the nurses was 79.06±26.68 (out of 161), indicating that their career problems are at a moderate level. On the other hand, the mean score of "stress and burnout" sub-dimensions of CPNS was 34.64±12.30 (out of 63), the mean score of "organizational pressure and occupational incompatibility" was 21.65±9.94 (out of 49), "double

career problem". Sub-dimension mean score 9.85 ± 4.95 (out of 21), "gender-related problems in career" sub-dimension score average of 12.92 ± 4.26 (out of 28) was found to be moderate (Table 2). Work stress and burnout problems are expressed as the most critical factors in career development [22,23]. Hospitals are inherently stressful institutions, and nursing is considered a demanding profession characterized by occupational stress and overload [24]. It is thought that when nurses have an excessive workload and the effort made to cope with this workload, nurses have to keep up with their family life, they cannot spare enough time for career planning and this situation leads them to more stress and exhaustion.

In our study, it was determined that nurses experienced high levels of stress and burnout while working, and those who stated that they experienced chronic fatigue were also high (Table 3). When the literature was examined, Rudman et al. (2020) found that nurses experienced burnout in the first three years of their careers after graduation [25]. Sarafis et al. (2016) determined that situations such as witnessing the death process of nurses, being in contact, and constantly interacting with patients and their families, conflicts, and uncertainty in the institution cause high levels of stress [26]. Nurses, who stated that they were always in stressful situations, stated that they experienced organizational pressure, professional incompatibility, and gender-related problems in their careers (Table 3). Cochran (2021) reported that nurses experience high levels of fatigue due to long working hours [27]. Chronic fatigue of nurses reflects negatively on their job performance and suggests that it also negatively affects their career planning or planning. It also shows that harmful processes caused by chronic stress start early in nurses' careers, and therefore preventive efforts should preferably be initiated early (for example, as part of nursing education and on-the-job training programs) [28].

It has been determined that nurses with postgraduate education experience stress and exhaustion, organizational pressure, and professional incompatibility problems while making a career plan (Table 3). Nurses in Türkiye are often promoted to managerial positions such as a chief nurse, assistant head nurse, supervisor, and head nurse, depending on organizational needs and professional competencies. However, they are also promoted to special branch nurses such as training nurses, infection control nurses, quality nurses, and diabetes nurses. According to the nursing, law numbered 6283 in Türkiye; Nurses who have graduated from postgraduate education programs in fields related to their profession have the right to work as specialist nurses [29]. Unfortunately, today, nurses in Türkiye still have not been able to get a "specialist nurse" staff and they cannot work in hospitals with expert nurse staff. In addition, according to the law, nurses who have received postgraduate education are given the right of priority to management positions in nursing. There are also problems with the implementation of this article. Nurses receive postgraduate education to advance their career paths. However, in most hospitals, the communication of nurses with graduate education with top managers is given priority and their diplomas can be ignored. This situation can slow down the promotion of nurses or lead to negative situations (such as the loss of nurses). In addition, the workload of nurses globally is high. The nursing workload is one of the reasons that increase burnout and stress. Nurses experiencing burnout and stress have persistent intentions to quit their jobs [30]. It can be said that this negative situation created by burnout and stress prevents nurses from making a career.

In our study, it was determined that the nurses working in the training and research hospital (university hospital) faced career problems, stress, and exhaustion at a higher level compared to other hospitals (Table 3). Considering the period in which the data of the study was collected, it is stated that the level of stress and burnout in nurses increased with the pandemic during the Covid 19 pandemic [31-33]. In Türkiye, patients prefer training and research hospitals for the treatment of moderate and severe diseases [34]. In this context, it is thought that the workload of nurses working in training and research hospitals during the pandemic process increased and this situation increased the stress and burnout levels of nurses, thus negatively affecting their career planning or career path.

In our study, they reported that nurses who were not satisfied with working as a nurse did not choose the profession voluntarily and were not satisfied with their current position experienced higher levels of career problems compared to other nurses (Table 3). When the literature is examined, it is found that there is a strong relationship between professional values and career development in their studies [8]. Guerrero et al. found that affective occupational commitment was negatively related to the intention to leave [35]. Individuals who do not like the nursing profession choose to nurse mostly because they have a high chance of finding a job, suggesting that they only do nursing to earn money and make a living,

and do not make or avoid a career planning for the future [36]. In this context, it can be said that individuals who do not like their profession and the job they do have problems in their career lives.

It was determined that nurses who worked for 15 years or more experienced career problems in the sub-dimension of organizational pressure and professional incompatibility (Table 3). According to the scale items of the sub-dimension; they stated that they were generally given simple and non-specialized jobs and were not given sufficient authority to fulfill their responsibilities. In the World's Nursing 2020 report, it is stated that nurses under the age of 35 act earlier to pursue a career than nurses approaching retirement. Considering that young nurses are more willing to make a career, the institutions and manager nurses must support them and provide training on career planning [1].

It has been determined that polyclinic nurses have dual-career problems in the field of career (Table 3). A dual career is defined as the progress of an individual in two different career fields [21]. This finding suggests that nurses have a dual career problem because they do jobs such as secretarial and technician, where they cannot do nursing work in polyclinic or non-clinical units. In this context, it can be said that nurses have career problems because they cannot perform their main profession, the nursing profession.

Factors such as nurses' busy and irregular working hours, stress, insufficient manpower, and high patient-nurse ratio negatively affect nurses' job satisfaction [37-39]. In our study, it was found that nurses who worked 61 hours or more had higher career problems (Table 3). When the literature is examined, it is reported that long-term and night shift work of nurses harms general health, such as increasing the susceptibility to social dysfunction and depression [40-41]. It can be said that the high perceived career barriers of nurses are because they care for patients with a heavy workload and that they cannot spare enough time for career studies due to their long working hours.

In our study, the career problems of the nurses who were not supported by their institutions to pursue a career were found to be higher than the other groups (Table 3). Cleary et al. (2013) found that especially the support of senior management and supervisors contributed significantly to the career development of nurses [38]. Labrague & McEnroe-Petitte (2018) reported that senior staff counseling and in-service training programs are important for nurses' career development and stress control [42]. In this context, nurses should be supported by their institutions, managers, teammates, and families for their career development.

CONCLUSIONS

It has been determined that the career problems of nurses are affected by the factors of education, institution, position, the working year, working hours, choosing the profession willingly and being satisfied, being in a stressful situation, experiencing burnout and chronic fatigue, supporting the institution's career, and being satisfied with the current position. For nurses, it is recommended to provide consultancy and training services that they need in career planning and development. Within the scope of health policies, it is recommended that nurses who have completed postgraduate education or received certificates should be employed in their fields of specialization, as well as creating clinical expertise staff and giving the acquired rights to their owners.

LIMITATIONS

There are some limitations to this study. First, the sample size of this study was selected from a single country. On the other hand, the findings are limited to the scale items.

RECOMMENDATIONS

Promoting the individual career development of nurses contributes to the development of the nurse workforce and quality. This study, which we have done throughout Türkiye, shows the career problems of nurses and which factors affect them. There are two approaches that nurse managers can do in this area; it may be that they give importance to individual career development, and provide training and consultancy for career development, including career

development in the scope of performance evaluation and follow-up regularly. Secondly, each institution should develop its career development model.

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CONFLICT OF INTEREST

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

AUTHOR CONTRIBUTIONS

SÇD, TK, HÖ: design of the study and manuscript revision; SÇD, TK, HÖ: literature searching, assessing the quality of literature; statistical analysis, and writing; SÇD, TK, HÖ: assessing the quality of literature and methodological guidance

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COMPARISON OF QUALITY OF CARE AND WELFARE SERVICES FOR MIDDLE-AGED AND OLDER DISABLED INDIVIDUALS IN IRAN AND LEBANON USING SERVQUAL MODEL

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ABSTRACT

OBJECTIVES:

The present study was conducted with the aim of investigating and comparing the quality of care and welfare services for middle-aged and older disabled individuals in Iran and Lebanon.

METHODS:

This analytical and cross-sectional study was conducted from July 2023 to April 2024. The samples included 84 middle-aged and older disabled clients receiving welfare services in Iran and Lebanon, who were selected by simple random sampling. In order to measure the quality of services and the level of satisfaction, a questionnaire ServQual scale was used to determine the performance gap. The study data were interpreted using SPSS version 28 and JAMOVI version 2.3.21.

RESULTS:

The years of receiving services (YS) for Iranians and Lebanese was 18.49 (SD = 6.36), 15.7 (SD = 4.81), 20.59 (SD = 6.61) respectively. The YS and weighted ServQual (wServQual) have statistically significant difference between disabled citizens of each country ($P < 0.001$), wServQual has statistically significant difference between Lebanese men and women ($P < 0.001$), additionally wServQual has statistically significant difference between Iranian and Lebanese women ($P < 0.001$). In the comparison between two countries, there was no significant difference in the mean scores of wServQual between Iranian and Lebanese men ($P > 0.05$). But this index was significantly different between women of two nations ($P < 0.05$). In the inter-gender comparison, the mean scores of the wServQual were significantly different between Lebanese men and women, but has no significant difference in the population of Iranian men and women ($P > 0.05$). The gender in Lebanese population, and years of age and nationality among Iranian and Lebanese women have the most predictive variables on wServQual score.

DISCUSSION AND CONCLUSION:

It is recommended that by concentrating on the dimensions of the ServQual index, the effectiveness of care services for these individuals can be enhanced.

KEYWORDS

disability, middle and older adults, servqual, consumer satisfaction, Iran, Lebanon

INTRODUCTION

Population aging is a global phenomenon that is expected to affect all countries. Projections indicate that the aging population worldwide will increase from 13% to 21% by 2050, and to 28% by the end of the 21st century [1]. According to the United Nations, countries are classified into three categories based on their population structure: young, middle-aged, and older people. This classification is determined by the proportion of the population aged 60 and older. Countries with a young population have less than four percent of older individuals, while those with a middle-aged population have between four and six percent. Finally, countries with an elderly population have more than seven percent of older individuals [2].

According to the above classification, starting in 2015, Iran is classified as one of the countries with an older population [3]. Based on Iran's 1390 census, there are 3.4 million older people aged 65 and over in the country, which is equivalent to 5.7% of the total population. Demographic forecasts predict that by 1430, the number of older people aged 65 and over in Iran will increase to 18 million, with their population share reaching about 20% [4].

Preparations for programs for the older adults in Iran have been established for a long time, with various institutions taking on the task of planning for this group. The Ministry of Health, the Ministry of Welfare and Social Affairs, universities of medical sciences and research centers, pension organizations, municipalities, as well as non-governmental and charitable organizations such as Kahrizak, the relief committee, are among the institutions responsible for providing services and care to the older persons in the country [5].

Providing quality healthcare services is one of the most important elements for patient satisfaction. Only institutions with a comprehensive view of the customer and a deep commitment to meeting patient expectations can sustainably provide this type of service. Creating client satisfaction is crucial for the success of any institution, as failure to do so can result in loss of profit, growth, employment, and ultimately the business. The slogans "customer first" and "customer is our boss" are now seen as ways to achieve a competitive advantage. Quality can be a strategic differentiator that creates a unique advantage that competitors find difficult to imitate [6].

Service management is a new topic in management that has gained attention in the past decade. As competition between institutions increases, they are exploring various ways to revitalize their organizations and implement innovations to attract patients [6]. Today, many health systems in countries are focusing on creating a management system to deliver quality and cost-effective services for the aging citizens [7].

For example, in Lebanon, the "Ain WaZein Center for the Aging Care" offers the most comprehensive services for the older persons. Initially, the center catered to 75 older individuals, with two-thirds being women. Currently, there is a waiting list of 150 people, prompting efforts to reorganize the center in terms of manpower and structure. The center's program includes community-oriented services and hospital services for the older adults, all connected under one system. This program could potentially be implemented at the regional or national level in Lebanon [8].

It appears that conducting studies on the quality of care services and the well-being of disabled and older individuals, as well as meeting the expectations of these service recipients, is crucial. This research aimed to investigate and compare the quality of care and welfare services for middle-aged and disabled older individuals in Iran and Lebanon in the second half of 2023.

MATERIALS AND METHODS

PARTICIPANTS AND PROCEDURES

The present descriptive-analytical study has been conducted in the second half of 2023 with the participation of 84 middle and older adults who are disabled and were served during the past year in the two countries of Lebanon and Iran. The mean ServQual difference formula obtained from a study by Ulucayli et al. (2023) was used to determine the sample size required. The sample size required was determined using software PASS (Version 15) with Power=0.95 equal to n=84. In this study, the researcher completed questionnaires using convenience sampling method in the cities of Shiraz and Tehran of Iran and Beirut of Lebanon. All 84 questionnaires were completed since July 15 to September 20, 2023, and were fully returned to the researchers. In order to collect the data, the samples filled the questionnaires by attending in their settlements in the cities of Lebanon and Iran and using the available sampling method. Additionally, 3 experts in Arabic and Persian languages, and native in the region were employed in order to gain the trust of disabled middle and older adults. At first, the questioners were given the necessary training on how to ask questions. The information is completed in the form of individual interviews with their home visits and comprehensive health service centers in the same areas. After expressing the desire of the participants with the inclusion criteria, first the informed consent form was completed and during the completion of the scales. These steps were performed for all sample in both countries during the study.

INSTRUMENTS OF STUDY

1. Demographic Information

The first part aims to gather demographic information about individuals through seven questions. These questions cover age, gender, marital status, level of education, employment status, work experience, type of disability, dependency level, and place of residence.

2. The ServQual Instrument

The second part of this questionnaire measures the perceptions and expectations of the service recipients through 22 questions across five dimensions: tangible factors (4 questions), reliability (5 questions), responsiveness (4 questions), assurance (4 questions), and empathy (5 questions). Responses are scored on a five-point Likert scale (1 = very low, 2 = low, 3 = medium, 4 = high, 5 = very high). To interpret the questionnaire, the following steps are taken:

- 1) After collecting the questionnaires and specifying the scores of the level of expectations and the perceived quality scores for each item, the difference of scores is obtained according to the following formula:
- 2) *Score difference = Perception score - Expectation score.*
- 3) The average score difference for each service quality dimension is obtained by evaluating the score difference of all the items that make up the dimension. This means that first, the difference in scores is added up and then divided by the number of items in that dimension. At this juncture, an evaluation of service quality can be performed. If the average value of the desired dimension is negative, it indicates that customers are not satisfied with the service. A positive value indicates their satisfaction. Utilizing these average scores allows for a comparative analysis across all five dimensions, facilitating the identification of the dimension with the highest level of customer dissatisfaction. Further analysis can be conducted in subsequent steps.
- 4) In the next step, researcher team calculate the sum of the averages and divide by 5 to get the average of the total ServQual score. This score is a non-weighted measurement of service quality for the assessed area.
- 5) To obtain a weighted score, researcher team determine the importance of the weights for all five dimensions of service quality from the ServQual scale. The sum of the weights assigned to all dimensions should total one hundred.
- 6) Researcher team calculate the average weighted ServQual scores for all five dimensions of service quality. The averages calculated in the second step are multiplied by the weighted scores determined in the fourth step.
- 7) The sum of these scores provides a weighted ServQual score for service quality in the measured area.

DATA RELIABILITY AND VALIDITY

The reliability of this questionnaire was investigated by Rizaida et al. (2016) [9]. In their study, a reliability test was conducted to determine if the respondents' scores on each statement were related to their scores on other items. All dimensions had a Cronbach's alpha value of more than 0.6 [10], indicating the reliability of the questionnaire used [11]. Additionally, the reliability and validity of this questionnaire have been confirmed by Parasurama et al. (1993). Confirmatory factor analysis was used to check the construct validity and apparent validity of the opinions of professors and managers within the organization. The construct validity of the questionnaire and its dimensions were evaluated using confirmatory factor analysis. Reliability was assessed using the Cronbach's alpha coefficient. An alpha coefficient higher than 0.7 is considered acceptable, and all values obtained in this research were higher than 0.7, indicating that the tool has the necessary reliability [12]. In the current study, the reliability of ServQual was $\alpha = 0.671$ and McDonald's $\omega = 0.678$ for perceptions, and Cronbach's 743 and McDonald's $\omega = 0.767$ for expectations, demonstrating high reliability and acceptability of the results ($P < 0.05$).

DATA COLLECTION

After receiving the list of eligible participants in the study from social workers affiliated with both organizations in Iran and Lebanon, individuals were invited to a face-to-face meeting. They completed the necessary forms in a private and serene environment while being mindful of important details. Psychological interviews were conducted upon completion of the forms. If at any point during the interview an individual chose not to continue or participate in the study, they were replaced by the next person. The time frame for completing the questionnaires was 3 months, from May 10, 2023 to August 15, 2023, following the code of ethics schedule. It is important to note that data collection was also conducted by a Lebanese colleague in Beirut simultaneously, under the same conditions.

ETHICAL CONSIDERATION

Following approval of the project implementation permit from the Research Ethics Committee of Shiraz University of Medical Sciences on Feb. 21, 2023 (ethics committee of Shiraz University of Medical Sciences has approved the research with ethical NO: IR.SUMS.SCHEANUT.REC.1402.031), the researchers in Iran and Lebanon visited all the Social Security and Welfare Organization in Iran and Beirut for sampling and data collection and in the samples' homes. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee. The current study was carried out in accordance with the 2013 version of the Helsinki Convention (and its 2020 extensions), and the STROBE guideline (2009).

All the participants received verbal explanation about the study objectives and procedures and then signed written informed consents for taking part in the study. The participants were also reassured about the anonymity and confidentiality of their information. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments including informed consent and confidentiality of all personal information.

DATA ANALYSIS

IBM SPSS Statistics for Windows, version 28 (2021, IBM Corp., Armonk, N.Y., USA) and JAMOVI, version 2.4.8 (2023) was used to analyze descriptive statistics (mean and SD), ANOVA, mediation and moderation analysis using Sobel test, and Regression. The significance level in all statistical tests was determined to be less than 0.05, indicating evidence against the null hypothesis.

RESULTS

Of the 86 middle-aged and older disabled in this study, 43 per cent of samples were Iranians (37) and 57% (49) were Lebanese, 59.3% (51) were women, 45.3% (39) of their literacy was less than high school, 70.9% have mobility disability and impairment, and disability ratio of 52.3% was high and the highest. About 75.7% of Iranian samples (28) married with adult children. The mean years of age for all samples, Iranians and Lebanese 66.9 (SD = 8.92), 65.46 (SD = 8.98), 68.02 (SD = 8.83) respectively and years of receiving services (YS) for all samples, Iranians and Lebanese was 18.49 (SD = 6.36), 15.7 (SD =

4.81), 20.59 (SD = 6.61) respectively. The ServQual reliability statistics were Cronbach's $\alpha = 0.671$ and McDonald's $\omega = 0.678$ for ServQual index (perceptions format) and Cronbach's $\alpha = 0.743$ and McDonald's $\omega = 0.767$ for ServQual index (expectations format) which means that the results of index are the high reliable and acceptable ($P < 0.05$).

According to the supplemental table, the YS, dM3, ServQual, and wServQual have statistically significant difference between disabled citizens of each country ($P < 0.001$), it means that years of receiving services (YS), for example, has significant difference between Iranians and Lebanese. Also, wServQual has statistically significant difference between Lebanese men and women ($P < 0.001$), additionally wServQual has statistically significant difference between Iranian and Lebanese women ($P < 0.001$).

Table 1 shows the mean score of weighted ServQual among disabled Iranian and Lebanese men and women. In the comparison between two countries, there was no significant difference in the mean scores of Iranian and Lebanese men ($P > 0.05$). But this index was significantly different between women of two nations ($P < 0.05$).

TABLE 1. THE T-TEST RESULTS FOR COMPARING WSERVQUAL SCORE BETWEEN IRANIAN AND LEBANESE MEN AND WOMEN

wServQual	Iranians (37)		Lebanese (49)		Student's t-test ¹	Effect Size Measures			
	Mean	SD	Mean	SD		Cohen's d	Glass's Delta	Hedges' G	Cohen's U3
Women	-44.18	16.3	28.27	7.8	† (86) = 4.185***	-1.705	-1.905	-1.665	4.8%
Men	-11.36	11.3	38.5	6.8	† (86) = 0.442 ^{n.s.}	-0.124	-0.219	-0.122	45.1%
Student's t-test ²	† (37) = 0.879 ^{n.s.}		† (49) = -3.662 ***						
Effect Size Measures									
Cohen's d	0.251		-1.047						
Glass's Delta ^a	0.416		-1.030						
Hedges' G ^b	0.245		-1.102						
Cohen's U3 ^c	59.9%		14.8%						

1. Independent samples t-test between Iranians and the Lebanese. 2. Independent samples t-test between Iranian & Lebanese men and women.

a. Each group has a different standard deviation.

b. Each group has a different sample sizes.

c. % of the efficacy of services to customers.

*** Statistically significant at the 1% level ($p\text{-value} \leq 0.001$). n.s. = not statistically significant.

In the inter-gender comparison using t-test, the mean scores of the wServQual were significantly different between Lebanese men and women and the Cohen's d (-1.047) as effect size coefficient was found at a significance level ($P < 0.001$). This result shows that care and health services in Lebanon are gender biased. This mean score has no significant difference in the population of Iranian men and women ($P > 0.05$). Other effect size coefficients i.e. Glass's Delta and Hedges' G also show similar results for the group of Iranian and Lebanese men and women. Additionally, the coefficient of efficiency (Cohen's U3) from the point of view of Lebanese women indicates that the effectiveness of care services for the middle-aged and older disabled is 4.8% and is far from the desired services. This index was only 14.8% in Lebanese's attitude as a whole. The Cohen's U3 is between 0 and 1 and is represented as a percentage. The number 1 means 100% service efficiency from the perspective of organization's customers [13].

The results of multiple regression analysis to predict weighted ServQual score were tabulated in table 2. In three times multiple regression analysis (baseline measures F, K, & O), the coefficients that statistically was significant, were performed on the data of the total population of the two countries (86 samples), Lebanese (49 citizens), women of both countries (35 persons) with Backward method ($P < 0.05$). The most predictive model (5) in the first baseline (F), Nationality scores predicted weighted ServQual score, Adjusted $R^2 = .16$, $F(1, 84) = 6.51$, $Beta = 0.268$, $P = .013$. The effect size of this model with Cohen's F square was 0.451 which is highly effective. For the 4th baseline (K), four models were extracted which in fourth model with Adjusted $R^2 = .215$, $F(1, 47) = 13.412$, $P = .001$, and effect size Cohen's $F^2 = 0.524$. In this model Gender

as predictive variable has the highest predictive role with Beta = 0.471 on wServQual among Lebanese citizens. In the 3rd baseline analysis on data of all women samples, the model number 3 has the most predictive role with Adjusted R² = .459, F (2, 32) = 14.861, Cohen's F² = 1.223, P < 0.05. In this model, years of age and nationality 29% and 67% predict wServQual score with Beta measures -0.29 and 0.67 (P < 0.05). In short, it can say that nationality among total population, gender among Lebanese, and YO and nationality among Iranian and Lebanese women have the most predictive power on wServQual scores (see Table 2).

TABLE 2. THE MULTIPLE REGRESSION ANALYSIS PREDICTING WSERVQUAL SCORE

Predictive Variables	model 1 ^a	Model 2 ^b	Model 3 ^c	model 4 ^d	model 5 ^e
1- Baseline Measures ^f					
Nationality	.221*	.223*	.227*	.243**	.268**
Gender	.128*	.128*	.127*	.129	
Years Old	.014				
Years of receiving services (YS)	.044*	.045*	.044		
Disability Ratio	-.031*	-.028			
Observations	78539.194	78381.641	77708.179	76302.405	62469.445
Adjusted R ²	0.133	0.145	0.156	0.166	0.161
Effect size measure of F ² for Models	0.329	0.402	0.436	0.479	0.451
Predictive Variables	model 1 ^g	Model 2 ^h	Model 3 ⁱ	model 4 ^j	
2- Baseline Measures ^k					
Gender	.477*	.476*	.481*	.471**	
Years Old	-.048*	-.049			
Years of receiving services (YS)	-.009				
Disability Ratio	-.095*	-.094*	-.115		
Observations	52368.456	52352.021	51916.478	49018.755	
Adjusted R ²	.168	.186	.202	.215	
Effect size measure of F ² for Models	0.288	0.341	0.459	0.524	
Predictive Variables	model 1 ^l	Model 2 ^m	Model 3 ⁿ		
3- Baseline Measures ^o					
Years Old	-.278*	-.285*	-.290**		
Years of receiving services (YS)	.170	.172			
Disability Ratio	-.036				
Nationality	.597*	.598**	.670**		
Observations	114652.857	114366.313	108854.711		
Adjusted R ²	.441	.448	.459		
Effect size measure of F ² for Models	1.192	1.202	1.223		

*p < 0.05, **p < 0.01. Method: Backward (criterion: Probability of F-to-remove >= .100).

a. Predictors: (Constant), Disability Ratio, Gender, YS, Years Old, Nationality. Method: Enter.

b. Predictors: (Constant), Disability Ratio, Gender, YS, Nationality.

c. Predictors: (Constant), Gender, YS, Nationality.

d. Predictors: (Constant), Gender, Nationality.

e. Predictors: (Constant), Nationality.

f. Dependent Variable: wServQual for all samples in both countries.

g. Predictors: (Constant), Disability Ratio, YS, Gender, YO.

h. Predictors: (Constant), Disability Ratio, Gender, YO

i. Predictors: (Constant), Disability Ratio, Gender.

j. Predictors: (Constant), Gender.

k. Dependent Variable: wServQual, Selecting only cases for which Nationality = Lebanese.

l. Predictors: (Constant), Nationality, Disability Ratio, Years Old, YS.

m. Predictors: (Constant), Nationality, Years Old, YS.

n. Predictors: (Constant), Nationality, Years Old.

o. Dependent Variable: wServQual Selecting only cases for which Gender = Female in both countries.

The results of mediation analysis have been assigned according to Table 3. Here, YS was the predictor, Nationality the mediation factor, and wServQual the dependent variable. The path c describes the direct effect of YS on wServQual, paths a × b indicates the indirect or mediated effect (Path Estimates Part of Table 3). The partial mediation occurs when both an indirect and direct effect exist simultaneously. But if there is only an indirect effect, it is called full moderation. Significant of Sobel & Aroian tests as mediation statistic coefficients confirm this indirect effectiveness [14].

TABLE 3. THE RESULTS OF MEDIATION ANALYSIS ON WSERVQUAL SCORE

Mediation Estimates										
Effect	Label	Estimate	SE	95% Confidence Interval		Z	P	% Mediation	Sobel Test	Aroian Test
				Lower	Upper					
Indirect	a × b	1.518	0.79	-0.0304	3.07	1.921	0.001*	79	2.11	2.06
Direct	c	0.782	1.787	-2.7195	4.28	0.438	0.662	21	-	-
Total	c + a × b	2.3	1.697	-1.0264	5.63	1.355	0.175	100	-	-

Path Estimates									
	Label	Estimate	SE	95% Confidence Interval		Z	P		
				Lower	Upper				
YS →	Nationality a	0.03	0.0078	0.0147	0.0453	3.844	<.001**		
Nationality →	wServQual b	50.6127	22.81267	5.9007	95.3247	2.219	0.027**		
YS →	wServQual c	0.7819	1.78651	-2.7195	4.2834	0.438	0.002**		

*p < 0.05, **p < 0.01. Sobel & Aroian tests as mediation statistic coefficients.

According to Table 3, the YS indirectly effects on wServQual about 79 per cent in mediation role [Indirect t-test = 1.52 (95% CI: -0.03, 3.07), Z = 1.92, Sobel test = 2.11, Aroian test = 2.06, P < 0.05]. The results show a full moderation model with a significant (P = 0.051) because direct effect has significant value = 0.662 (P > 0.05).

DISCUSSION

The purpose of this study was to compare the quality of care and welfare services for middle-aged and disabled older individuals in Iran and Lebanon in the second half of 2023. The results of the current research showed the quality of care and welfare services in Lebanon and Iran across 5 dimensions: reliability, trust, tangible factors, empathy, and responsiveness.

The findings indicated significant differences in the years of receiving services (YS) between Iranians and Lebanese, with gender affecting healthcare services in Lebanon. Lebanese women rated the effectiveness of care services for middle-aged and older disabled individuals at 4.8%, falling short of optimal services. Nationality, gender among Lebanese, and YO and nationality among Iranian and Lebanese women were found to have the highest predictive power in wServQual scores. Additionally, YS indirectly impacted wSevQual by about 79% in a mediating role. This aligns with a study by Rahmani et al. (2022) where all quality dimensions were negative based on ServQual, indicating unsatisfactory primary healthcare services [15].

The ServQual scores demonstrated that Shiraz, while having a higher overall service quality score for both expectations (90.68) and perceptions (95.62) compared to Beirut (expectations: 84.79, perceptions: 80.69), still exhibited a gap between expectations and actual service delivery. This gap signifies unmet needs for disabled individuals in both cities, reflecting systemic inefficiencies and resource limitations. These findings align with Parasuraman et al. (1988) [16], who emphasized

that gaps between expectations and perceptions are common in healthcare and welfare services, particularly for vulnerable populations.

The results underline the importance of addressing service delivery gaps through targeted interventions, particularly for individuals with specific challenges, such as high dependency levels, longer years of service, and limited educational attainment.

In both Shiraz and Beirut, women face huge barriers to receiving care, especially those who have speech and mental disabilities. Public health services should be able to institute specific programs for women with disabilities, including mental health support, speech therapy, and vocational education. Evidence shows that women with disabilities often experience intersecting social and economic challenges [17]. Programs for outreach aimed at women with disabilities tend to reduce stigma and increase seeking and utilizing services. On the other hand, Policies should aim at increasing the possibilities for men with loco-motor disabilities to participate in work life to increase their level of independence and social integration. Speech and mental disabilities were slightly more prevalent in Beirut than in Shiraz, particularly among women. Public health services should expand access to speech therapy, counseling, and psychiatric care in community-based settings. Early diagnosis and intervention programs should also be established to address these disabilities proactively.

In a study by Rumi et al. (2021) on "Patients' satisfaction with the quality of services of upazila health centers in Bangladesh," results showed overall service quality at UHC was not very satisfactory, leading to significant mistrust and poor patient satisfaction. Male patients were relatively more satisfied than female patients, suggesting gender inequality and discriminatory attitudes towards women in healthcare services [18].

A study in Sibenik, Croatia by Muje et al. (2015) evaluating primary healthcare services found public institutions did not meet patient quality service expectations. While primary health services need improvement in all dimensions, demographic variables like age and gender did not significantly impact perceptions of service quality [19].

Fan et al. (2017) found in their study on "Patients' perception of service quality in China: a survey using the ServQual model" a significant gap between expected and perceived service quality before and after medical services. The service quality gap was negative across all service dimensions [20].

Abdullah's study in Saudi Arabia in 2022 revealed a gap between perceived service quality and expected services in comprehensive rehabilitation centers for individuals with mental disabilities across all dimensions [21].

In Sharifirad et al.'s (2012) study titled "Quality Gap in Primary Health Services in Isfahan: Women's Perspective," findings showed disagreement among women in all 5 dimensions, with tangible factors having the largest quality gap. This indicates that customers' expectations exceed their current understanding, leaving ample room for service improvement and enhanced customer satisfaction [22].

In the study by Sharifi et al. (2021), conducted in Mashhad, the average scores of expectations and perceptions of health service users were 4.97 and 3.26, respectively. Additionally, the total service quality gap was (-1.707), indicating that the services provided do not meet the expectations of service users [23].

The results of Hosseini et al.'s study (2018) titled "Correlation of work ethics and the service quality gap in the rehabilitation centers of Isfahan City Welfare Organization" regarding the service quality gap showed a negative gap in all dimensions of service quality. This means that the expectations of clients regarding the services received were higher than their perception of the services received. The biggest gap was related to the dimension of tangibility, while the smallest gap was related to the guarantee of services, indicating that clients' expectations from the services provided were not met [24].

In Kim's (2006) study titled "Measuring citizens' satisfaction with the quality of contracted public services," a significant difference in satisfaction between women and men was observed. All estimated coefficients were insignificant in the male group, while the coefficients of concrete factors and reliability were significant predictors of overall satisfaction in the female group. A possible interpretation of this result is that female users pay attention to the details of the service delivery process, while male users apply a more comprehensive mechanism to evaluate satisfaction with the service provided [25].

The findings of the study by Li et al. (2015) showed that in all aspects of service quality, it exceeded the expectations of its customers, which contrasts with the results of the present study [26]. This difference may be attributed to the type of service, customers, location, and society. Additionally, China's health and treatment system has made extensive improvements in the disease care system, leading to increased quality of services for service recipients.

The findings of Fathi et al.'s study (2019) revealed that the dimension of immediate attention was the most important in most studies related to health and treatment services. However, in rehabilitation centers, clients placed greater importance on aspects such as participation in decisions and the right to choose. This could indicate a difference in the nature of healthcare services and rehabilitation services [27].

Previous studies indicate that the lack of specialized treatment facilities in hospitals can cause widespread dissatisfaction among the elderly [28]. Mojeh et al.'s study demonstrated that physical appearance is the second most important factor for service delivery and can significantly impact the level of patient satisfaction (17).

Individuals with longer years of service often require more comprehensive care plans, including regular reassessments of their needs and improved long-term care support. Health managers should establish periodic care evaluations to ensure that services remain aligned with the evolving needs of these individuals. Additionally, introducing respite care services for caregivers can alleviate the burden on families also early interventions, such as skill development programs and access to assistive technologies, can help reduce long-term dependency.

Service providers should invest in community-based rehabilitation programs and in-home care services. These programs can reduce the burden on families and improve the quality of life for individuals with high dependency. Individuals with lower dependency levels should be integrated into vocational training programs and independent living initiatives. For instance, job training programs for individuals with locomotor disabilities can enable them to contribute economically and socially.

CONCLUSION

This study provides a comprehensive analysis of the quality of care and welfare services for middle-aged and older disabled individuals in Shiraz, Iran, and Beirut, Lebanon, using the ServQual model. The findings reveal significant disparities in service quality perceptions between the two cities, as well as within demographic subsets such as gender, years of service, dependency levels, and educational attainment. Despite Shiraz demonstrating higher overall ServQual scores compared to Beirut, both cities exhibit notable gaps between individuals' expectations and the actual quality of services received, reflecting unmet needs and systemic inefficiencies in disability care.

A key insight from this research is the influence of socioeconomic and cultural factors on service quality. For example, the higher prevalence of loco-motor disabilities in Shiraz underscores the need for greater investment in assistive technologies and mobility-related services, while the higher prevalence of speech and mental disabilities in Beirut highlights the necessity of expanding mental health and speech therapy programs. Furthermore, gender-specific disparities in access to care, particularly the vulnerabilities faced by women with disabilities, emphasize the importance of designing gender-sensitive policies and programs. The education gap in Shiraz, where the majority of participants had less than a diploma, also points to the critical role of education in improving self-advocacy and access to care among disabled individuals.

LIMITATIONS AND SUGGESTIONS

From the limitations of this study, it can be said that the subjects were Arabic-speaking, so Arabic-speaking assistants were utilized. Additionally, some participants did not cooperate with the research team, making access to them challenging. It is recommended that in order to enhance the quality of care and welfare services for middle-aged and disabled older persons in Iran and Lebanon, suitable policies and plans should be developed at the Ministry of Health and welfare organizations' level. Furthermore, by concentrating on the dimensions of the ServQual tool, the efficacy of care services for these individuals can be enhanced.

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Authors' Contribution

NPJ has collected the data and interviewed the samples, SST has written the introduction and discussion, AAs analyzed the data and wrote the method and results. SMA and AAb have made comments and corrections in final analysis and preparing the final format of manuscript. All authors read and approved the final manuscript.

Patient Consent

Written and verbal consent of samples was obtained before participating in the study.

Supplementary Material

Supplementary material for this article is available online.

Availability of Data & Materials

The datasets generated and/or analysed during the current study are available from the authors upon reasonable request and with the permission of SUMS.

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Conflict of Interest

The author declares no conflict of interest, financial or otherwise.

Human & Animal Rights

No animals were used for studies that are the basis of this research. This research was conducted on humans in accordance with the Helsinki Declaration of 1975, as revised in 2013 (<http://ethics.iit.edu/ecodes/node/3931>).

Consent for Publication

Not applicable.

The Standard for Reporting

The STROBE guidelines and methodology were followed during this study.

Ethical Considerations

Ethical matters e.g. plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been totally observed by the authors. All the participants received verbal explanation about the study objectives and procedures and then signed written informed consents for taking part in the study. The participants were also reassured about the anonymity and confidentiality of their information. Also, the ethics committee of Shiraz University of Medical Sciences has approved the research with ethical No: IR.SUMS.SCHEANUT.REC.1402.031 on February 21, 2023. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments including informed consent and confidentiality of all personal information.

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APPENDIX

SUPPLEMENTAL TABLE 1. DESCRIPTIVES CHARACTERISTICS OF SERVQUAL AND ITS DOMAINS

	Nationality	Gender	N	Mean	Median	SD	Variance	IQR ^j	Minimum	Maximum	P ^k	P ^l	P ^m
Years old	Iranians	Male	26	65.61	66.5	9.67	93.5	17.25	50	80	0.267	0.190	0.235
		Female	11	65.09	64	7.52	56.6	11	51	76			0.247
	Lebanese	Male	25	68.56	71	9.01	81.1	17	51	80	0.447		
		Female	24	67.45	67	8.81	77.6	14.2	53	81			
YS ^a	Iranians	Male	26	16.07	16	4.21	17.7	6.25	11	28	0.422	<.001*	0.587
		Female	11	14.81	13	6.14	37.7	6.5	8	27			0.577
	Lebanese	Male	25	19.8	22	6.03	36.4	11	10	28	0.266		
		Female	24	21.41	22.5	7.20	51.9	13	10	30			
Mean ^b	Iranians	Male	26	-0.042	0.022	0.62	0.39	0.79	-1.523	1.091	0.045	0.009	0.439
		Female	11	-0.617	-0.409	1.04	1.09	1.06	-2.545	0.932			0.002
	Lebanese	Male	25	0.085	0.136	0.53	0.28	0.68	-1.273	1.091	0.732		
		Female	24	0.246	0.159	0.47	0.22	0.61	-0.5	1.045			
dM1 ^c	Iranians	Male	26	-0.153	-0.25	1.22	1.49	1.75	-2.5	2	0.548	0.541	0.991
		Female	11	-0.340	-0.25	2.05	4.22	1.87	-5.75	1.75			0.399
	Lebanese	Male	25	-0.15	-0.25	1.32	1.76	1	-3	3	0.405		
		Female	24	0.083	0	0.91	0.83	1	-1.5	2.25			
dM2 ^d	Iranians	Male	26	0.023	-0.4	1.41	1.99	2.8	-1.8	2.2	0.517	0.105	0.435
		Female	11	-0.327	-0.2	2.01	4.04	2.4	-5	2.2			0.136
	Lebanese	Male	25	0.304	0.6	1.10	1.23	1.6	-1.8	2.2	0.759		
		Female	24	0.508	0.7	1.21	1.47	1.65	-1.6	2.6			
dM3 ^e	Iranians	Male	26	-0.230	-0.125	1.54	2.39	2.37	-3	2	0.537	<.001**	0.004
		Female	11	-0.727	-0.75	1.84	3.39	2	-5	1.75			0.069
	Lebanese	Male	25	0.97	1.25	1.31	1.73	1.25	-2.5	2.75	0.490		
		Female	24	0.25	0.5	1.20	1.45	1.25	-2.5	2.75			
dM4 ^f	Iranians	Male	26	0.173	0	1.57	2.48	1.75	-2.75	2.75	0.272	0.498	0.358
		Female	11	-0.204	0	1.66	2.77	1.12	-4.5	1.5			0.882
	Lebanese	Male	25	-0.23	-0.25	1.52	2.32	2.25	-3	4	0.479		
		Female	24	-0.114	0.375	1.65	2.72	2.56	-2.5	3.25			

SUPPLEMENTAL TABLE 1. DESCRIPTIVES CHARACTERISTICS OF SERVQUAL AND ITS DOMAINS

	Nationality	Gender	N	Mean	Median	SD	Variance	IQR ^j	Minimum	Maximum	P ^k	P ^l	P ^m
dM5 ^g	Iranians	Male	26	-0.530	-0.7	1.39	1.93	1.95	-3.2	2	0.542	0.092	0.117
		Female	11	-0.381	-0.8	1.20	1.44	1.8	-1.6	1.8			0.329
	Lebanese	Male	25	0.104	0	1.44	2.09	2	-3.2	2.8	0.052		
		Female	24	0.075	0	1.29	1.66	1.45	-2.2	2.8			
ServQual ^h	Iranians	Male	26	-0.143	-0.34	0.96	0.92	1.51	-1.75	1.51	0.801	<.001*	0.137
		Female	11	-0.396	-0.34	1.45	2.12	1.15	-4.29	1.07			0.115
	Lebanese	Male	25	0.199	0.16	0.61	0.37	0.89	-1.39	1.42	0.822		
		Female	24	0.160	0.285	0.59	0.35	1	-1.02	1.26			
wServQual ⁱ	Iranians	Male	26	-11.11	-9.5	11.3	12177.38	160.8	-192.5	181.5	0.491	<.001**	0.661
		Female	11	-44.18	-18	16.3	27331.21	127.5	-464.5	142.5			<.001***
	Lebanese	Male	25	38.5	37.5	6.8	4331.47	98	-113.5	152	0.001***		
		Female	24	28.27	39	7.8	5024.36	77.1	-137	155			
	Total	--	86	10.1	11.5	10.1	10229	134	-465	182			0.385 ⁿ
	Population												

a. Years of receiving services, b. mean score of differences between customers' perceptions and expectations, c. mean score of differences of domain 1's items, d. mean score of differences of domain 2's items, e. mean score of differences of domain 3's items, f. mean score of differences of domain 4's items, g. mean score of differences of domain 5's items, h. mean score dM1 to dM5, i. weighted ServQual = (dM1*10) + (dM2*40) + (dM3*30) + (dM4*10) + (dM5*10), j. IQR = interquartile rate, k. $P < 0.05$ between men & women of each country, l. $P < 0.05$ between Iranian and Lebanese citizens, m. $P < 0.05$ between Iranian and Lebanese men & women separately. n. Using One-sample t-test, $P > 0.05$.

* Cohen's d as effect size measure = -0.46 (-0.91 to -0.02), ** Cohen's d as effect size measure = -0.55 (-0.99 to -0.11), *** Cohen's d as effect size measure = -1.71 (-2.518 to -.872), ****Cohen's d as effect size measure = -1.047 (-1.64 to -0.44).

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UTILIZATION, DEMAND, AND WILLINGNESS TO PAY FOR TELEHEALTH SERVICES: A STUDY OF PATIENTS IN SELECTED VIETNAMESE PROVINCES

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ABSTRACT

OBJECTIVE:

Telehealth has become essential in healthcare delivery, particularly during the COVID-19 pandemic. It provides solutions to access disruptions and enhances healthcare accessibility and efficiency. This study aimed to describe the utilization, demand, and willingness to pay for Telehealth services in selected provinces in Vietnam.

METHODS:

A cross-sectional survey involving 438 participants from three Vietnamese provinces was conducted between late 2021 and early 2022. The study assessed telehealth utilization, user preferences, and willingness to pay for different telehealth services.

RESULTS:

The study revealed that 58.7% of participants had utilized telehealth services. For lower-cost services (100,000 VND to 500,000 VND), low-income households were 2.7 times more likely to pay (OR: 2.7, 95% CI: 1.41-5.00, $p < 0.01$); familiarity with telehealth services increased the likelihood of spending by 1.6 times (OR: 1.6, 95% CI: 1.10-2.54, $p < 0.05$); and those with less convenient access to healthcare were 1.79 times more likely to pay (OR: 1.79, 95% CI: 1.00-3.13, $p < 0.05$). For higher-cost services (500,000 VND to 1,500,000 VND), wealthier households were 16.67 times more likely to invest (OR: 16.67, 95% CI: 2.04-100.00, $p < 0.01$); insured individuals were 5.88 times more likely to pay (OR: 5.88, 95% CI: 1.92-16.67, $p < 0.01$); and familiarity with telehealth increased the likelihood of payment by 2.3 times (OR: 2.3, 95% CI: 1.20-4.46, $p < 0.05$).

CONCLUSION:

Telehealth is a crucial component of healthcare in Vietnam, with substantial engagement and willingness to pay. The findings underscore the need for investment in telehealth infrastructure and supportive policies to integrate telehealth into the national healthcare system, particularly in underserved regions.

KEYWORDS

telehealth, telemedicine, utilization, willingness to pay, Vietnam

INTRODUCTION

Telehealth, broadly encompassing health services such as virtual consultations, remote monitoring, and health education, has gained prominence globally, especially during the COVID-19 pandemic [1]. While telemedicine focuses on direct clinical interactions, telehealth includes health maintenance, prevention, and administrative services [2, 3]. These modalities, particularly synchronous (real-time) and asynchronous (store-and-forward) communication, have proven essential in maintaining healthcare delivery amidst physical access disruptions [3, 4].

In Vietnam, the rapid adoption of telehealth during the COVID-19 pandemic highlighted its potential to bridge healthcare gaps, particularly in rural areas with limited access to medical facilities [5]. The Vietnamese Ministry of Health's initiative 2628/QĐ-BYT, launched in 2020, underscores the national commitment to integrating telehealth into the healthcare system [6]. However, challenges such as inconsistent internet access, varying levels of digital literacy, and infrastructural disparities between urban and rural regions present significant barriers to widespread adoption [5].

This study hypothesizes that socioeconomic status, familiarity with digital technologies, and geographical location are significant determinants of telehealth adoption in Vietnam. Specifically, we expect wealthier households with higher digital literacy and those in urban areas will demonstrate higher telehealth utilization and willingness to pay for such services. By addressing these factors, this research aims to provide insights that will support the sustainable expansion of telehealth within Vietnam's healthcare landscape, particularly in underserved regions.

METHODS

STUDY DESIGN AND SETTING

This cross-sectional study was conducted from September 2021 to September 2022 across three provinces in Vietnam, including Son La, Quang Ninh, and Ha Tinh. These provinces were chosen to provide a representative sample of rural and urban populations, reflecting diverse healthcare access scenarios.

PARTICIPANTS

The study included 438 patients currently using telemedicine services. Participants were recruited from ten provincial and district hospitals equipped with telemedicine capabilities, ensuring a diverse participant pool that reflects varied healthcare settings.

Eligible participants were those who had utilized telemedicine services within the year before the study and were able to provide informed consent. Exclusions were made for patients unable to communicate effectively due to severe health conditions or those unwilling to participate.

SAMPLE SIZE CALCULATION

The sample size was determined based on the following formula:

$$n = z^2_{(1-\frac{\alpha}{2})} \times \frac{p \times q}{d^2}$$

The sample size for this study was initially determined based on a previous feasibility study conducted in 2016 by Tran Minh Khanh, which reported that 72.6% of the population was willing to pay for telemedicine services [7]. Accordingly, the estimated sample size needed to achieve a 90% confidence level with a margin of error of 5% was 430. To accommodate the actual recruitment process, this number was adjusted to 438.

DATA COLLECTION

The study was conducted in 10 hospitals located in Son La, Quang Ninh, and Ha Tinh provinces, in which five hospitals belong to provincial and 5 belong to district level hospitals. These locations were specifically chosen because they had recently initiated telemedicine services and were deemed successful by state health management bodies. For each hospital, approximately 44 patients were randomly selected from eligible participants.

Data were collected using a structured questionnaire developed based on the Telemedicine Satisfaction and Usefulness Questionnaire, which has been validated in prior research [8]. Interviews were conducted face-to-face by trained healthcare professionals who were briefed on the ethical considerations of the patient interaction [9].

In this study, participants were asked about their willingness to pay for telemedicine consultations and remote medical services, with a maximum fee set at 1,500,000 VND. This classification follows Circular No. 02/2017/TT-BYT, which outlines the maximum allowable fees for telemedicine services in Vietnam. According to Circular No. 39/2018/TT-BYT, issued by the Ministry of Health on November 30, 2018, the standardized cost of medical services across hospitals is specified. For example, the consultation fee at special-grade hospitals and first-grade hospitals is set at 37,000 VND (applicable to higher-level hospitals providing telemedicine consultations). In comparison, the consultation fee at second-grade hospitals is 33,000 VND (applicable to lower-level hospitals in the telemedicine consultation hierarchy). Given that provincial general hospitals are larger and serve more patients, the study estimated a lower system management and transmission cost for these facilities compared to regional general hospitals and district hospitals. To estimate the minimum fee for telemedicine consultations, the research team aggregated the two cost components (consultation fee and additional costs) and further included an estimated 25% additional cost for system management and transmission for provincial hospitals and 30% for regional general hospitals and district hospitals. Based on these calculations, the study determined that the lowest estimated fee for remote consultations would be approximately 100,000 VND.

STATISTICAL ANALYSIS

Statistical analysis was performed using SPSS version 25. Descriptive statistics summarized demographics and usage patterns. Inferential statistics, including chi-square and logistic regression, were used to explore associations between demographic factors and telemedicine usage, with significance set at $p < 0.05$ [10].

ETHICAL CONSIDERATIONS

The study received ethical approval from the Scientific Board of the Health Strategy and Policy Institute under decision number 192/QĐ-CLCSYT dated September 24, 2021. Consent forms were obtained from all participants before conducting the survey. All collected information regarding the research subjects was kept confidential, with the primary aim to improve community health and contribute to policy development, not for other purposes.

RESULTS

GENERAL INFORMATION OF STUDY PARTICIPANTS

Table 1 provides the demographic breakdown of the 438 participants enrolled in the study, detailing their age, gender, ethnicity, economic status, and health insurance coverage. The participants had an average age of 45.9 years, with a standard deviation of 17.1. Females were more represented at 62.6%, and the majority ethnic group was Kinh at 74.7%. Economic data show that the vast majority (88.1%) are not considered poor or near-poor. Social health insurance coverage was notably high, with 91.3% of participants having some form of health insurance (Table 1).

TABLE 1: GENERAL INFORMATION OF STUDY PARTICIPANTS

Characteristics	Number (%)
Age (Mean, SD)	45.9 (17.1)
Gender	
Male	167 (37.4%)
Female	274 (62.6%)
Ethnicity	
Kinh	327 (74.7%)
Others	111 (25.3%)

Characteristics	Number (%)
Economic status	
Poor/Near Poor	52 (11.9%)
Not Poor/Near Poor	386 (88.1%)
Health insurance coverage	
Social Health Insurance	400 (91.3%)
Commercial Insurance	5 (1.1%)
None (out-of-pocket payment)	33 (7.5%)

UTILIZATION OF TELEHEALTH SERVICES

This section reports on the types of telehealth services utilized by the study participants. Data collected from 438 patients indicate varying preferences for telehealth modalities, as summarized in Table 2.

TABLE 2: TYPES OF TELEHEALTH SERVICES USED BY PATIENTS IN THREE PROVINCES (N=438)

No.	Type of service used	Number of users	Percentage (%)	Telehealth modality
1	Phone calls to healthcare providers to inquire about health conditions	196	44.8	Synchronous
2	Receiving phone calls from healthcare providers about health status and medication post-visit	161	36.8	Synchronous
3	Calls to a health hotline for advice on health issues and medication	96	21.9	Synchronous
4	Sending images, test results, medical records for consultation	77	17.6	Asynchronous (store and forward)
5	Remote consultations with live interaction via apps like Zalo, Viber, Messenger	72	16.4	Synchronous
6	Using smartphone apps to connect with healthcare providers for consultation	64	14.6	Mobile Health (mHealth)
7	Local doctors discussing cases with hospital specialists via phone or TV during medical examinations or surgeries	53	12.1	Synchronous

A total of 257 patients (58.7%) reported using at least one form of telehealth. The most utilized service was making phone calls to healthcare providers to inquire about health conditions, engaged by 44.8% of participants. This service is categorized under synchronous telehealth modalities, which involve real-time communication. Conversely, the least commonly used service was consultations involving local doctors and hospital specialists during procedures, used by only 12.1% of participants. This underscores a significant preference for direct and immediate telehealth communication, while more complex interactions involving specialist coordination were less frequent.

DEMAND FOR TELEHEALTH SERVICES

This section explores the preferences and potential future demand for telehealth services among 438 participants, revealing a strong inclination towards synchronous telehealth services for immediate health concerns. Phone consultations are the most popular method, with 253 patients (57.8%) choosing this synchronous mode for real-time consultations. Meanwhile, 99 patients (22.6%) have utilized modern interactive synchronous services such as video calls via platforms like Zalo, Viber, and Messenger. Health advice hotlines, another form of synchronous service, and health consultations via smartphone apps, classified under mobile health due to their use of mobile technologies, were embraced by 90 (20.6%) and 77 (17.6%) patients, respectively. This diversity in service utilization underscores the broad

spectrum of patient needs and preferences for telehealth services, particularly under the constraints of the COVID-19 pandemic (Table 3).

TABLE 3: DEMAND FOR TELEHEALTH SERVICES WHEN FACING HEALTH ISSUES (N=438)

No.	Service Demand	Number	(%)	Telehealth modality
1	Phone calls to healthcare providers for consultations	253	57.8	Synchronous
2	Remote consultations with live image and direct interaction (via Zalo, Viber, Messenger)	99	22.6	Synchronous
3	Calls to health advice hotlines	90	20.6	Synchronous
4	Health consultations through smartphone apps with direct interaction	77	17.6	Mobile Health (mHealth)

In the domain of post-discharge services, a diverse range of telehealth modalities are actively employed by the study participants to manage their health effectively from home. Phone consultations, classified as synchronous telehealth, remain the most utilized service, with 248 patients (56.6%) engaging in this form for treatment consultations. Meanwhile, synchronous exchanges involving live images and direct interaction, used by 130 patients (29.7%), highlight the preference for more interactive and detailed medical communications. Monitoring health parameters through devices, part of remote patient monitoring, was reported by 90 patients (20.6%), and mHealth services guiding rehabilitation and health reminders were utilized by 62 and 40 patients, respectively. These services underscore the significant integration of telehealth into post-discharge care, emphasizing its role in continuous patient management and recovery (Table 4).

TABLE 4: DEMAND FOR SERVICES RELATED TO MEDICATION MANAGEMENT, TREATMENT, AND RECOVERY AT HOME (N=438)

Service Demand	Number	(%)	Telehealth modality
Phone calls to healthcare providers for treatment consultation	248	56.6	Synchronous
Exchanges with healthcare providers involving images and direct interaction (via Zalo, Viber, Messenger)	130	29.7	Synchronous
Monitoring health parameters through smart devices	90	20.6	Remote Patient Monitoring
Guidance on rehabilitation exercises or health improvement via phone or smart devices	62	14.2	Mobile Health (mHealth)
Reminders for medication timing via text messages or synthetic voice	40	9.1	Mobile Health (mHealth)

WILLINGNESS TO PAY FOR TELEHEALTH SERVICES

FIGURE 2. WILLINGNESS TO PAY FOR SINGLE USE OF TELEHEALTH SERVICES WITH CENTRAL-LEVEL PHYSICIANS AT LOWER-LEVEL HEALTH FACILITIES (N=438)

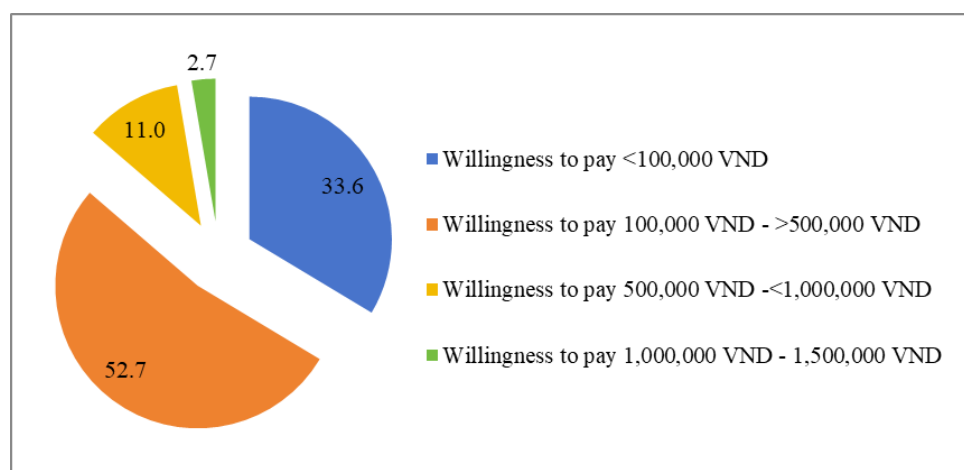


Figure 2 visually represents patient willingness to pay for telehealth services, demonstrating that a significant majority, 52.7% (231 patients), are willing to pay between 100,000 VND and 500,000 VND. Notably, 33.6% are willing to pay less than 100,000 VND, and a smaller segment, 11%, can afford 500,000 VND to 1,000,000 VND. The highest payment range, 1,000,000 VND to 1,500,000 VND, is the least preferred, with only 2.7% willing to pay this amount.

TABLE 5. MULTIVARIABLE REGRESSION ANALYSIS OF WILLINGNESS TO PAY FOR TELEHEALTH SERVICES AND DEMOGRAPHIC CHARACTERISTICS

Characteristic	OR	95%CI	P
Willingness to pay between 100.000 and 500.000 VND			
Economic situation (Ref: Not poor/Near poor)	2.70	1.41-5.00	0,002
Health insurance (Ref: Without health insurance)	2.38	0.91-6.25	>0,05
Knowledge of telehealth (Ref: Never heard of it)	1,6	1.10-2.54	0,021
Accessibility (Ref: Travel convenience)	1.79	1.00-3.13	0,047
Willingness to pay between 500.000 and 1.500.000 VND			
Economic situation (Ref: Not poor/Near poor)	16.67	2.04-100	0,008
Health insurance (Ref: Without health insurance)	5.88	1.92-16.67	0,002
Knowledge of telehealth (Ref: Never heard of it)	2,3	1,20-4,46	0,012
Accessibility (Ref: Travel convenience)	1.52	0.61-3.85	0,372

Pseudo R2 = 0,0549

The results from Table 5 indicate three factors—economic status, knowledge of telehealth, and accessibility—that have statistically significant impacts on the willingness to pay for telehealth services ranging from 100,000 VND to 500,000 VND. Households not classified as poor/near-poor are 2.7 times more likely to pay for telehealth services compared to poorer households (95% CI: 1.41-5.00, $p<0.01$). Patients aware of telehealth are 1.6 times more inclined to spend on these services compared to those unaware (95% CI: 1.10-2.54, $p<0.05$). Those facing accessibility challenges are 1.79 times more likely to pay compared to those with easier access to medical facilities (95% CI: 1.00-3.13, $p<0.05$).

Further analysis of Table 5 also shows that economic status, the use of health insurance, and knowledge of telehealth significantly influence the willingness to pay for services ranging from 500,000 VND to 1,500,000 VND. Households not classified as poor are 16.67 times more likely to pay for higher-priced telehealth services compared to poorer households (95% CI: 2.04-100.00, $p<0.01$). Those who used health insurance for a medical visit are 5.88 times more likely to spend on these services compared to those without insurance (95% CI: 1.92-16.67, $p<0.01$). Patients familiar with telehealth are 2.3 times more likely to pay higher amounts compared to those not familiar (95% CI: 1.20-4.46, $p<0.05$).

DISCUSSION

During the resurgence of the COVID-19 pandemic in late 2021 and early 2022, telemedicine adoption underwent significant global shifts. Public healthcare providers in Vietnam utilized platforms like Zalo to manage COVID-19 patients, demonstrating innovative solutions to accessibility challenges. Consequently, 58.7% of our study's participants engaged in telemedicine services, a usage rate closely mirroring the 57% reported in Canada [11] yet lower than the rate observed in China. A comprehensive survey in China across 57 hospitals in 16 provinces found that 94.6% of physicians adopted telemedicine during the pandemic, with 34.1% being first-time users and only 9.3% using it weekly [12]. Additionally, there was a high willingness among Chinese physicians to continue using telemedicine, with 91.5% expressing readiness during the pandemic and 88.4% afterward. However, major concerns included the inability to conduct physical examinations (78.3%) and other implementation challenges (58.0%) [13].

In contrast, Africa has seen limited success in sustaining telemedicine initiatives despite its potential to address critical health challenges. Barriers such as a shortage of doctors, heavy disease burdens, poverty, inadequate infrastructure, and unreliable power supplies have hindered adoption [14]. Furthermore, the lack of insurance reimbursement, alongside

medico-legal and ethical concerns, has made telemedicine less appealing [13]. Similarly, in Vietnam, telehealth faces significant barriers, especially in underserved areas. Economic status remains a key determinant, with wealthier individuals more likely to utilize and benefit from telehealth services. Nevertheless, infrastructural inadequacies and a general lack of awareness about telehealth's benefits continue to impede broader adoption, underscoring the need for enhanced public education and investment in infrastructure to effectively integrate telehealth into Vietnam's healthcare system.

Our analysis identified familiarity with telehealth services as a significant determinant of healthcare spending across different economic thresholds. At the lower financial threshold (100,000 VND to 500,000 VND, approximately \$4.26 to \$21.32), participants familiar with telehealth were 1.6 times more likely to invest in these services. This association remained strong at higher expenditure levels (500,000 VND to 1,500,000 VND, approximately \$21.32 to \$63.97), where familiarity increased the likelihood of spending by 2.3 times. These results are consistent with findings from a U.S. study, where positive experiences with telemedicine significantly influenced future usage intentions, and perceived risks associated with in-person visits promoted a shift towards telemedicine [15].

Additionally, our study revealed that, at the lower financial bracket, accessibility issues significantly influenced willingness to pay for telehealth services, with those facing less convenient access being 1.79 times more likely to spend. At higher financial thresholds, health insurance coverage played a pivotal role, with insured individuals being 5.88 times more likely to pay higher rates. This trend exceeds that observed in U.S. studies, where insurance coverage was also a significant factor [15]. Notably, at the highest financial threshold (500,000 VND to 1,500,000 VND, approximately \$21.32 to \$63.97), wealthier households were 16.67 times more likely to pay than their less affluent counterparts. This finding aligns with American research, where convenience was a key motivator for telemedicine adoption [15]. However, similar to the U.S. context, barriers such as poverty, physical access to hospitals, lack of insurance, and unfamiliarity with telehealth persist in Vietnam, limiting broader adoption. Also, participants who have higher economic status are more likely to have a higher willingness to pay for telehealth services [16, 17].

The limitations of our study highlight the complexities of researching telehealth usage in Vietnam, a country with a unique healthcare system facing rapid technological changes. The absence of qualitative methods in our study prevented a deeper exploration of telehealth users' subjective experiences [15]. Additionally, the study did not comprehensively analyse demographic characteristics or include diverse geographical locations, which could have enriched the findings. The COVID-19 pandemic context may also have influenced healthcare utilization patterns. The ongoing development of artificial intelligence presents opportunities to enhance telehealth services and public adoption, warranting further investigation in future research.

Understanding the structure of Vietnam's healthcare system, which is divided into four main levels—national, provincial, district, and commune—is crucial. This decentralized structure, while addressing the diverse needs of urban and rural populations, has resulted in underinvestment in public hospital infrastructure. Consequently, the private healthcare sector has begun to play a critical role, particularly in major cities, although its impact remains limited [18].

Future research should include private hospitals to provide a more comprehensive understanding of telehealth's impact across different healthcare settings in Vietnam. This approach will help clarify how healthcare structure influences the adoption and effectiveness of telehealth solutions, offering valuable insights for integrating these technologies into Vietnam's healthcare landscape [19].

CONCLUSION

This study highlights the significant role of telehealth in advancing healthcare delivery in Vietnam, particularly during the COVID-19 pandemic. The findings reveal a substantial adoption rate of 58.7%, with most patients preferring regular teleconsultations with their usual healthcare providers. Despite the promising engagement, the majority of patients are only willing to pay up to 500,000 VND for telehealth services. Key determinants of willingness to pay include economic status, health insurance coverage, and familiarity with telehealth technologies.

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ATTITUDES AND FAMILIARITY OF HOSPITAL ADMINISTRATIVE AND MEDICAL STAFF TOWARDS ARTIFICIAL INTELLIGENCE: A CROSS-SECTIONAL STUDY IN TURKEY

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ABSTRACT

Artificial intelligence in healthcare holds great promise and continues to advance. Despite the clear potential of its integration into healthcare delivery and management, little has been investigated about the attitudes and familiarity of hospital administrative and medical staff towards artificial intelligence.

In this study, we cross-sectionally surveyed 152 administrative and medical staff who were employed in two private hospitals in the northern region of Türkiye with a structured questionnaire on their attitudes and familiarity regarding artificial intelligence in healthcare delivery and management.

Our results showed that only 8.6% of the 152 participants used AI in their work, and 13.8% followed ongoing AI developments in healthcare. Despite this limited engagement, the majority recognized AI's potential benefits. For instance, 74.4% (with 23.0% partially agreeing) acknowledged its value in education and research, and similar high percentages supported its potential for workload reduction, learning enhancement, data processing, healthcare delivery, and innovation. In contrast, attitudes were divided regarding AI's ability to reduce healthcare costs, minimize errors, offer a competitive advantage, assist in decision-making, and optimize healthcare resources. Concerns about job displacement were also prominent, with 45.4% agreeing and 35.5% partially agreeing that AI could lead to unemployment in healthcare. Statistical tests showed significant differences across occupations. Administrative staff demonstrated higher knowledge and optimism about AI applications in competitive positioning (94.2%) and customer relationship management (95.5%) compared to physicians (57.1% and 68.9%) and nurses (77.5% and 74.4%).

Despite general optimism about AI's potential, both Turkish medical professionals and healthcare managers face notable gaps in familiarity and engagement, as well as concerns about decision-making, healthcare costs, and job displacement. To enhance staff readiness for AI adoption, Turkish hospitals must urgently address these challenges through structured AI training programs.

KEYWORDS

artificial intelligence, healthcare delivery, healthcare management, Turkish, Türkiye

INTRODUCTION

Artificial intelligence (AI) can be described as the ability of machines to perform tasks usually associated with human cognitive functions such as learning and problem solving [1]. AI in healthcare holds great promise and continues to advance. It has been shown that AI algorithms can assist healthcare professionals by providing decision support systems in various clinical practices including radiology [2,3], dermatology [4,5], and ophthalmology [6]. AI also has the potential to be integrated into hospital management. AI-based automation tools have a great potential for enabling automation of redundant healthcare tasks and prescription writing and thus increasing operational efficiency of hospital service production [7,8]. AI-based chatbot services and virtual health assistants are evolving with the potential of increasing patient satisfaction as well as reducing healthcare costs and improving accessibility to medical knowledge [9-11]. While the potential role of AI in neutralizing human biases in the recruitment and selection processes has already been highlighted in several articles [12,13], it is foreseen that it can also be integrated into the in-service training and personal development processes as the training instructors [14].

A technology can only yield the expected results if it is adopted by its users. Accordingly, the successful integration of AI into hospital settings depends on the active involvement of hospital staff. However, research on the attitudes and familiarity of hospital staff towards AI remains limited, particularly among hospital administrative staff. Previous research, which primarily focuses on medical staff, has highlighted limited knowledge and familiarity with AI [15-17], as well as concerns about AI replacing human jobs [1,15,18] and doubts about the accuracy of AI algorithms [1]. Similarly, studies conducted among Turkish medical professionals [19,20] have reported minimal use of AI tools and insufficient AI training. While these studies provide valuable insights into the challenges faced by medical staff, they have largely overlooked hospital administrative staff and management, leaving a gap in research on AI adoption across hospital roles.

This study, conducted in two private Turkish hospitals, aimed to examine the attitudes and familiarity of both administrative and medical staff towards AI in healthcare, with a specific focus on healthcare and hospital management. Here, "attitudes" refer to hospital staff's perceptions and beliefs about AI in healthcare, including its acceptance, potential benefits, and broader implications such as concerns about job displacement and skepticism regarding the accuracy and reliability of AI-based algorithms in hospital settings. "Familiarity" refers to both direct experience with AI and general knowledge of its applications in various hospital departments, such as healthcare service delivery, human resources, and customer relationship management.

METHODS

STUDY DESIGN AND DATA COLLECTION

This study employed a cross-sectional design and was conducted in two private hospitals in the northern region of Türkiye. There were a total of 65 medical, 120 nursing, and 23 administrative staff members across both hospitals (N=208). The study sample consisted of 152 participants, representing a participation rate of 73.0%. Data were collected through a convenience sampling method on a voluntary basis from 14-31 March 2023, using a survey developed by the authors based on a literature review.

INSTRUMENT

The survey included 29 questions: 6 demographic questions and 23 assessing attitudes and familiarity towards AI in healthcare delivery and management. To ensure content validity and relevance, the 23 questions were reviewed by two academic experts with experience in healthcare management. Their feedback was incorporated to refine the clarity and appropriateness of the survey items. Each survey question was designed as a subjective item, with expressions such as "do you think AI can..." or "do you have any knowledge about AI applications in...". Of the 23 items, 5 focused on familiarity with AI in hospital administrative departments: 2 on healthcare service production, 2 on human resources, and 1 on customer relationship management. The remaining 18 items assessed general attitudes and beliefs around and familiarity with AI in healthcare. Each item had three response options: (1) "Yes", (2) "No", and (3) "Partially". While Likert scales (e.g., 5-point scales) are commonly used to capture more nuanced responses, a limited set of response options

was chosen to minimize confusion and streamline participant responses. This approach was particularly suitable given that the goal was to assess general attitudes and familiarity with AI, rather than measuring the intensity of these attitudes.

STATISTICAL ANALYSIS

Statistical analysis was performed using IBM SPSS Statistics 22. Descriptive statistics and frequencies were calculated for survey responses. Normality tests (Kolmogorov-Smirnov and skewness/kurtosis tests) were conducted to determine the appropriate statistical tests. As the data did not follow a normal distribution, non-parametric tests (Mann-Whitney and Kruskal-Wallis H) were used. The Chi-squared test was applied to compare categorical variables. A significant level of $p < 0.05$ was adopted.

ETHICAL CONSIDERATIONS

The study protocol was approved by the Sakarya University Ethics Committee (Code E-61923333-050.99-229068). The consent from the two hospitals where the data were collected was also obtained.

RESULTS

SOCIODEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

The sociodemographic characteristics of the entire sample ($n=152$) was given in Table 1. The majority of the participants were female ($n=106$, 69.7%), were aged between 19 and 28 years ($n=77$, 50.7%), and were nurses ($n=103$, 67.8%).

TABLE 1. SOCIODEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

Gender	n	%
Male	46	30.3
Female	106	69.7
Age	n	%
19-28	77	50.7
29-38	39	25.7
39-48	25	16.4
≥ 49	11	7.2
Education	n	%
High school	48	31.6
Associate	49	32.2
Undergraduate	27	17.8
Postgraduate	28	18.4
Occupation	n	%
Administrative staff	23	15.1
Physician	26	17.1
Nurse	103	67.8

SURVEY OVERVIEW

The survey results were given in Table 2. In the first section of the survey, Q11 (*Do you think AI can be a valuable asset in education and research in healthcare?*) was the question with the highest rate of "yes" responses (74.4%), whereas only 8.6% of the participants answered "yes" to Q17 (*Are you currently using AI in your area of work?*). Another item questioning participants' familiarity with AI (Q15: *Do you follow current developments regarding AI in healthcare?*) also had a quite low rate of "yes" responses (13.8%). Yet very few participants (15.8%) answered "yes" to Q18, questioning participants about their anticipated challenges in using AI in their area of work (*Do you think you would have difficulty when using AI in your area of work in the future?*). We provided a detailed interpretation of the results, highlighting potential factors influencing participants' varying responses, such as optimism, skepticism, and familiarity with AI.

TABLE 2. THE SURVEY RESULTS

Section 1: Attitudes and beliefs around and familiarity with AI in healthcare in general	Yes		No		Partially	
	n	%	n	%	n	%
Q1: Do you think AI is needed in healthcare?	84	55.2	10	6.6	58	38.2
Q2: Do you think AI can be helpful in your area of work?	102	67.1	10	6.6	40	26.3
Q3: Do you think AI can offer important advantages in healthcare delivery?	91	59.8	15	9.9	46	30.3
Q4: Do you think AI can help to reduce costs for healthcare?	58	38.2	41	27.0	53	34.8
Q5: Do you think AI can support the efficient use of limited resources in healthcare?	77	50.7	19	12.5	56	36.8
Q6: Do you think AI can offer a competitive advantage in healthcare delivery?	77	50.7	30	19.7	45	29.6
Q7: Do you think AI can reduce the workload of healthcare professionals?	100	65.8	14	9.2	38	25.0
Q8: Do you think AI can reduce the risk of making mistakes in delivering healthcare?	62	40.7	35	21.1	58	38.2
Q9: Do you think AI can make easier the learning processes in healthcare?	98	64.5	14	9.2	40	26.3
Q10: Do you think AI can drive innovation in healthcare delivery?	84	55.2	13	8.6	55	36.2
Q11: Do you think AI can be a valuable asset in education and research in healthcare?	113	74.4	4	2.6	35	23.0
Q12: Do you think AI can process data, interpret meaning, and offer appropriate suggestions in healthcare domain?	95	62.5	14	9.2	43	28.3
Q13: Do you think AI would become an indispensable part of the healthcare systems in the future?	76	50.0	26	17.1	50	32.9
Q14: Do you think AI-based decision support can assist healthcare professionals in their healthcare practices?	67	44.0	20	13.2	65	42.8
Q15: Do you follow current developments regarding AI in healthcare?	21	13.8	50	32.9	81	53.3
Q16: Do you think AI would cause high level of unemployment in the healthcare sector in the future?	69	45.4	29	19.1	54	35.5
Q17: Are you currently using AI in your area of work?	13	8.6	139	91.4	0	0.0
Q18: Do you think you would have difficulty when using AI in your area of work in the future?	24	15.8	64	42.1	64	42.1
Section 2: Familiarity with AI in the administrative departments of hospitals	Yes		No		Partially	
	n	%	n	%	n	%
Q19: Do you have any knowledge about AI applications in healthcare delivery?	44	28.9	49	32.2	59	38.8
Q20: Do you have any knowledge about AI-based prescribing support systems, pharmacy support systems, and diagnostic clinical decision support systems?	54	35.5	47	30.9	51	33.6
Q21: Do you have any knowledge about AI applications in recruitment and selection processes?	27	17.8	67	44.0	58	38.2
Q22: Do you have any knowledge about AI applications in in-service training and professional development activities?	43	28.3	67	44.1	42	27.6
Q23: Do you have any knowledge about AI applications in customer relationship management?	20	13.2	94	61.8	38	25.0

AI'S ACCEPTANCE

Most participants believed or partially believed that AI was necessary in healthcare (55.2% and 38.2%, respectively) and their respective fields (67.1% and 26.3%, respectively), while a small percentage (6.6%) remained skeptical about AI's necessity in both healthcare and their area of work. This suggested a general optimism about AI, though some participants might still have reservations regarding its full implementation, effectiveness, or ethical implications.

Further supporting this optimism, 50.0% of participants believed AI would become an indispensable part of healthcare systems in the future, with an additional 32.9% partially agreeing, reflecting strong expectations for AI's role moving forward. Additionally, a majority of participants felt either confident (42.1%) or uncertain (42.1%) about their ability to use AI effectively, suggesting that while some might fear challenges, many were open to learning and adapting to AI technologies in the future.

AI'S BENEFITS

Most participants recognized or partially recognized AI's potential benefits in education and research (74.4% and 23.0%, respectively), workload reduction (65.8% and 25.0%, respectively), learning processes (64.5% and 26.3%, respectively), data processing (62.5% and 28.3%, respectively), healthcare delivery (59.8% and 30.3%, respectively) and innovation (55.2% and 36.2%, respectively), while a small but consistent percentage (around 6-10%) remained skeptical. This suggested that while many participants acknowledged AI's potential, some might need more evidence, training, or firsthand experience before fully embracing its use.

CONCERNS AND SKEPTICISM TOWARDS AI

When asked about AI's ability to reduce healthcare costs (27.0% disagreed; 34.8% partially agreed), minimize errors (21.1% disagreed; 38.2% partially agreed), offer a competitive advantage (19.7% disagreed; 29.6% partially agreed), assist in decision-making (13.2% disagreed; 42.8% partially agreed), and optimize the use of limited healthcare resources (12.5% disagreed; 36.8% partially agreed), responses were more divided. This indicated that while many participants acknowledged AI's potential in these areas, a significant level of uncertainty and skepticism remained.

Additionally, nearly half (45.4%) of participants believed that AI would lead to high unemployment in healthcare in the future, with an additional 35.5% partially agreeing. This highlighted that a significant portion of participants were concerned about AI's potential negative impact on employment in the healthcare sector.

FAMILIARITY WITH AI

A small percentage (8.6%) of participants reported using AI in their area of work, while the majority (91.4%) were not yet utilizing AI technologies. This suggested a low level of AI integration in daily workflows, highlighting potential challenges in its widespread adoption within healthcare and hospital settings. Consistently, only 13.8% of participants actively followed AI developments in healthcare. Additionally, participants' responses regarding familiarity with AI in hospital administrative departments were generally negative, with "yes" responses to each of the five items being below 35.5%.

STATISTICAL TEST RESULTS

We tested all possible interactions between the sociodemographic variables and each of the survey items, presenting the significant ones in Table 3.

TABLE 3. THE SIGNIFICANT STATISTICAL TEST RESULTS

Q2: Do you think AI can be helpful in your area of work?					
Age	n	%	H test	p	Post-hoc test
1) 19-28	77	75.1	11.992	0.007	1-3; p=0.006 2-3; p=0.002 3-4; p=0.009
2) 29-38	39	68.9			
3) 39-48	25	98.1			
4) ≥49	11	64.0			
Q5: Do you think AI can support the efficient use of limited resources in healthcare?					
Age	n	%	H test	p	Post-hoc test
1) 19-28	77	77.0	1.429	0.010	1-3; p=0.006 2-3; p=0.001 3-4; p=0.002
2) 29-38	39	64.6			
3) 39-48	25	98.0			
4) ≥49	11	66.7			
Q5: Do you think AI can support the efficient use of limited resources in healthcare?					
Education	n	%	H test	p	Post-hoc test

1) High school	48	92.1	11.382	0.010	1-2; p=0.005 1-4; p=0.004
2) Associate	49	69.3			
3) Undergraduate	27	73.6			
4) Postgraduate	28	65.1			
Q6: Do you think AI can offer a competitive advantage in healthcare delivery?					
Education	n	%	H test	p	Post-hoc test
1) High school	48	84.6	9.791	0.020	1-4; p=0.003 2-4; p=0.010
2) Associate	49	80.4			
3) Undergraduate	27	76.5			
4) Postgraduate	28	55.8			
Q6: Do you think AI can offer a competitive advantage in healthcare delivery?					
Occupation	n	%	H test	p	Post-hoc test
1) Administrative staff	23	94.2	10.506	0.005	1-2; p=0.001 2-3; p=0.021
2) Physician	26	57.1			
3) Nurse	103	77.5			
Q20: Do you have any knowledge about AI applications in recruitment and selection?					
Occupation	n	%	H test	p	Post-hoc test
1) Administrative staff	23	68.4	6.729	0.035	2-3; p=0.017
2) Physician	26	61.0			
3) Nurse	103	82.2			
Q23: Do you have any knowledge about AI applications in customer relationship?					
Occupation	n	%	H test	p	Post-hoc test
1) Administrative staff	23	95.5	6.514	0.039	1-2; p=0.019 1-3; p=0.022
2) Physician	26	68.9			
3) Nurse	103	74.4			

STATISTICAL TEST RESULTS ACROSS DIFFERENT AGE GROUPS

Participants aged 39-48 reported the highest percentages for Q2 (*Do you think AI can be helpful in your area of work?*, 98.1%) and Q5 (*Do you think AI can support the efficient use of limited resources in healthcare?*, 98.0%), significantly higher ($p<0.05$) than participants aged 19-28 (Q2: 75.1%, Q5: 77.0%), 29-38 (Q2: 68.9%, Q5: 64.6%), and ≥ 49 (Q2: 64.0%, Q5: 66.7%). This indicated that middle-aged staff were more likely to recognize AI's potential to enhance their work and improve resource efficiency in healthcare. This might be due to career experience or adaptability to new technologies, whereas younger and older participants might be forming a view of AI or more cautious about adoption.

STATISTICAL TEST RESULTS ACROSS DIFFERENT EDUCATION LEVELS

Participants with a high school education reported the highest percentages for Q5 (*Do you think AI can support the efficient use of limited resources in healthcare?*, 92.1%) and Q6 (*Do you think AI can offer a competitive advantage in healthcare delivery?*, 84.6%), significantly higher ($p<0.05$) than those with a postgraduate degree (Q5: 65.1%, Q6: 55.8%). This indicated that those with lower education levels were more optimistic about AI's ability to improve resource efficiency and offer a competitive advantage. This might be because they focused on AI's immediate benefits such as reducing repetitive tasks and improving resource management. Alternatively, they might simply perceive AI technologies as inherently beneficial, without fully considering the underlying challenges and constraints, while those with higher education levels might be more critical due to a deeper understanding of healthcare systems and technology limitations.

STATISTICAL TEST RESULTS ACROSS DIFFERENT OCCUPATIONS

Administrative staff had the highest percentages for Q6 (*Do you think AI can offer a competitive advantage in healthcare delivery?*, 94.2%) and Q23 (*Do you have any knowledge about AI applications in customer relationship management?*, 95.5%), significantly higher ($p<0.05$) than physicians (Q6: 57.1%, Q23: 68.9%) and nurses (Q6: 74.4%). Additionally, nurses had the highest percentage for Q20 (*Do you have any knowledge about AI applications in recruitment and selection processes?* 82.2%), significantly higher ($p<0.05$) than physicians (Q20: 61.0%). These findings suggested that administrative

staff were more optimistic about AI's potential to offer a competitive advantage and more knowledgeable about its applications in customer relationship management, likely due to their focus on the operational aspects of healthcare delivery. On the other hand, nurses appeared more familiar with AI applications in recruitment and selection, possibly because these processes were more directly relevant to their day-to-day responsibilities. Physicians, meanwhile, had lower scores in all these areas, likely because their primary focus on patient care left them less engaged with or aware of AI applications in administrative functions. Medical staff's cautious approach might also be influenced by concerns about AI's limitations in clinical practice and its potential impact on patient outcomes.

DISCUSSION

The aim of this study was to examine the attitudes and familiarity of both administrative and medical staff towards AI in healthcare delivery and management. The present findings provided valuable insights into how different hospital staff groups perceive AI. Administrative staff demonstrated greater optimism and familiarity with AI's managerial applications, such as competitive positioning and customer relationship management, likely due to their direct involvement in these areas. In contrast to the administrative staff, medical staff, especially physicians, approached these applications of AI with greater caution. While this might partly stem from their primary focus on patient care, leaving them less engaged with or aware of AI applications in administrative functions, their cautious stance might also be driven by concerns about AI's limitations in clinical practice and its potential impact on patient outcomes. Indeed, a qualitative study analyzing text-based comments from healthcare professionals, 65.3% of whom were physicians, revealed concerns about the accuracy of AI-powered applications [1]. Similarly, a cross-sectional study on Turkish physicians identified trust as the strongest predictor of physicians' willingness to integrate AI into their practices [21]. Therefore, unless concerns about AI's reliability in clinical practice are fully addressed, physicians are likely to resist its widespread adoption in healthcare, thereby limiting its potential to drive competitive advantage.

Age and education level were found to influence hospital staff's perceptions and understanding of AI, suggesting nuanced differences in attitudes across these groups. Hospital staff aged 39-48 were more likely than those in the 19-28, 29-38, and ≥ 49 age groups to recognize AI's potential to enhance their work and improve resource efficiency in healthcare. Additionally, hospital staff with higher education levels, particularly those with postgraduate degrees, were less optimistic about AI's benefits. However, we could not fully account for occupation due to insufficient sample size within certain groups (e.g., physicians), which might affect the interpretation of these findings. Future research should better address this limitation by ensuring a more balanced sample across age, education, and occupational groups, which would allow for a more comprehensive understanding of how these factors influence attitudes towards AI in healthcare and hospital settings.

The majority of hospital staff demonstrated general optimism about AI's potential in healthcare and hospital settings, with greater interest in its ability to enhance work efficiency, support resource management, and contribute to education and research. However, this optimism was accompanied by concerns and skepticism, particularly regarding decision-making, healthcare costs, and the potential for job displacement, issues similarly noted in previous studies [1, 15, 18]. On the other hand, despite their general positive outlook, we observed a notable gap in staff familiarity with AI technologies. Low usage rates in their current roles, coupled with limited engagement in ongoing AI developments, revealed substantial barriers to widespread adoption and integration. The lack of familiarity is consistent with previous research documenting limited AI knowledge among healthcare professionals [15-17, 19, 20]. These findings underscore the need for targeted educational initiatives and training programs that both enhance familiarity with AI technologies and address concerns regarding its impact on decision-making and job roles. Hospital-driven initiatives that provide hands-on experience and real-time applications of AI tools could increase AI literacy and foster broader adoption, ultimately maximizing its benefits in healthcare delivery and management.

LIMITATIONS

The present study had several limitations. First, our findings might not be generalizable beyond the surveyed participants, as the sample was limited to specific hospital settings. However, they were consistent with the results of similar studies conducted both in Türkiye and globally. Second, as with any survey-based research, self-report bias may have influenced the responses. Participants may have responded in a socially desirable manner rather than reflecting their true attitudes. Third, although our study was conducted across two different hospitals with the aim of reaching the entire sample, our participants were limited to those who were readily available and willing to participate, resulting in a convenience sample. This limitation further constrains the generalizability of our findings. Fourth, although we kept the survey concise and straightforward to encourage participation, the participation rate among physicians was notably low (40.0%). Extending the survey period and employing additional recruitment strategies (e.g., incentives) might have increased physician participation. However, due to time constraints, we were unable to achieve a more representative response from this group. Fifth, the use of a structured questionnaire limited our ability to comprehensively capture our participants' in-depth opinions regarding AI in healthcare. Future research could incorporate qualitative methods to gain a more comprehensive understanding of hospital staff's perspectives. Sixth and last, while our questionnaire was based on a well-established framework and reviewed by two academic experts to ensure its relevance, we did not conduct pilot testing or formal reliability analysis (e.g., Cronbach's alpha). Our primary focus was on gathering broad data rather than validating the instrument in-depth. Future studies could enhance the validity and reliability of the instrument by conducting pilot testing and formal reliability analysis.

CONCLUSION

In conclusion, this study highlights the diverse attitudes and familiarity of hospital staff toward AI in healthcare delivery and management. While administrative staff demonstrated greater optimism and familiarity with AI's managerial applications, medical staff, particularly physicians, exhibited more caution. Additionally, age and education level played significant roles in shaping certain attitudes towards AI, with middle-aged staff recognizing AI's benefits more than younger or older colleagues, and highly educated individuals displaying more skepticism. However, limitations in sample representation suggest that future research should ensure a more balanced distribution to provide a more comprehensive understanding of AI perceptions in healthcare and hospital settings.

Despite general optimism regarding AI's potential, significant gaps in familiarity and engagement with AI technologies persist among hospital staff, hindering its widespread adoption. Concerns and skepticism, particularly regarding decision-making, healthcare costs, and the potential for job displacement, further highlight the need for targeted educational initiatives and training programs. To address these challenges, Turkish hospitals should implement structured AI training that enhances AI literacy, mitigates skepticism, and builds staff confidence in integrating AI into their daily practices. Additionally, by promoting the practical application of AI technologies and providing hands-on opportunities for staff to engage with these tools, hospitals can bridge familiarity gaps and maximize AI's benefits in healthcare delivery and management.

AUTHOR CONTRIBUTIONS:

The authors confirm contribution to the paper as follows: the study concept and design: BB and SA; data collection and analysis: BB and SA; interpretation of results: BB, SA, and GÜ; draft manuscript preparation: BB, SA, and GÜ. All authors reviewed the results and approved the final version of the manuscript.

DECLARATION OF CONFLICTING INTERESTS:

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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A VALIDATION STUDY ON THE PAIN BELIEFS QUESTIONNAIRE MALAY VERSION (PBQ-M) AMONG MALAYSIAN ADULTS

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ABSTRACT

The biopsychosocial approach in chronic pain considers one's belief, cognition and behaviours related to the pain experience. To date, there is no measure for pain beliefs in Malaysia, highlighting the need for validation of the Pain Beliefs Questionnaire (PBQ). There were 125 participants in this cross-sectional study. The PBQ was first translated from English to Bahasa Malaysia and then back-translated by the team of researchers, reviewed and examined by third party clinical psychologists experienced in chronic pain management.

While all participants completed the PBQ, only those who reported having pain exceeding six months ($n = 37$) were required to complete the Pain Catastrophizing Scale (PCS) and the Pain Self-Efficacy Questionnaire (PSEQ). The organic subscale had a Cronbach's alpha coefficient of 0.81 while the psychological subscale had a coefficient of 0.71. Overall, the PBQ-M demonstrated good reliability ($ICC = 0.81$). The Organic subscale of the PBQ had a significant association with PCS, however, there were weak correlations between the organic ($p = .058$) and psychological ($p = .077$) subscales of PBQ with the PSEQ.

In conclusion, the PBQ-M is a valid and reliable measure of Malaysian adults' pain beliefs, independent of the presence of the condition, via two scales that can potentially predict pain catastrophizing and pain self-efficacy.

KEYWORDS

Chronic pain, biopsychosocial, pain belief, pain catastrophizing, self-efficacy

INTRODUCTION

Pain refers to the sensorial and emotional experience that is unpleasant related to or mimicking the relation with real or potential damage to the tissue [1]. Generally, it serves an adaptive and protective function. However, when pain becomes a chronic condition, these functions are no longer served. Instead, consequences are reflected socially, economically and clinically. Some examples can be seen in the struggles of individuals with chronic pain in terms of employment, financial management, companionship and mental health such as depression, anxiety and ultimately,

suicide [2]. The general prevalence of chronic pain in Malaysia is low but a recent study highlighted the increased prevalence of chronic pain across the aging population (21.5%) [3].

From the biomedical reductionist model, chronic pain management has taken a shift towards the biopsychosocial approach where pain is viewed as a result of the interactions among the physiological, psychological and social components [4]. This shift was due to criticisms towards sole biomedical treatments such as medications and surgeries which pose risk of medication abuse, misuse, and impairment on human functioning [5].

Patient's belief, cognition, and their associated behaviours are crucial underlying factors contributing to the understanding of the biopsychosocial perspective of chronic pain. An individual's belief towards pain contributes to the whole pain experience and responses. One meta-analysis indicated that disability had a moderate correlation with pain self-efficacy ($r = -.51$, $p < .001$), pain catastrophizing ($r = .44$, $p < .001$) and pain-related fear ($r = .41$, $p < .001$). A past study has found that a large proportion of pain beliefs had a medium effect size on disability and pain, when pooled together, indicating that individuals who possessed a higher pain self-efficacy, lower catastrophizing, pain-related fear and negative pain-related beliefs displayed lower disability [6]. The perception of pain as frightening contributes to disruption in daily functioning and encourages the engagement of safety behaviours such as pain avoidance [7]. Pain avoidance can be manifested in many ways, one of which is the fear of movement. Subsequently, individuals with high self-efficacy in their capacity to manage pain and accomplish an action can lessen this fear. While there is an indication for chronic pain to increase organic beliefs among individuals [8], a shift towards the psychological perspective led to decreased pain [9]. This implies that if pain beliefs are targeted, the daily functioning and management of pain can be improved. The Pain Catastrophizing Scale (PCS) was developed to assess an individual's tendency to catastrophize in response to pain, influencing how pain is perceived. Items in the scale reflect 3 subscales: rumination, magnification, and helplessness. The PCS demonstrated high internal consistency ($\alpha = 0.87$) and construct validity [10]. Among 229 studies, PCS was found to have good internal reliability ($\alpha = 0.92$), test-retest reliability (Spearman $\rho = .88$) and strong correlations with participants' pain type, specifically those with generalized pain [11].

In Malaysia, the adaptations of Pain Catastrophizing Scale (PCS) and Brief Pain Inventory (BPI) are used to evaluate pain catastrophizing, intensity and interference [12,13]. However, there are currently no measures of pain beliefs in the country. One of the widely used tools for this purpose is the Pain Beliefs Questionnaire (PBQ). The PBQ was first established to assess individual's beliefs and attributions of the causes and effect of pain, and possible factors contributing to the experience of pain in the long run [14]. The PBQ was found to have good psychometric properties in other languages and in different ethnicities [15]. It has also been used in many countries to study pain beliefs and in deciding treatment options [16]. The study of PBQ has also extended to the association of pain beliefs with depression [17], disability [9], help seeking behaviour and helplessness [18]. Hence, to obtain a more comprehensive understanding of Malaysian chronic pain patients, a pain beliefs questionnaire that is adapted to the local context will be useful to explore individuals' perception of pain, as this may lead future research on the relationship between pain perception with daily living and coping.

METHODOLOGY

PARTICIPANTS

There were 125 participants who took part in this validation study. The sample size was determined using the 10:1, respondent-to-item ratio. As the PBQ consists of 12 items, a sample size of at least 120 participants was adequate. They were recruited through social media platforms and messaging service (i.e. Facebook, Instagram, WhatsApp), as well as hardcopy distribution at Hospital Selayang. Participants who were 18 years old and above, Malaysian, fluent in English or Bahasa Malaysia and provided consent to participate were included in the study as the general population. Individuals who reported having pain exceeding six months or was clinically diagnosed with chronic pain were considered chronic pain patients in this study and included in the stage 2 analysis.

DESIGN

This was a cross-sectional study using a survey method.

MEASURES

The pain beliefs questionnaire (PBQ) has a total of 12 items under Organic Beliefs Scale (8 items) and Psychological Beliefs Scale (4 items), rated across a Likert scale of 1 (Never) to 6 (Always). The Organic Beliefs Scale reflects the pain perception as organic while the Psychological Beliefs Scale reflects the interplay of psychological components in pain. The scale was found to have good construct validity and internal consistency ($\alpha = .70$ to $.73$) [14].

The Pain Catastrophizing Scale (PCS) has 13 items across three subscales, Rumination, Helplessness and Magnification, that assesses individuals' pain-related catastrophizing thinking rated using a Likert scale of 0 (Not at all) to 4 (All the time). Higher scores on the PCS indicate a higher tendency for pain catastrophizing [19]. The translation and validation study of PCS in the Malaysian context found satisfactory internal consistency ($\alpha = .93$) [12].

The Pain Self-Efficacy Questionnaire (PSEQ) has 10 items that measure an individual's belief about their functioning in the presence of pain across a Likert scale of 0 (Not confident at all) to 6 (Completely confident) [20]. Stronger beliefs related to self-efficacy are characterized by higher scores on the PSEQ. Although there is no published study on the validation of PSEQ in Malaysia, Hospital Selayang is using a Malay translated version that possesses good internal consistency ($\alpha = .95$) [21].

PROCEDURE

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki and complies with the ethical standards of the university's ethics review committee which provided ethical clearance. Then, the PBQ was translated from English to Bahasa Malaysia by the primary researcher and subsequently, back-translated from Bahasa Malaysia to English by a secondary researcher. The translated versions of the PBQ were reviewed by a clinical psychologist bilingually, and the final version of the PBQ Bahasa Malaysia (PBQ-M) was reviewed by a panel which comprised of three clinical psychologists in pain management.

Participants were recruited in person during their hospital visit and via social media platforms. Informed consent was obtained before collecting participants' demographic information and their ratings on the PBQ, PCS and PSEQ via Qualtrics (for online respondents only). While all participants completed the PBQ, only those who had experienced pain exceeding six months were asked to complete the PCS and PSEQ.

DATA ANALYSIS

Data analysis was done using SPSS version 26. Participants' socio-demographic information are presented via descriptive statistics, while factor analysis was used to assess the construct validity of PBQ-M. Firstly, normality was determined using histogram and QQ-plots. To determine whether factor analysis was appropriate to be conducted, Kaiser-Meyer-Olkin (KMO) statistics (> 0.7) and Bartlett's test of sphericity ($p < .05$) was done. Subsequently, principal components analysis (PCA) was conducted to reduce the dimensionality of datasets, hence allowing data interpretation with minimal loss of information. The internal consistency was further assessed using Cronbach's alpha while concurrent validity was assessed using Pearson's correlation between PBQ-M with PCS and PSEQ.

RESULTS

SAMPLE CHARACTERISTICS

Out of 175 responses, there was 50 missing data, resulting in a final total of 125 participants in this study. The mean age was 27.68 (SD = 10.69) with a majority of female ($n = 77$; 61.6%). The majority of respondents ($n = 88$; 70.4%) completed the PBQ-M only as they had pain of less than six months. Among the chronic pain participants ($n = 37$, 29.6%), two of them had missing data on PCS and PSEQ, resulting in only the analysis of their PBQ scores.

CONFIRMATORY FACTOR ANALYSIS AND RELIABILITY

Factor analysis was conducted on all items from the PBQ. The PBQ scored well on the KMO (KMO = 0.81) with significance on the Bartlett's test of sphericity ($p < .001$). Such results indicate that sphericity is assumed, and factor analysis was suitable to be used to analyse the responses. Principle component analysis was conducted in a 2-factor model as two definite components were reflected by the scree plot (see Table 1). All items were kept due to strong loading (>0.40) on a single component. The total scale showed adequate internal consistency ($\alpha = 0.81$). Similar results were found for the organic subscale ($\alpha = 0.81$), and the psychological subscale ($\alpha = 0.71$).

TABLE 1. COMPONENT LOADINGS OF 12-ITEMS IN PBQ

Items	Component 1 (Organic)	Component 2 (Psychological)
PBQ1: Damage to tissue	0.55	
PBQ2: Physical exercise	0.77	
PBQ3: Impossible alone to relieve pain	0.62	
PBQ4: Being anxious worsens pain		0.80
PBQ5: Something wrong with body	0.62	
PBQ6: Coping when relaxed		0.50
PBQ7: Prevents hobbies and social activities	0.55	
PBQ8: Pain related to amount of damage	0.63	
PBQ9: Thinking about pain		0.68
PBQ10: Impossible to control pain	0.72	
PBQ11: Sign of illness	0.65	
PBQ12: Feeling depressed worsens pain		0.83

CRITERION-RELATED VALIDITY

The Pearson's correlation was conducted on PBQ-Organic (PBQ-O), PBQ-Psychological (PBQ-P), PCS total and PSEQ ($\alpha = .05$) (see Table 2). There was a significant association between PBQ-Organic and PCS. However, PSEQ was observed to have weak correlations with PBQ-Organic ($p = .058$) and PBQ-Psychological ($p = .077$).

TABLE 2. PEARSON CORRELATION BETWEEN PBQ-O, PBQ-P, PCS, AND PSEQ

	PBQ-Org	PBQ-Psy	PCS	PSEQ
PBQ-Org	1			
PBQ-Psy	-0.07	1		
PCS	0.40 **	-0.05	1	
PSEQ	-0.33*	0.31*	-0.07	1

Note. ** represents significant correlation at the 0.05 level (2-tailed). PBQ-Org = Pain Beliefs Questionnaire-Organic. PBQ-Psy = Pain Beliefs Questionnaire-Psychological. PCS = Pain Catastrophizing Scale. PSEQ = Pain Self-Efficacy Questionnaire.

DISCUSSION

The goal of this research was to translate and evaluate the validity of the Pain Beliefs Questionnaire (PBQ) in the Malaysian context. The findings on the validity ($p = .058, .077$) and reliability ($\alpha = 0.71, 0.81$) of the PBQ in this study are consistent with previous reports [8, 14]. Confirmatory factor analysis showed that 2-factor was the best model for the PBQ-M, where it demonstrated similarity with the initial findings by a previous study [14]. All item loadings were strong with no cross loading in the 2-factor model. The PBQ-M therefore, can be characterized by two sub-scales: Organic, dealing with individual's perception on the cause of pain and its management, and Psychological, dealing with the impact of factors such as anxiety, depression, attention to pain and relaxation. Similar to the original findings [14], the total scores and individual sub-scales of the PBQ-M demonstrated acceptable internal consistency. These findings suggest that PBQ-M is valid and reliable to be used among the Malaysian adult population.

Apart from that, organic pain beliefs significantly correlate with pain catastrophizing in this study. This is consistent with previous studies on the association between negative metacognitive beliefs with pain catastrophizing [22]. Similarly, pain catastrophizing was found to be correlated with the belief that social support is low and perceived poor self-coping abilities [23]. Such findings highlight the contribution of metacognitive beliefs in understanding pain and its impact on functioning. Organic beliefs may lead to the idea that pain has a biological basis and can only be treated by external variables (e.g., doctors, medicine, surgery), thus contributing to the reduced sense of control associated with increased pain catastrophizing. Further evidence is reflected by the schema-activation model, which proposes that pain catastrophizing is characterised by a pain schema consisting of excessive pessimistic beliefs about pain, its experience and one's coping ability [24]. This schema is activated in the presence of a minimally noxious stimulus, and heightens the pain experience, which translates into a self-fulfilling prophecy that pain is threatening and cannot be self-managed. Nevertheless, this model failed to address the conditions and dynamics that lead to schema activation.

In contrast to organic beliefs and previous findings on anxiety with pain catastrophizing [25], no significant association was found between psychological pain beliefs and pain catastrophizing in this study. This finding may be explained by the lack of education among Malaysians on the other aspects of pain, where many still hold on to the biomedical perspective. It seemed that Malaysians are still skeptical of mental health care due to its stigma, as evidenced by varying findings on pain beliefs and catastrophizing across different countries [26]. This may be due to the reduced accessibility and exposure towards mental health affected by socioeconomic status, education and culture.

The findings on the negative association between organic pain beliefs with pain self-efficacy, and the positive association between psychological pain beliefs with pain self-efficacy, is consistent with a previous study where chronic low back pain individuals with organic pain beliefs felt less in control of pain, leading to lower self-efficacy and greater disability, anxiety and depression [17]. The direction of association between pain beliefs with self-efficacy, or lowered self-efficacy scores with passive coping (reliance on medication) is also supported by previous studies on individuals with low back pain who had poor self-efficacy with higher drug use [27] and, the engagement in active coping and higher self-efficacy with lesser drug use [28]. There is strong evidence in literature to support these findings whereby patients with musculoskeletal disorders who reported higher pain self-efficacy had better outcomes in terms of ability to function, interference of pain, anxiety and depression [29].

To date, there are very few studies in Malaysia which focuses on the psychological aspect of pain as it is perceived to be a rather new perspective. Within this perspective, some critics may argue that the contextualisation of pain is difficult as psychological beliefs vary across individuals, more so between chronic and non-chronic pain individuals [8]. This suggests that apart from pain itself, its severity may have a unique influence on an individual's psychological belief towards it. Self-efficacy refers to an individual's belief in their own capacity to perform behaviours for attainment [30], which can explain the association between beliefs and self-efficacy in the pain context. Self-efficacy is also characterised by an individual's confidence in their ability to control areas such as motivation, behaviour, and social environment. All these play a role in influencing an individual's experience, including goals in life, expansion of effort and the possibility of achieving a certain

level of behavioural performance. Due to its influence on the direction of an individual's experience, pain self-efficacy is regarded as one of the most influential and valuable constructs within the psychological perspective for individuals with chronic low back pain [31]. It is, therefore, worthwhile for future research to explore this construct with clinical implications. There are, however, a few limitations in this study. Findings from this study resulted from cross-sectional design, hence a causal relationship cannot be established. The sample size in this study was reasonable for psychometric testing but participants with chronic pain, in particular, was relatively small ($n = 37$). Although the sample size was sufficient to be analysed using Pearson's correlation, results generated from small sample sizes may not accurately resemble that of the true population, thus affecting data generalization. Similarly, missing data from the participants were excluded from the results which may incur selection bias, hence not adequately representing the population. Therefore, future studies may be conducted with a larger sample size of chronic pain patients. As chronic pain may be more prevalent among the older population [3], there is a limitation in our findings where samples were collected from a relatively young age group. In view of recruiting the older population, it is also important to consider physical recruitment as the technological accessibility and literacy among the older population may be lacking.

Findings from this study indicated that the PBQ-M is suitable to measure pain beliefs among Malaysians. To further enhance the value of PBQ-M, future studies may consider using confirmatory factor analysis and study its predictive validity. There is potential for the PBQ to have clinical benefit as the understanding of an individual's pain belief would facilitate a more tailored pain management intervention and/or treatment program. Overall, recognising the impact of organic and psychological beliefs on an individual's pain perception is important as it allows a better delivery of care towards chronic pain patients and a more effective pain management.

CONCLUSION

In conclusion, the PBQ-M is valid and reliable to be used among Malaysian chronic pain samples. The questionnaire also poses potential benefits in terms of research and practice, as it emphasises clinically relevant beliefs that are both central and malleable. The significance of pain beliefs has been highlighted in this study. This is an important step in the rehabilitation of chronic pain as addressing the beliefs about the nature, origin and treatment of pain improves the "biomedical" perspective of pain. Lastly, the PBQ-M is a simple measure that is independent of the condition or presence of pain yet demonstrates good potential in predicting pain catastrophizing and pain self-efficacy.

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OPPORTUNITIES AND CHALLENGES FOR ICT-BASED ENTREPRENEURSHIP IN INDIA: SPECIAL REFERENCE TO INDIAN HEALTHCARE INDUSTRY

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ABSTRACT

OBJECTIVE:

This study investigates the potential of technology entrepreneurship to address critical challenges within the Indian healthcare landscape. Leveraging existing literature, we develop a novel theoretical framework examining how patients, medical professionals, and the healthcare industry interact with three key elements of technology entrepreneurship: technology innovation, technology proactivity, and technology risk-taking. Analysing these interactions across three tiers – patients, medical professionals, and the industry itself – reveals practical implications for fostering positive change.

DESIGN / METHODOLOGY:

The authors have conducted an extensive review of literature focusing on technological growth in the healthcare industry and its effect on entrepreneurship development in this area. The review is primarily focused on developments in the last two decades. Consequently, the authors have proposed a framework for technology entrepreneurship development (i.e., technological innovation, technological proactivity, and technological risk-taking), which is the foundation of value creation. This concept will be dealt with at three levels, namely, patients, medical professionals and hospitals, and the entire healthcare industry.

RESULTS:

Many researchers have identified that innovation, proactivity, and risk-taking are the key characteristics of the entrepreneurial journey. Each of these characteristics (innovation, proactivity, and risk-taking) has been explained with supporting examples from the healthcare industry. The paper's practical implications can be separated into three categories: those for patients (support for patients and technology-based engagement techniques), organizations (digital health solutions and collaborative motivation), and the healthcare industry (infrastructure and trust building).

CONCLUSION:

The paper has outlined the challenges and opportunities for technology entrepreneurs at three levels, namely, patients, medical professionals and hospitals, and the entire industry. Prospects for research in the near future have been also identified.

KEYWORDS

Healthcare entrepreneurship, technology entrepreneurship, entrepreneurship in healthcare technology, new technologies in healthcare, healthcare technologies in India.

INTRODUCTION

Information and Communication Technology (ICT) permeates various business sectors in India, offering immense potential for transformation. The healthcare sector, plagued by limited access to affordable care and uneven distribution of resources, presents a compelling opportunity for technology-driven interventions. With a population of 1.3 billion and a skewed urban-rural healthcare infrastructure, India demands innovative solutions to bridge the gap between demand and quality care [1,2].

TECHNOLOGY ENTREPRENEURSHIP: A CATALYST FOR CHANGE

Technological entrepreneurship in healthcare refers to the establishment and expansion of enterprises offering novel solutions to improve healthcare delivery [3]. Driven by increasing societal demand, stricter regulations, and a growing need for efficient services, the healthcare industry requires innovative approaches to address rising patient numbers and ensure personalized, high-quality care amidst resource constraints [4].

While numerous studies have explored the healthcare sector through diverse social science lenses (marketing, organization studies, economics), a holistic framework integrating various perspectives remains elusive [5]. This research aims to address this gap by developing a novel framework grounded in the interactions between key stakeholders (patients, medical professionals, and the industry as a whole) and the following three critical elements of technology entrepreneurship:

- **Technology Innovation:** Development and adoption of novel technologies to enhance healthcare delivery.
- **Technology Proactivity:** Anticipating and proactively addressing evolving healthcare needs through technology.
- **Technology Risk-Taking:** Embracing calculated risks associated with implementing new technologies for potential advancements.

This research uses a framework of multi-tiered analysis, which analyses technology entrepreneurship across three tiers: patients, medical professionals, and the healthcare industry. The first tier of analysis examines how technology can enhance patient support, engagement, and empowerment through innovative solutions. The second tier explores how digital health tools and collaborative platforms can empower medical professionals and foster teamwork. The third tier investigates how technology entrepreneurship can contribute to infrastructure development, trust building, and improved service delivery within the healthcare system. This analysis yields valuable insights for various stakeholders. For the healthcare sector, it emphasizes the need for infrastructure development, trust building, and data security considerations alongside technology adoption. For organizations, this analysis highlights the importance of implementing digital health solutions, fostering collaborative cultures within healthcare organizations, and supporting technology entrepreneurs. For patients, it underscores the value of patient-centric technology design, promoting patient engagement strategies, and ensuring ethical considerations in data use.

ENTREPRENEURIAL ATTRIBUTES IN HEALTHCARE TECHNOLOGY: CREATIVITY, PROACTIVITY, AND RISK-TAKING

This research article explores three critical attributes shaping the entrepreneurial journey in healthcare technology: creativity, proactivity, and risk-taking. By examining these characteristics and their practical applications within the Indian healthcare landscape, we aim to shed light on the essential qualities driving innovation and positive change in this dynamic field.

CREATIVITY: FUELLING INNOVATION IN HEALTHCARE TECHNOLOGY

Technological innovation forms the bedrock of advancements in healthcare, enabling the development of novel solutions to tackle existing challenges and enhance patient care. Defined as the process of creating, implementing, and utilizing new or improved technology, innovation encompasses a wide range of products and services designed to optimize patient outcomes, reduce costs, and streamline clinical procedures [6]. The healthcare technology landscape thrives on the contributions of both large organizations and small and medium-sized enterprises (SMEs). While large corporations

often leverage research-based forecasting and advanced data analytics tools like IBM Watson for drug discovery, fraud detection, and healthcare administration [7]. SMEs play a crucial role in fostering agility and bringing innovative solutions to the market. In a testament to the power of creativity, the collaboration between Apollo Hospitals and India Medtronic has yielded an AI-powered stroke treatment solution capable of reducing diagnosis time from 60 minutes to 2 minutes, highlighting the immense potential of creative approaches to improve patient outcomes.

PROACTIVE APPROACH: ANTICIPATING AND ADDRESSING HEALTHCARE NEEDS

Technology proactivity—defined as the anticipatory use of technology to address emerging challenges before they materialize—empowers the healthcare sector to prepare for and effectively manage evolving demands [8]. Predictive analytics, early disease detection systems, and healthcare automation represent key applications of proactive technology. These tools aim to safeguard population health, identify individual medical anomalies, and generate future projections at both individual and societal levels. Additionally, technology proactivity can promote sustainable healthcare practices by enabling hospitals to adopt innovative and cost-effective service delivery models [9]. The social aspect of technology entrepreneurship plays a pivotal role in fostering collaboration between market players and internal/external resources, which is particularly relevant in the healthcare industry due to its inherent focus on tackling medical challenges [10]. An illustrative example is Wadhvani AI's development of an innovative triaging tool that utilizes self-reported symptoms and analyzes cough sounds to identify potential COVID-19 cases. This project, in collaboration with various government agencies, exemplifies the proactive use of technology to optimize resource allocation and improve testing reach during the pandemic.

RISK-TAKING: EMBRACING CHALLENGES FOR VENTURE CREATION

Entrepreneurship inherently involves calculated risk-taking. However, in the healthcare industry, decisions made by entrepreneurs and stakeholders impact not only themselves but also patients and healthcare providers. Doctors take risks by participating in trials of new technologies or services, while patients may choose to undergo innovative treatments if the potential benefits outweigh the risks associated with established approaches. Hospitals, too, face potential reputational and operational challenges if they are unprepared to manage risks associated with innovative solutions. In this complex ecosystem, all stakeholders – entrepreneurs, providers, and patients – must exhibit a degree of risk tolerance and decision-making ability [11,12]. Building trust within the healthcare industry requires transparent communication, a demonstrably robust safety net, and a proven track record of success, as evidenced by experience, expertise, and positive referrals.

VALUE CREATION IN HEALTHCARE TECHNOLOGY: OPPORTUNITIES AND CHALLENGES ACROSS STAKEHOLDERS

This section delves into the multifaceted interplay between value creation, challenges, and opportunities in healthcare technology at the patient, organizational (hospitals and medical personnel), and healthcare sector levels.

PATIENT-LEVEL

Opportunities:

- Predictive Health: Companies like Google leverage data to predict long-term health trends, while other companies like Practo, Pharmeasy, and Tata 1mg focus on analyzing activity and capture data for personalized insights [13].
- Remote Patient Evaluation: Technologies like Dectrocel Healthcare's AI-based medical imaging facilitate early diagnosis, while Ubicare and HealthifyMe assist with chronic disease management. [13].
- Treatment Monitoring: Solutions for medication reminders, drug discovery, and family involvement are emerging, and help to enhance treatment adherence and support. [14].

Challenges:

- Data Privacy and Security: Balancing personalization with data protection remains crucial [14].

- Access and Affordability: Ensuring equitable access to technology across diverse socioeconomic backgrounds is essential. [14].
- Digital Literacy: Bridging the gap between patients' computer skills and technology utilization requires ongoing education. [13].

ORGANIZATIONAL-LEVEL

Opportunities:

- Enhanced Diagnostics: Startups like Phase Laboratories and Adiuvo Diagnostics address specific healthcare challenges through innovative diagnostic tools [14].
- Improved Treatment and Care: MedMarvel Software Solutions empowers neurologists with advanced imaging tools, while telemedicine platforms like Apollo 24x7 and Medibuddy facilitate remote consultations and reduce infection risks [13].
- Decision Support and Precision Medicine: PierianDx leverages AI to interpret complex genetic data for personalized treatment plans, while HealthPlix's AI-powered EMR platform supports clinical decision-making. [15].

Challenges:

- Infrastructure and Training: Equipping healthcare providers with necessary infrastructure and training to efficiently utilize new technologies is critical [13].
- Integration and Interoperability: Ensuring seamless integration of diverse technologies within existing healthcare systems remains a challenge. [15].
- Workforce Reskilling: Addressing potential job displacement and empowering healthcare professionals to adapt to changing roles is crucial. [13].

HEALTHCARE INDUSTRY-LEVEL

Opportunities:

- Big Data Insights: Analyzing vast datasets, including unstructured data, unveils opportunities for identifying disease patterns, optimizing resource allocation, and developing targeted interventions [15].
- Data Sharing and Collaboration: Secure data sharing across stakeholders can foster collaborative research and innovation, driving industry-wide advancements. [14].
- New Business Models: Data-driven insights can inform the development of innovative value-based healthcare models that prioritize patient outcomes. [14].

Challenges:

- Data Governance and Regulations: Establishing robust data governance frameworks and ethical regulations is crucial to ensure responsible data use and privacy protection. [13].
- Equity and Accessibility: Bridging the digital divide and ensuring equitable access to data-driven healthcare solutions remains a significant challenge [14].
- Interoperability Standards: Establishing standardized data formats and interoperability standards is essential for seamless information exchange across healthcare systems [15].

HEALTHCARE TECHNOLOGY ENTREPRENEURSHIP: CHALLENGES AND OPPORTUNITIES

This article's main contribution is an assessment of the many facets of innovation and knowledge in the healthcare industry. Several aspects of technology entrepreneurship are discussed, especially how it creates a value framework for understanding value creation processes in the healthcare industry. The current technological status based on this approach, entrepreneurship in healthcare has been investigated and related to a multi-level framework of challenges and opportunities. Table 1 presents our framework, which is discussed in the next paragraph in terms of its theoretical and practical implications.

At the macro level, trust in technological proactivity is lacking in new products and institutional gaps continue to exist. At the same time, innovative technological tools are being created, which are capable of collecting data from patients and conducting data evaluation [16]. Additionally, the micro-level information collected from numerous patients may serve as the foundation for creating long-term trends in emerging societies, as well as the formation of specialist markets. The proactive production of technical value will increase the provision of medical treatment in underserved areas, emerging nations, and remote locations, ultimately influencing a country's macroeconomic growth [17]. Technology entrepreneurs also contribute value to health organizations by tackling issues such as the lack of medical specialists, an overburdened workforce, and the unproductive use of time by healthcare workers. Overall, technology entrepreneurs provide plenty of possibilities for proactive creation of value to the sector.

TABLE 1: CHALLENGES AND OPPORTUNITIES FRAMEWORK

	Technology innovation		Technology proactivity		Technology risk-taking	
	Challenges	Opportunities	Challenges	Opportunities	Challenges	Opportunities
Patient level	Low awareness; refusal to accept automated medical treatments. [1,19]	Service co-creation in close collaboration with patients [17,18]	Patients' lives are disrupted; patients' needs are underestimated. [4,19]	Long-term health advantages are anticipated; supporting gradual rather than abrupt behavioural changes; and practising preventive medicine. [9,20]	Individual risk perception is influenced by personal preferences. [1,16]	Collaboration with industry specialists during the development, testing, and integration stages; protocol creation and standardisation. [6]
Organization level	Resisting new technological solutions; raising certification standards. [17]	Evidence-based trust; increased work efficiency and decreased workload; professional skill development over a career. [12]	Risk to reputation. [9]	To compensate for a shortage of medical professionals, a huge dataset is used to support assessments, and the workload is reduced. [9,17]	Medical workers are being replaced by machines. [6,9]	Creating value in collaboration with risk-tolerant stakeholders; optimising decisions. [9,10]
Industry level	Product complexity. [19,21]	Data is the industry's new source of collective knowledge. [6,19]	Emerging market institutional gaps. [18,19]	Developing long-term plans for industrial growth; institutionalisation and establishment of specialist markets. [19,20]	Unplanned third-party access to medical data [15,20]	Increasing the number of risk-averse investors. [13,18]

Finally, we examine technological risk-taking in terms of the hurdles and possibilities for value creation in the healthcare industry. Individual attitudes and dispositions towards healthcare impact risk perception. Another concern that is associated with technology driven healthcare solutions is that of data security and cybersecurity. There exists the threat of unauthorized access to large sets of patients' data and hence it is important for organizations to ensure that required precautions for data security are taken so that organizations can run smoothly with technology-driven solutions [21].

PATIENT-LEVEL: PATIENT ADVOCACY AND TECHNOLOGY-ENABLED ENGAGEMENT STRATEGIES

Patient participation in the process of developing technology-driven solutions ensures that the solutions developed are in accordance with the needs of the patients [22]. The involvement of patients during product development can bring out creative solutions and also motivates entrepreneurs to improve their design during product development. Transparent communication is the key to enabling patient engagement during the process of creating technology-enabled solutions. Better communication among patients and technology providers builds patients' confidence in the technology and hence improves their participation. Efficient communication allows patients to freely express their opinions and concerns, which is helpful for healthcare experts during diagnosis and treatment.

ORGANIZATION-LEVEL: DIGITAL HEALTH SOLUTIONS AND MOTIVATION FOR COLLABORATION

At the organizational level, e.g. in hospitals, patient care can be improved by using technology and digital healthcare solutions. The use of electronic medical records (EMRs) allows medical personnel such as doctors, nurses, and support staff, to monitor patients' medical histories and health conditions in a convenient way. Moreover, technology may aid hospitals in better managing their resources and saving costs through the automation of administrative processes such as appointment scheduling, billing, insurance claims processing, and performance metrics tracking [23]. Additionally, hospitals may also use technology to construct telemedicine systems that allow patients to contact their physicians remotely while receiving medical advice and treatment online. Finally, virtual reality simulations may be developed utilizing technology, allowing physicians and nurses to practice medical procedures in a safe and controlled environment. An important area of research is motivation for hospital-level collaboration. Financial incentives, corporate share transfers, and board of directors' participation are all well-studied issues. Intangible assets, at the same time, may be just as valuable [24].

INDUSTRY-LEVEL: TRUST BUILDING AND INFRASTRUCTURE

Another prominent area for academic research is the issue of development of trust among market actors. When engaging with healthcare sector experts, it is recommended that greater attention is devoted to practical processes and real ideas for technology entrepreneurs [20].

A sustainable healthcare business requires solid infrastructure that serves society as a whole, and not just a few individuals. Healthcare is rarely considered by entrepreneurs from other sectors because of its complexity and overregulation [25]. Further research (Table 2) is therefore required to understand the effect of digital infrastructure on healthcare technology entrepreneurship.

TABLE 2: FUTURE RESEARCH AVENUES

	Key topics	Future research
Patient-level [18,26]	Patients' needs identification; building trust between patients and entrepreneurs.	Investigating the domain of patient support and its related implications.
	Proper communication with patients in order to anticipate their needs; increased patient participation in technology-enabled diagnosis.	Researching the enhancement of patient involvement using digital technology.
Organization-level [7,13,25]	Telemedicine solutions, virtual reality simulations, automated administrative activities and accesses of patient history can be developed as a part of enhanced digital health solutions.	Researching the impact of digital health solutions with a focus on increased efficiency, improved efficacy, and better implementation.

	Encouraging leaders and motivators to advance the use of digital technology in healthcare activities.	Researching the journey of digital technology solutions and their implications.
Industry-level [13,25,27]	Building trust by coping with institutional constraints and negotiating competing reasons.	Understanding how trust can be built and maintained at the healthcare industry level while taking into account the complexities of a multi-stakeholder situation in which various players have different interests.
	Encouraging private players and ensuring that regulations are reviewed.	Exploring the relationship between infrastructure development and healthcare entrepreneurship.

CONCLUSION

Technology entrepreneurship can benefit the healthcare sector in India because it solves some of the fundamental challenges related to healthcare by giving more power to users and building innovative worth-creation systems. This paper demonstrates how combining creative thinking with proactive approaches and risk management at various levels enables technology entrepreneurship to resolve healthcare access inequalities, delivery inefficiencies, and quality deficiencies, among other complex obstacles. Forecasted medical insights coupled with remote diagnostic tools and personalized care are among the benefits that technology provides to patients, but such improvements require strong data privacy measures and user education. Organizations can also benefit from improved diagnostics along with telemedicine and AI-supported decision systems. However, they need to establish proper infrastructure and teach their workers new skills and establish cross-departmental working relationships. In the healthcare industry, big data analysis with innovative business strategies creates both macroeconomic potential and fair patient services through well-established rules and strong reputation-building frameworks.

This study demonstrates how technology entrepreneurship plays an essential function in changing India's healthcare system. The analysis of value creation opportunities and challenges across different levels of stakeholders underscores the transformative potential of technology, while also highlighting the inherent complexities related to data privacy, infrastructure development, and ethical considerations. All stakeholders must collaborate to create an environment favorable for technology adoption because they face significant challenges related to trust, along with data security and digital literacy needs. This study presents implementable guides for both business owners and policy creators through its analysis of patient support systems and joint organizational ventures, along with industrial trust-building initiatives.

FUTURE RESEARCH

Future research could explore specific examples of technological innovations within each tier of the presented framework and their impact on stakeholders. Additionally, quantitative and qualitative studies could assess the effectiveness of specific technology-driven interventions in different healthcare settings. Further research could also explore the specific skills and competencies required to cultivate specific attributes within healthcare entrepreneurs. Comparative studies examining the risk-taking profiles of entrepreneurs in different sub-sectors of healthcare technology could also offer valuable insights. Additionally, investigating the role of policy and regulatory frameworks in encouraging or hindering the development of different attributes within the healthcare landscape could inform the creation of more supportive environments for innovation.

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TO STUDY AND COMPARE POSTURAL SWAY BY ROMBERG TEST IN DIABETIC AND NON-DIABETIC SUBJECTS

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ABSTRACT

BACKGROUND:

Diabetes is a silent disorder leading to disabling and fatal complications. The long-term complications of diabetes affect almost every system in the body. Balance impairment and postural instability is also observed in people having chronic diabetes which is a result of diabetic peripheral neuropathy, diabetic retinopathy, and vestibular dysfunctions.

OBJECTIVE:

The objective of this study is to find out the effect of chronic diabetes on postural sway by Romberg's test and thereby finding effects of diabetes on balance and stability.

METHOD:

60 participants, both male and female, between 40 to 60 years of age were included. The participants were divided into diabetic and non-diabetic groups (n=30). All the participants performed Romberg's test. Their postural sway was observed and subsequently Romberg's sign was noted. The procedure is repeated again two more times to find out average Romberg's sign.

RESULTS:

The data shows a significant difference in postural sway between diabetic and non-diabetic subjects. The Chi-square value computed for this comparison was 5.406, yielding a p-value of 0.020. The p-value was below the conventional significance threshold of 0.05, indicating a statistically significant association between diabetes status and the presence of postural sway. Diabetic individuals were significantly more likely to exhibit signs of impaired balance compared to non-diabetic individuals, as evidenced by the highly significant chi-square test result. This finding highlights the impact of diabetes on balance and stability.

CONCLUSION:

The study demonstrated that postural sway and instability was more common in diabetic subjects as compared to non-diabetic subjects between 40 to 60 years of age. Additionally, this study suggested that patients having diabetes should take measures to prevent postural instability, balance impairments and other complications of diabetes.

KEYWORDS

diabetes, proprioception, instability, postural sway, Romberg's test

INTRODUCTION

The most prevalent endocrine illness, diabetes mellitus, affects around 100 million individuals globally (6% of the total population) [1]. It is also anticipated that by 2040, there would be over 640 million adults worldwide who suffer from diabetes [2].

Diabetes mellitus (DM) is brought on by a disruption in insulin secretion and/or activity, which then results in hyperglycemia and ultimately impairs the metabolism of proteins, lipids, and carbohydrates [3]. Diabetes has a negative impact on an individual's functional abilities and quality of life, resulting in significant illness and premature death [4]. Diabetes-related microvascular and macrovascular problems frequently result in multiorgan anatomical, structural, and functional alterations in affected individuals [5]. Patients with type 1 or type 2 diabetes frequently experience diabetes complications, which also significantly increase morbidity and mortality. Microvascular and macrovascular chronic problems are the two main categories [6]. Microvascular problems comprise neuropathy, nephropathy, and retinopathy, whilst macrovascular issues encompass peripheral artery disease (PAD), cardiovascular disease, and stroke [7].

Peripheral neuropathy and retinopathy are common microvascular disorders that have been shown to increase postural sway and the risk of falls [8, 9]. Peripheral neuropathy patients have been observed to have postural instability and a raised sway area when standing motionless with their eyes closed [10, 11, 12]. Compared to those who are age-matched and acting as controls, people with Diabetic Peripheral Neuropathy (DPN) show a greater range of sway in the anterior-posterior and medial-lateral directions as well as a higher sway speed [13]. It has been demonstrated that individuals with DPN exhibit 66% more sway than healthy individuals of similar age when standing quietly with their eyes open [14].

When eyes are closed, postural stability in DPN patients decreases the most; this suggests that vision serves as a compensatory mechanism for sensory deficiencies [14]. Recurrent falls have also been linked to diminished vibration sensitivity and decreased pressure sensitivity, according to research [15]. This appears to be the result of a confluence of factors including reduced proprioception, vision, and potential vestibular system damage from prolonged hyperglycemia (a study on diabetic animals has shown that long-term hyperglycemia causes structural damage in the otolith organs of the vestibular system) [16].

Several studies show the association of diabetes with impaired balance and instability. Thus, the purpose of this study is to compare the postural stability between diabetic and non-diabetic subjects in middle adulthood (40 to 60 years) by performing Romberg's sign. The Romberg's sign is supposed to be observed while the examinee is standing, without shoes, with their feet placed together and crossed arms on the chest or down by the side [17]. In healthy persons, proprioceptive system (70%) vestibular system (20%) and visual system (10%) share the responsibility for keeping standing on a stable surface [18]. A positive Romberg sign is indicative of the loss of the ascending proprioceptive function of the lower limbs which may be observed in patients with peripheral neuropathy and proprioceptive changes as well in acute vestibular disorders [19].

MATERIAL AND METHODOLOGY

STUDY LOCATION AND DESIGN

This study was conducted in physiotherapy OPD, Integral University Lucknow and Old age Home, Vikas Nagar, Lucknow. The study design was cross sectional.

STUDY POPULATION

The study population selected using simple random sampling. Both males and females between ages 40 to 60 years who met with inclusion and exclusion criteria of study were selected. The population included the subjects who were either normal healthy individuals (never diagnosed with any type of diabetes) or diagnosed with type 2 diabetes for 5 years or more years. Also, the inclusion criteria were participants who were able to walk independently without any support, able

to communicate, cooperate and follow the instructions and whose MMSE (Mini Mental State Examination) cognitive score is 25 or more (out of 30). Subjects were excluded from the study if they had any neurological impairment such as Parkinson's disease, Multiple sclerosis, history of stroke, surgery of lower extremity, fracture of lower limbs, subjects who were unstable, had any deformity, presence of any relevant visual / auditory impairment, presence of dizziness / vertigo, pregnant females. The participants were asked to sign a written informed consent. The sample size that was successfully collected consisted of 60 participants.

PROCEDURE

The subjects were categorized into two groups. Group A having diabetic subjects and group B having non-diabetic subjects. The demographic characteristics such as age, weight, height, BMI (body mass index) of the two groups were assessed at baseline before performing procedure. Similarly, MMSE was also assessed by the same physiotherapist supervising the test procedure. All the participants were asked to perform the two stage Romberg's test.

STAGE I In this stage the participants were asked to remove their shoes and stand with their feet together on a firm surface. Their arms down by their side with their eyes opened. The participants were asked to hold this position for 30 seconds. During this time, the therapist monitored the stability by seeing if participant was swaying or if he/she needed to move his/her arms or feet to maintain balance.

STAGE II In this stage the participants remained standing with their feet together. Their arms down by their side and their eyes closed. The participants held this position for 60 seconds. Their postural sway was observed and the time at which their postural sway was maximal was noted. The physiotherapist was standing near the subjects without touching them in order to prevent significant swaying or fall. The time at which participants started swaying and were unable to maintain the position is noted. The same procedure was repeated two more times to avoid any error occurring during procedure. Depending on whether postural sway was present or not participants were assigned either with positive or negative Romberg's sign. It was a single time study and it took approximately 30 minutes for the whole procedure and documentation.

STATISTICAL ANALYSIS

Data was analyzed using the software SPSS (version 16.0). Under descriptive statistics, qualitative variables were described in terms of frequency, percentage, and graphs such as pie chart, bar diagram etc. Normality of data was evaluated by plotting the numerical variable distinctly for each group or with the use of Shapiro-Wilk test. Quantitative variables were described in terms of mean and standard deviation. The Independent Samples t-test was used to compare the participants' characteristics between both diabetic and non-diabetic groups. The Chi-square test was used to test association of postural sway between Diabetic & Non-Diabetic subjects with their eyes opened/closed and hold position for 30/60 seconds. P value of less than 0.05 was considered as significant.

FIGURE 1: FLOW DIAGRAM OF THE STUDY

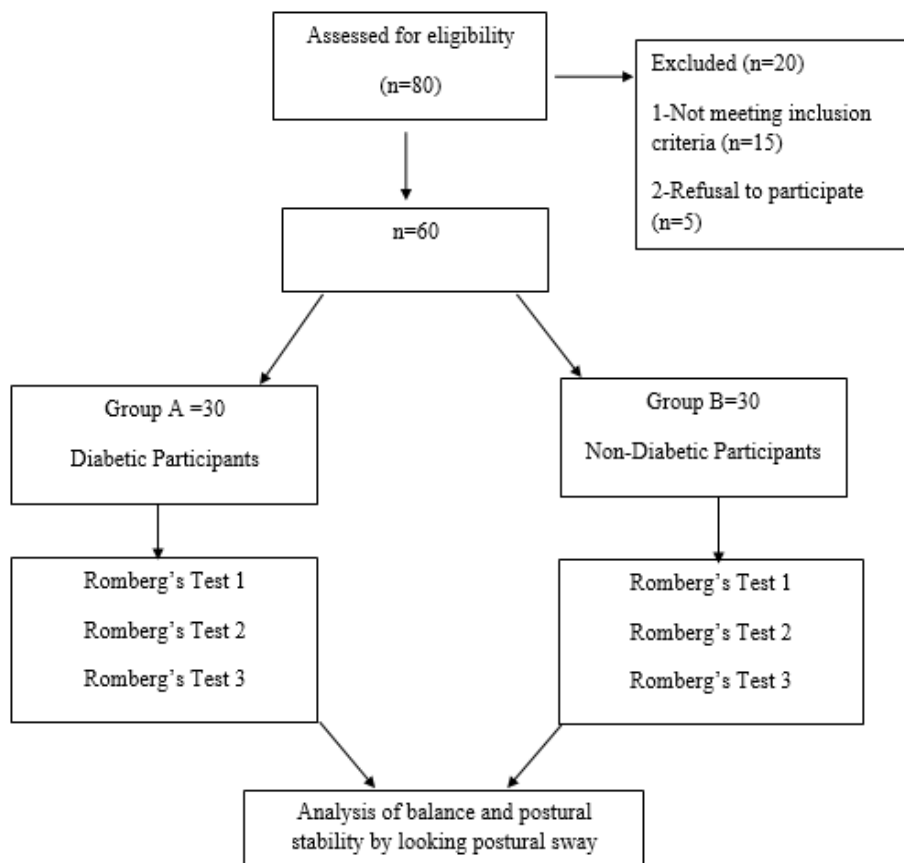


FIGURE 2: ROMBERG'S TEST WITH EYES OPEN



FIGURE 3: ROMBERG'S TEST WITH EYES CLOSED



TABLE 1: DESCRIPTIVE STATISTICS OF PARTICIPANTS' CHARACTERISTICS IN BOTH DIABETIC AND NON - DIABETIC GROUPS

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age (Years)	Diabetic	30	49.63	5.846	1.067
	Non- Diabetic	30	49.43	5.935	1.084
Height (cm)	Diabetic	30	163.33	8.620	1.574
	Non- Diabetic	30	166.67	7.345	1.341
Weight (kg)	Diabetic	30	71.50	6.442	1.176
	Non- Diabetic	30	70.77	7.908	1.444
BMI (kg/m ²)	Diabetic	30	26.93	3.181	0.581
	Non- Diabetic	30	25.55	3.109	0.568

Interpretation

Table 1 presents the descriptive statistics for age, height, weight, and BMI of participants in diabetic and non-diabetic groups, each with 30 participants.

The mean age of participants in the diabetic group is 49.63 years, with a standard deviation of 5.846 years and a standard error of 1.067 years. In comparison, the non-diabetic group has a slightly lower mean age of 49.43 years, with a standard deviation of 5.935 years and a standard error of 1.084 years. The closeness of the mean ages and their standard deviations suggests that both groups are quite similar in terms of age distribution.

For height, the diabetic group has a mean height of 163.33 cm, a standard deviation of 8.620 cm, and a standard error of 1.574 cm. The non-diabetic group has a higher mean height of 166.67 cm, with a standard deviation of 7.345 cm and a standard error of 1.341 cm. The non-diabetic group appears to be slightly taller on average, and the standard deviations indicate a comparable spread of height measurements within each group.

The mean weight of the diabetic group is 71.50 kg, with a standard deviation of 6.442 kg and a standard error of 1.176 kg. In contrast, the non-diabetic group has a mean weight of 70.77 kg, with a higher standard deviation of 7.908 kg and a

standard error of 1.444 kg. While the mean weights are similar, the greater standard deviation in the non-diabetic group suggests more variability in weight among its participants compared to the diabetic group.

Regarding BMI, participants in the diabetic group have a higher mean BMI of 26.933 kg/m², with a standard deviation of 3.1818 kg/m² and a standard error of .5809 kg/m². The non-diabetic group has a lower mean BMI of 25.553 kg/m², with a standard deviation of 3.1089 kg/m² and a standard error of .5676 kg/m². The diabetic group, on average, has a higher BMI, though the standard deviations indicate similar variability in BMI measurements within both groups.

The descriptive statistics indicate that the diabetic and non-diabetic groups are closely matched in terms of age and weight. However, the non-diabetic group tends to be slightly taller, while the diabetic group has a higher average BMI. The standard deviations and standard errors suggest that the variability within each characteristic is relatively consistent across both groups, with slight differences observed in height and weight variability.

STAGE I: POSTURAL SWAY WITH EYES OPEN FOR 30 SECONDS

TABLE 2: ASSOCIATION OF POSTURAL SWAY BETWEEN DIABETIC & NON-DIABETIC SUBJECTS WITH THEIR EYES OPEN AND HOLD POSITION FOR 30 SECONDS.

READING		Study Subjects		Total	Chi Square	P value
		Diabetic	Non-Diabetic			
Postural Sway (With Eyes Open, 30 second)	Absent	24	28	52	2.308	0.129
		46.2%	53.8%	100.0%		
	Present	6	2	8		
		75.0%	25.0%	100.0%		
Total		30	30	60		
		50.0%	50.0%	100.0%		

Interpretation

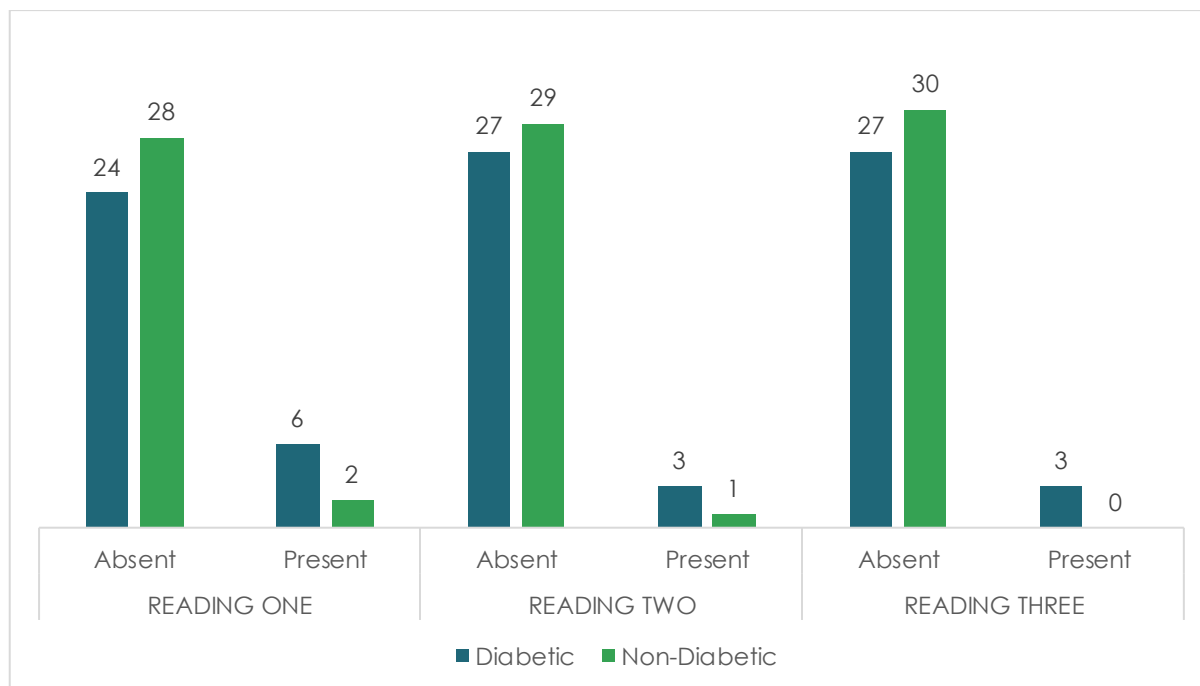
Table 2 provides an analysis of the association between postural sway and diabetic status among subjects holding a position with their eyes open for 30 seconds. The table categorizes the subjects into those with and without postural sway and presents the total counts, Chi-square value, and p-value to assess statistical significance.

Postural Sway (With Eyes Open, 30 seconds):

For the absence of postural sway, 24 out of 30 diabetic subjects (80%) did not exhibit sway, compared to 28 out of 30 non-diabetic subjects (93.3%). This results in a total of 52 subjects without postural sway, with the non-diabetic group slightly outperforming the diabetic group. Conversely, for the presence of postural sway, 6 out of 30 diabetic subjects (20%) showed sway, while only 2 out of 30 non-diabetic subjects (6.7%) experienced sway. This indicates that diabetic subjects show a higher incidence of postural sway compared to non-diabetic subjects when holding a position with eyes open for 30 seconds, highlighting a potential impact of diabetes on postural control.

The Chi-square value calculated is 2.308, with a p-value of 0.129. Since the p-value is greater than the standard significance threshold of 0.05, the results suggest that there is no statistically significant association between diabetic status and the presence of postural sway in this sample. This implies that the observed differences in postural sway between the diabetic and non-diabetic groups might be due to chance or other factors not accounted for in this study. Moreover, the findings suggest that there may be a trend towards an association, but it is not strong enough to be considered significant based on this sample size.

FIGURE 4: DISTRIBUTION OF POSTURAL SWAY IN THREE READINGS BETWEEN DIABETIC & NON-DIABETIC SUBJECTS WITH THEIR EYES OPEN AND HOLD POSITION FOR 30 SECONDS



STAGE II: POSTURAL SWAY WITH EYES CLOSED FOR 60 SECONDS

TABLE 3: ASSOCIATION OF POSTURAL SWAY BETWEEN DIABETIC & NON-DIABETIC SUBJECTS WITH THEIR EYES CLOSED AND HOLD POSITION FOR 60 SECONDS.

READING		Study Subjects		Total	Chi Square	P value
		Diabetic	Non-Diabetic			
Postural Sway (With Eyes Closed, 60 second)	Absent	10	19	29	5.406	0.020
		34.5%	65.5%	100.0%		
	Present	20	11	31		
		64.5%	35.5%	100.0%		
Total		30	30	60		
		50.0%	50.0%	100.0%		

Interpretation

Table 3 investigates the association between postural sway and diabetic status among subjects tasked with holding a position with their eyes closed for 60 seconds. The table provides a breakdown of participants who exhibited postural sway and those who did not, categorized by their diabetic or non-diabetic status, accompanied by chi-square values and p-values for statistical assessment.

Postural Sway (With Eyes Closed, 60 seconds):

In the diabetic group, 10 out of 30 subjects (34.5%) were able to maintain their posture without sway, while in the non-diabetic group, 19 out of 30 subjects (65.5%) showed no postural sway. Conversely, postural sway was observed in 20 out of 30 diabetic subjects (64.5%) compared to 11 out of 30 non-diabetic subjects (35.5%). This disparity underscores the higher prevalence of postural instability among diabetic individuals during the 60-second eyes-closed task.

The Chi-square value for this comparison is 5.406, yielding a p-value of 0.020. The p-value is below the conventional significance threshold of 0.05, indicating a statistically significant association between diabetes status and the presence

of postural sway when visual input is removed. These findings highlight the critical impact of diabetes on postural stability. The statistical significance of the chi-square test ($p = 0.020$) reinforces the robustness of this association, suggesting that diabetes adversely affects proprioceptive feedback or neuromuscular coordination required for maintaining balance without visual cues.

FIGURE 5: DISTRIBUTION OF POSTURAL SWAY IN THREE READINGS BETWEEN DIABETIC & NON-DIABETIC SUBJECTS WITH THEIR EYES CLOSED AND HOLD POSITION FOR 60 SECONDS

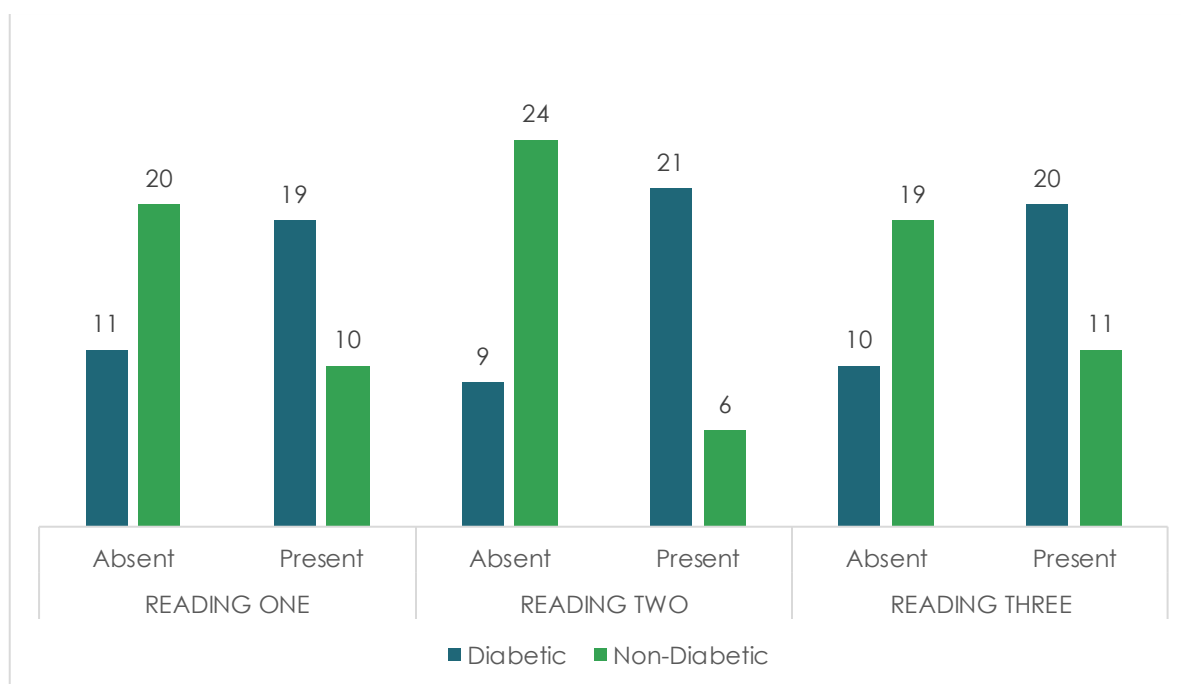


TABLE 4: ASSOCIATION BETWEEN STUDY SUBJECTS WITH ROMBERG'S TEST SIGN FOR BALANCE AND POSTURAL STABILITY BY OBSERVING POSTURAL SWAY

Romberg's Tests		Study Subjects		Total	Chi Square	P value
		Diabetic	Non-Diabetic			
Romberg's Sign	Negative	7	25	32	21.696	0.000
		21.9%	78.1%	100.0%		
	Positive	23	5	28		
		82.1%	17.9%	100.0%		
Total		30	30	60		
		50.0%	50.0%	100.0%		

Interpretation

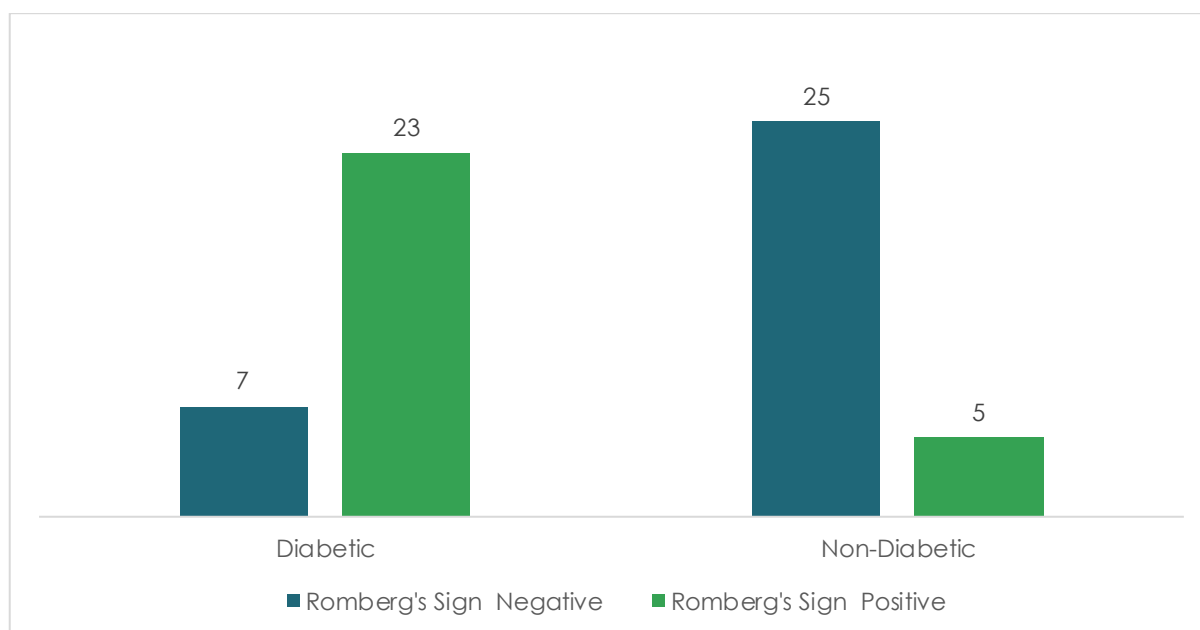
Table 4 examines the association between Romberg's test sign for balance and postural stability in diabetic and non-diabetic subjects. This table categorizes participants based on whether they tested negative or positive for the Romberg's sign, which reflects overall balance and proprioceptive function with eyes closed. It provides chi-square values and p-values to evaluate the statistical significance of the association.

Among diabetic subjects, 7 out of 30 (21.9%) tested negative for the Romberg's sign, indicating they were able to maintain balance with eyes closed. In contrast, 23 out of 30 (82.1%) diabetic subjects tested positive for the average Romberg's sign, suggesting impaired balance or postural instability. This distribution highlights a significant majority of diabetic individuals experiencing difficulty in maintaining balance without visual input, as indicated by the high prevalence of

positive Romberg's test results. In the non-diabetic group, 25 out of 30 (78.1%) tested negative for the Romberg's sign, indicating better balance control, while 5 out of 30 (17.9%) tested positive. This demonstrates a smaller proportion of non-diabetic individuals showing signs of impaired balance compared to diabetic individuals.

The Chi-square value calculated for this comparison is 21.696, resulting in a p-value of 0.000. The p-value is well below the conventional significance threshold of 0.05, which suggests that diabetes significantly correlates with impaired overall balance and proprioceptive function particularly in conditions where visual cues are limited as assessed by the Romberg's test.

FIGURE 6: DISTRIBUTION OF ROMBERG'S TEST SIGN AMONG BOTH GROUPS



DISCUSSION

This cross-sectional study investigated the effects of diabetes on balance and postural stability and also compares the postural stability with non-diabetic individuals. The overall purpose of this study was to find how the complication of diabetes, especially diabetic neuropathy is affecting proprioception which contributes almost 70% in maintaining static balance [18].

Our findings indicated that the diabetic and non-diabetic groups were closely matched in terms of age and weight. However, the non-diabetic group tended to be slightly taller, whereas the diabetic group had a higher average BMI. Although obesity is a known risk factor for type 2 diabetes, the weight distributions between the two groups were broadly similar, suggesting that additional factors beyond BMI may contribute to postural instability in individuals with diabetes [20].

In Stage I of Romberg's test, where diabetic subjects show a higher incidence of postural sway compared to non-diabetic subjects when holding a position with eyes open for 30 seconds, the difference is not statistically significant. While this result suggests a possible trend toward an association, it is not sufficiently strong to be conclusive. Importantly, the discussion of these findings should not overstate the significance of group characteristics as study findings but rather focus on interpreting the relationship between diabetes and postural stability. A larger sample size or additional variables may be required to explore this trend further.

In Stage II of Romberg's test, findings demonstrated a significant association between diabetes and impaired postural control when visual input was removed. Diabetic subjects were significantly more likely to experience postural sway compared to non-diabetic subjects ($p = 0.020$). However, the interpretation of this association must also consider potential confounders, such as differences in proprioceptive function, neuromuscular coordination, or undiagnosed diabetic neuropathy within the study population. The statistical significance of the chi-square test reinforces the robustness of this association, suggesting that diabetes adversely affects proprioceptive feedback or neuromuscular coordination required for maintaining balance without visual cues.

This study also found a strong association between diabetes and impaired balance, as assessed by Romberg's test. However, the relationship between diabetes and postural instability should not be viewed in a one-dimensional manner, as multiple interacting factors contribute to balance impairments. While diabetes was significantly associated with poorer balance performance ($\chi^2 = 21.696$, $p = 0.000$), additional variables such as the duration of diabetes, presence of neuropathy, and levels of physical activity should be considered in future investigations to fully understand the mechanisms involved.

According to earlier research, falls are very common among older adults with type 2 diabetes; among those over 65, the annual incidence rate is 39%, and falls are more common in those with inadequate glycemic control [21]. Impaired balance is one of the most often recognized risk factors, despite the fact that falls are linked to a number of risk factors [22]. Diabetic individuals may experience sensory loss, decreased proprioception, and diminished spinal reflexes, all of which increase the risk of falling [23]. While this study provides valuable insights into balance impairments, future research should aim to explore how these factors interact over time and whether specific physiotherapeutic interventions can mitigate the risk of postural instability.

Romberg's test proved to be an effective tool for evaluating postural instability. The study also observed that diabetic individuals with a disease duration of more than five years exhibited greater postural instability, which is likely attributed to impaired proprioception. However, additional analysis incorporating neuropathy severity and functional assessments would strengthen this conclusion. This study highlights the importance of early intervention and awareness regarding postural instability in diabetic individuals, which may help in designing targeted rehabilitation programs.

In summary, while this study establishes a significant association between diabetes and postural instability, future research should take a more nuanced approach by integrating additional factors such as neuropathy severity, physical activity levels, and long-term glycemic control. Addressing these challenges through targeted interventions focused on proprioception and balance training could be crucial in reducing the risk of falls and improving the overall quality of life for diabetic individuals.

STUDY LIMITATIONS

The present studies have certain limitations. Firstly, the sample size used in the study was small, greater sample size in future may increase the efficiency of the study. Secondly this study was based on a single test for assessing postural stability, it could provide better findings if two or more reliable tests were used. Moreover, in this study few individuals who were non-diabetic were also observed having postural sway which might be due to presence of ataxia, vitamin B12 deficiency, copper deficiency, muscle weakness etc.

Future research can be conducted by giving various balance training interventions and then performing Romberg's test. In future this study can be conducted with advanced sensor-based tools or apps. Also, it is recommended to further explore the impact of age, diabetes type, and duration of the condition, while also considering non-diabetes-related factors that may influence balance.

CONCLUSION

The results of this study showed that diabetic patients suffer more often from balance disorders and postural instability than the rest of the population and are at higher risk of falling. This seems to be the consequence of a combination between

impaired proprioception, vision, and damage to vestibular system. Furthermore, it is advisable to implement training initiatives for diabetes patients to improve their balance

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DECLARATION OF INTEREST:

The authors report no conflicts of interest.

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EFFECTS OF SMOKERS' RECENT CESSATION FAILURE ON THEIR RESPONSES TO THREAT APPEALS IN ANTI-SMOKING ADS

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ABSTRACT

BACKGROUND:

Quitting smoking often involves multiple cessation attempts before smokers succeed. Recent cessation failure can influence how smokers respond to smoking-related threat appeals in anti-smoking advertisements (ads) that may encourage them to quit smoking. This study aims to investigate the effects of smokers' recent cessation failure on their responses to smoking-related threat appeals in anti-smoking ads.

METHODS:

This study conducted a 2 (strong vs. weak verbal threat appeal) x 2 (strong vs. weak visual threat appeal) pretest-posttest experiment online with a smoker segment (Korean male smokers in their 30's) who had the highest rate of attempted smoking cessation across all gender and age groups in Korea. Participants' recent cessation failure (quit attempts within the previous 12 months) was measured in pretest session. Participants' cessation intention and defensive responses (e.g., wishful thinking) were assessed during pretest and posttest sessions.

RESULTS:

For participants with a recent cessation failure ($n = 84$), anti-smoking ad exposure increased their fatalism and hopelessness. Among participants without a recent cessation failure ($n = 41$), anti-smoking ad exposure intensified their cessation intention. However, exposure to strong visual threat appeal in anti-smoking ads increased their wishful thinking.

CONCLUSION:

Verbal and visual threat appeals in anti-smoking ads had a differential effect on adaptive (e.g., cessation intention) and maladaptive (e.g., fatalism) responses between smokers with and without a recent cessation failure. Study findings expand our understanding of the empirical linkage between recent cessation failure, smoking prevention messaging in anti-smoking ads, and psychological coping mechanism among smokers.

KEYWORDS

anti-smoking ads, cessation attempt failure, Korean male smokers, adaptive and maladaptive coping, smoking cessation, verbal and visual threat appeals

INTRODUCTION

From seeing images of disfigured lungs on cigarette packages to hearing testimonials from former smokers about their health woes, smokers can be exposed to a plethora of smoking cessation messages. Due to exposure to such messaging, smokers are aware of the serious health impact of smoking leading to attempting to quit smoking. However, most smokers tend to fail in their cessation attempts. In 2018, 55.1% of American adult smokers made at least one cessation attempt to quit in the past year, but only 7.5% of them quit. [1] Similarly, in Korea, 47.3% of adult smokers made at least one cessation attempt in the previous 12 months but only 4-7% of them succeeded. [2]

Governments and non-profit organizations worldwide have identified the importance of urging smokers to quit smoking by implementing a variety of risk communication strategies. Smoking-related threat, an event that questions smokers' positive self-regard via portending negative consequences of their smoking, is a common communication strategy used by practitioners. [3] For instance, *Tips from a Former Smoker* was a widely popular anti-smoking campaign in the United States (2012-2018) that used real people's testimonials about long-term health effects stemmed from smoking. [4] In this case, the goal of the campaign was to inspire smokers to quit smoking by presenting smoking-related threats. Typically, it is common to use verbal or visual threats in anti-smoking messaging. [5] A smoker's perception of these smoking-related threats is usually the first step for considering smoking cessation. [6]

Verbal threat appeal in anti-smoking advertisements (ads) can be manipulated by using message framing that presents the relationship between a smoking-related act and its consequence valence. [7] A strong verbal threat in anti-smoking ads presents negative consequences (e.g., an increase in the onset of lung cancer) resulting from noncompliance with smoking cessation. By contrast, weak verbal threats in anti-smoking ads focus on the relationship between compliance with smoking cessation and its positive consequences (e.g., a decrease in the onset of lung cancer). On the other hand, a visual threat presented in anti-smoking ads can be manipulated by using visual images that display serious and negative smoking consequences such as an image of disfigured lungs (strong visual threat appeal), compared to an image of healthy lungs (weak visual threat appeal). [8]

Exposure to verbal and visual threat appeals in anti-smoking ads can encourage smokers to quit smoking, which is an adaptive and desirable response sought by practitioners. [5] However, exposure to such threat appeals could also evoke defensive responses among smokers [9] such as avoidance, denial or wishful thinking, [10-12] which could offer a 'cognitive escape' for ignoring, dismissing or underestimating the negative health consequences of smoking. Upon exposure to the threat appeals in anti-smoking ads, smokers could develop fatalism and hopelessness [10, 12] to manifest a 'cognitive withdrawal' due to the feeling of powerlessness. Both cognitive escape and withdrawal reflect a maladaptive coping strategy to control their negative emotions (e.g., fear, anxiety) but not the threat itself. [13] These potential maladaptive responses to visual or verbal threat appeals commonly found in anti-smoking ads can negate intended effects.

While anti-smoking ads can be effective as a tool to encourage smokers to quit smoking, most smokers who attempt to quit smoking fail in their smoking cessation. [1-2] Smokers with a recent cessation failure tend to experience lower smoking abstinence self-efficacy that discourages them to retry smoking cessation. [14] It is not uncommon for smokers with a failed cessation attempt to actively engage in defensive responses (maladaptive responses) to protect themselves against smoking-related fear elicited by threat appeals in anti-smoking ads. [15] In the event that a smoker who has not experienced a recent failed cessation attempt is exposed to smoking-related threat appeals in anti-smoking ads, they could feel anxiety due to the discrepancy between their current smoking status and social obligation to stop smoking. [16] This anxiety in turn motivates them to find a coping strategy to reduce the probable occurrence of a future threat. [17] For example, after viewing an anti-smoking ad about the negative effects of second-hand smoke, a smoker without a recent cessation failure might experience anxiety because they do not want to be socially blamed for causing harm to others. Consequently, they may attempt to quit smoking (adaptive response) since smoking cessation as a coping strategy can be strongly linked to their higher self-efficacy in smoking abstinence. [18]

Extant literature is limited on whether smokers with a recent failed quit attempt will enhance their defensive responses and smokers without a recent cessation attempt will increase their intention to quit smoking because of exposure to the smoking-related threats presented in anti-smoking ads. In addition, empirical research that examines the differential effects of exposure to verbal and/or visual threat appeals in anti-smoking ads on adaptive (e.g., an increase in cessation intention) or maladaptive (e.g., increases in reactant defensiveness) responses between smokers with and without a recent cessation failure remains limited. Hence, the objective of this study is to fill this empirical gap to further our understanding of how smoking-related threat appeals in anti-smoking ads may influence smokers with different recent cessation failure experiences. Specifically, this study explores how smokers who recently tried to quit smoking and failed may respond to verbal and visual threat appeals in anti-smoking ads, compared to those who did not recently try to quit smoking.

METHODS

PARTICIPANTS:

The study population was Korean male smokers in their 30's who had the highest rate of attempted smoking cessation (55.1%) across all gender and age groups in Korea [19], a country with one of the highest smoking rates in the world. [2] One hundred twenty-five Korean male smokers aged 30-39 years completed a pretest-posttest experiment online. Participants were recruited through an email invitation that were delivered to a national consumer panel of Korean males in their 30's by a Korean market research company. The average participant age was 34.43 years old ($SD = 2.69$); 49.6% of them were married and 44.0% of them had at least one child. While 76.8% of participants had at least a 2-year college degree, 76.0% of them were in clerical or service work and 64.0% of them reported an average monthly household income of 2-3.99 million KRW (lower-middle- and middle-income class). On average, participants smoked 11.9 cigarettes per day and had been smoking for 12.7 years; 67.2% of them attempted to quit smoking in the last 12 months.

A power analysis targeting an ANCOVA with a 2 (recent cessation failure: yes vs. no) $\times$ 2 (verbal threat appeal: strong vs. weak) $\times$ 2 (visual threat appeal: strong vs. weak) between-participants design was conducted. The results confirmed that the sample size ($N = 125$) was sufficient to detect a large effect size ($f = .40$) at the .05 level.

STIMULUS DEVELOPMENT:

Two verbal threat messages (strong vs. weak verbal threat appeal) were developed based on a previous study. [20] The two messages contained the same number of Korean syllables. The strong and weak visual threat images (strong vs. weak visual threat appeal) featured a pair of disfigured and healthy lungs, respectively. The messages of the ads were made to appear slightly larger than the images to attract an equal level of participant attention to both messages and images. Consequently, 2 (strong vs. weak verbal threat appeal) $\times$ 2 (strong vs. weak visual threat appeal) anti-smoking ads (four experimental conditions) were developed by a graphic designer.

Twenty-seven male smokers in their 30's completed the manipulation checks for the four experimental anti-smoking ads online. Two paired t-tests showed that the strong verbal threat appeal ($M = 4.70$, $SD = 1.59$) was more negative than the weak verbal threat appeal ($M = 3.56$, $SD = 1.78$) [$t(26) = 4.01$, $p < .001$]. The strong visual threat appeal ($M = 5.48$, $SD = 1.28$) was found to be scarier than the weak visual threat appeal ($M = 4.11$, $SD = 1.34$) [$t(26) = 4.53$, $p < .001$].

With help from a Korean magazine editor, a webzine containing the six most popular topics (health, personal finance, wine, jazz, travel, food) among Korean readers in their 30's was developed as the media platform for inserting the experimental anti-smoking ads. The content of the articles on the six topics was not relevant to the smoking context. Each ad was inserted into the webzine three times at an equal interval to achieve effective reach for each ad.

PROCEDURE:

In the online experiment, participants completed a pretest instrument that contained the following variables: cessation intention [21] ($\alpha = .85$), avoidance [10] ($\alpha = .87$), denial [11, 22] ($\alpha = .83$), wishful thinking [10, 12] ($\alpha = .83$), fatalism [10, 12]

($\alpha = .81$), hopelessness [12, 23] ($\alpha = .87$), whether to try to quit smoking within the past year or not, smoker attributes (e.g., smoking duration) and demographic characteristics (e.g., occupation). Two and half weeks later, the participants were randomly assigned to one of 2 (strong vs. weak verbal threat appeal) x 2 (strong vs. weak visual threat appeal) anti-smoking ad exposure conditions. Upon reviewing the webzine and the anti-smoking ads, they completed a posttest evaluation instrument that measured the following variables: cessation intention [21] ($\alpha = .82$), avoidance [10] ($\alpha = .89$), denial [11, 22] ($\alpha = .88$), wishful thinking [10, 12] ($\alpha = .85$), fatalism [10, 12] ($\alpha = .68$) and hopelessness [12, 23] ($\alpha = .86$).

ETHICS:

The study protocol was reviewed and approved by the Institutional Review Board of the University of Connecticut with approval number X11-170 before data collection was commenced. There was no identifiable participant information included in the study and data.

RESULTS

Twelve paired t-tests showed the following results (TABLE 1). For participants with a recent cessation failure ($n = 84$), exposure to the anti-smoking ads generated an increase in their fatalism [$t(83) = 2.53, p = .014$] and hopelessness [$t(83) = 2.49, p = .015$], but not their cessation intention, avoidance, denial and wishful thinking. For participants without a recent cessation failure ($n = 41$), exposure to the anti-smoking ads led to an increase in their cessation intention [$t(40) = 2.33, p = .025$]. However, the exposure generated no change in the defensive responses including avoidance, denial, wishful thinking, fatalism and hopelessness.

TABLE 1: EFFECTS OF EXPOSURE TO THREAT APPEALS IN ANTI-SMOKING ADS

	PRE-EXPOSURE M (SD)	POST-EXPOSURE M (SD)	t (df = 83)
Participants with a recent cessation failure (n = 84)			
Cessation intention	4.52 (1.17)	4.65 (1.24)	1.24
Avoidance	4.56 (1.12)	4.60 (1.30)	.30
Denial	4.24 (1.08)	4.16 (1.28)	.60
Wishful thinking	4.19 (1.12)	4.31 (1.20)	1.09
Fatalism	4.85 (1.03)	5.13 (.93)	2.53*
Hopelessness	3.87 (1.17)	4.16 (1.26)	2.49*
Participants without a recent cessation failure (n = 41)			
Cessation intention	3.85 (1.36)	4.27 (1.30)	2.33*
Avoidance	4.47 (1.04)	4.72 (.83)	1.39
Denial	3.96 (.95)	4.19 (1.00)	1.57
Wishful thinking	3.92 (1.08)	4.11 (1.04)	1.48
Fatalism	4.84 (1.06)	4.98 (.90)	.67
Hopelessness	3.63 (1.21)	3.83 (1.17)	1.08

Note. All the tests were two-tailed; * $p < .05$

A three-factor ANCOVA procedure separately tested the posttest cessation intention measure and each posttest defensive response measure – with the corresponding pretest measure as the covariate – across the factors of recent cessation failure (yes vs. no), verbal threat appeal (strong vs. weak) and visual threat appeal (strong vs. weak). The two statistically significant ANCOVA results for posttest measure of wishful thinking and posttest measure of hopelessness are reported below.

For posttest measure of wishful thinking, the three-factor ANCOVA test indicated an interaction effect between recent cessation failure and visual threat appeal [$F(1, 116) = 3.95, p = .045$] (TABLE 2). Two post-hoc one-factor ANCOVA tests

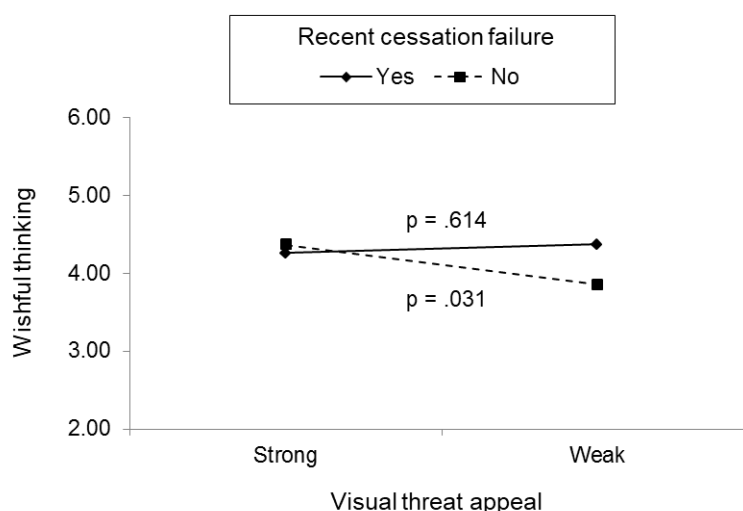
showed that for participants with a recent cessation failure, posttest measure of wishful thinking did not differ between the strong (estimated $M = 4.26$, $SE = .15$) and weak (estimated $M = 4.37$, $SE = .16$) visual threat appeal exposure conditions [$F(1, 81) = .26$, $p = .614$]. However, for participants without a recent cessation failure, posttest measure of wishful thinking was higher in the strong visual threat appeal exposure condition (estimated $M = 4.36$, $SE = .16$) than in the weak visual threat appeal exposure condition (estimated $M = 3.85$, $SE = .16$) [$F(1, 38) = 5.00$, $p = .031$] (FIGURE 1).

TABLE 2: ANCOVA RESULTS FOR POSTTEST WISHFUL THINKING MEASURE

VARIABLE	F (df = 1, 116)
Pretest measure of wishful thinking (covariate)	68.08
Recent cessation failure (factor A)	.04
Verbal threat appeal (factor B)	.05
Visual threat appeal (factor C)	2.32
(factor A) x (factor B)	2.80
(factor A) x (factor C)	3.95*
(factor B) x (factor C)	3.12
(factor A) x (factor B) x (factor C)	.52

Note. Adjusted $R^2 = .39$; * $p < .05$

FIGURE 1: INTERACTION EFFECT BETWEEN RECENT CESSATION FAILURE AND VISUAL THREAT APPEAL ON POSTTEST WISHFUL THINKING MEASURE



For posttest measure of hopelessness, the three-factor ANCOVA test revealed two interaction effects between recent cessation failure and either (1) verbal threat appeal [$F(1, 116) = 6.21$, $p = .014$] or (2) visual threat appeal [$F(1, 116) = 6.51$, $p = .012$] (TABLE 3). However, four post-hoc one-factor ANCOVA tests did not show how verbal (FIGURE 2) and visual (FIGURE 3) threat appeals had significantly different effects on posttest measure of hopelessness between participants with and without a recent cessation failure. The results are reported below.

First, two post-hoc one-factor ANCOVA tests indicated that for participants with a recent cessation failure, posttest measure of hopelessness did not differ between the strong (estimated $M = 3.97$, $SE = .15$) and weak (estimated $M = 4.36$, $SE = .15$) verbal threat appeal exposure conditions [$F(1, 38) = 3.28$, $p = .074$]. Likewise, for participants without a recent cessation failure, posttest measure of hopelessness did not differ between the strong (estimated $M = 4.05$, $SE = .26$) and weak (estimated $M = 3.69$, $SE = .20$) verbal threat appeal exposure conditions [$F(1, 38) = 1.18$, $p = .284$].

Second, two post-hoc one-factor ANCOVA tests revealed that for participants with a recent cessation failure, posttest measure of hopelessness did not differ between the strong (estimated $M = 4.04$, $SE = .15$) and weak (estimated $M = 4.30$, $SE = .16$) visual threat appeal exposure conditions [$F(1, 81) = 1.49$, $p = .226$]. Similarly, for participants without a recent

cessation attempt failure, posttest measure of hopelessness did not differ between the strong (estimated $M = 4.08$, $SE = .22$) and weak (estimated $M = 3.57$, $SE = .22$) visual threat appeal exposure conditions [$F(1, 38) = 2.75$, $p = .105$].

TABLE 3: ANCOVA RESULTS FOR POSTTEST HOPELESSNESS MEASURE

VARIABLE	F (df = 1, 116)
Pretest measure of hopelessness (covariate)	72.68
Recent cessation failure (factor A)	.11
Verbal threat appeal (factor B)	.35
Visual threat appeal (factor C)	1.82
(factor A) x (factor B)	6.21*
(factor A) x (factor C)	6.51*
(factor B) x (factor C)	2.55
(factor A) x (factor B) x (factor C)	1.74

Note. Adjusted $R^2 = .38$; * $p < .05$

FIGURE 2: INTERACTION EFFECT BETWEEN RECENT CESSATION FAILURE AND VERBAL THREAT APPEAL ON POSTTET HOPELESSNESS MEASURE

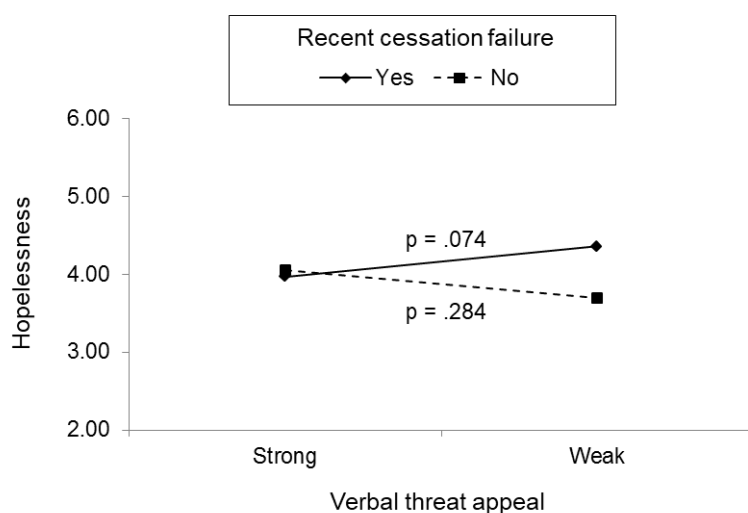
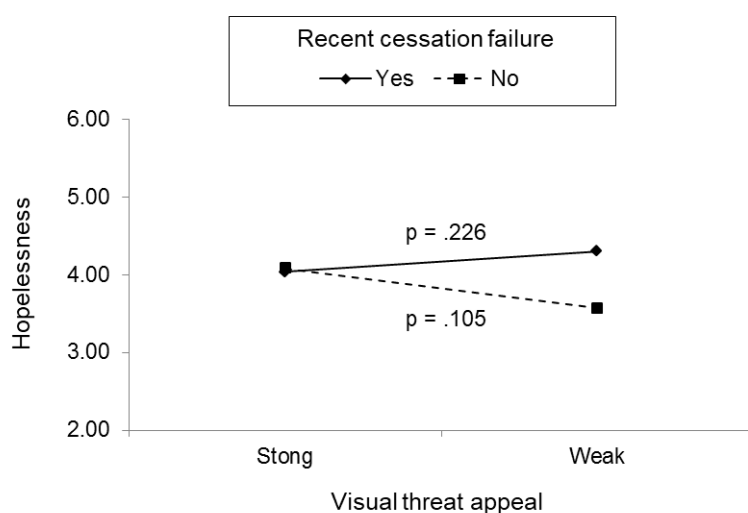


FIGURE 3: INTERACTION EFFECT BETWEEN RECENT CESSATION FAILURE AND VISUAL THREAT APPEAL ON POSTTET HOPELESSNESS MEASURE



DISCUSSION

To the best of the authors' knowledge, the current study is among the first to examine how recent cessation failure can influence smoker's responses to smoking-related threat appeals in anti-smoking ads. Specifically, it examines both adaptive (an increase in cessation intention) and maladaptive (increases in reactant defensiveness) responses to verbal and visual threat appeals in anti-smoking ads between smokers with and without a cessation failure in the previous 12 months. Study findings expand our understanding of the empirical linkage between recent cessation failure, smoking prevention messaging and psychological coping mechanism among long-term habitual smokers.

Results showed that exposure to anti-smoking threat appeals did not significantly change the cessation intention among participants who failed in a cessation attempt in the past year. Instead, it increased their maladaptive responses (fatalism, hopelessness) which reflects a 'cognitive withdrawal' from dealing with their current smoking behavior. At the same time, the level of other types of maladaptive responses indicative of a 'cognitive escape' (avoidance, denial, wishful thinking) remained unchanged. These findings suggest that for smokers with a recent cessation failure, exposure to anti-smoking ads could have a negative impact on their perceived ability to cope with the smoking-related threat posed by their current smoking behavior. Past research has shown that it is not uncommon to observe comorbidity of depression and hopelessness, especially among smokers with a recent cessation failure. [24] The depression and hopelessness experienced by smokers with a recent cessation failure during exposure to threat appeals in anti-smoking ads were found to enhance smokers' perception of the uncontrolled aspects of future smoking-related health problems. [25]

By contrast, exposure to smoking-related threat appeals did trigger an adaptive response via an increase in cessation intention among participants who did not try quitting smoking in the previous year. Study findings also indicated that smoking-related threat appeals in anti-smoking ads did not increase participants' level of maladaptive responses (defensive responses). These findings seem consistent with past research that reported how feelings of anxiety could motivate individuals to seek a coping strategy in response to the danger that they may encounter in the future. [17] By implication, this anxiety, if it does not lead to a depressive state, could encourage smokers without a recent cessation failure to turn to an adaptive or efficacious response such as cessation intention.

Results indicated no significant main effects across the factors of recent cessation failure (yes vs. no), verbal threat appeal (strong vs. weak) and visual threat appeal (strong vs. weak) on posttest cessation intention measure or defensive response measures, after controlling for their corresponding pretest measures. However, a significant interaction effect was found between a recent cessation failure and visual threat appeal on the posttest wishful thinking measure. Specifically, exposure to a strong visual threat appeal enhanced wishful thinking among participants without a recent cessation failure. As wishful thinking is a cognitive escape outcome, this suggests that a strong anti-smoking visual threat could elicit such maladaptive defensive response, which smokers without a recent cessation failure could use to convince themselves of their invulnerability to future smoking-related health problems. Nonetheless, it is also possible that for smokers without a recent cessation failure, wishful thinking may help them reduce their anxiety facilitated by smoking-related threat appeals in anti-smoking ads.

Two significant interaction effects were also identified between a recent cessation failure and either (1) verbal threat appeal or (2) visual threat appeal on the posttest hopelessness measure, but post-hoc analyses did not significantly differentiate the posttest hopelessness measure by the two separate sets of factors (verbal and visual threat appeal exposure conditions). Therefore, hopelessness, a cognitive withdrawal state, could be elicited when smokers with and without a recent cessation failure were exposed to verbal and visual threat appeals in an anti-smoking ad. It is probable that hopelessness may help smokers justify their current smoking status after being exposed to verbal and visual threat appeals in anti-smoking ads.

When interpreting the current findings, several limitations should be considered. First, the online experiment conducted in this study has less control over the environments in which participants completed their experimental tasks, relative to a

laboratory setting. [26] Second, participants were exposed to the experimental anti-smoking ad only three times in the experiment. It is possible that the potential effects of these anti-smoking ads could have been stronger through repeated exposures outside of the study setting. Third, the pretest-posttest experimental design only provided a snapshot of the effects under observation, since the study did not use a longitudinal design to measure the outcomes (e.g., avoidance, denial) in multiple waves. Lastly, the experimental anti-smoking ads could have a weaker effect on the long-term heavy smokers who participated in the current study than smokers with a shorter smoking history or light smokers [27], due to message fatigue over time. [9]

CONCLUSIONS

Even though cigarette smoking poses a serious health threat, limited research has addressed how long-term smokers may react to risk communication strategies involving anti-smoking ads. This study is novel because it addressed this gap in research by using Korean male smokers as a sample. [28] The current study conducted with a sample of Korean male smokers in their 30's showed that for smokers without a recent cessation failure, their exposure to anti-smoking ads increased their cessation intention. Weak (vs. strong) visual threat appeal in anti-smoking ads reduced their wishful thinking as cognitive escape from anxiety evoked by anti-smoking ads. However, such exposure also facilitated fatalism and hopelessness as cognitive withdrawal from fear elicited by anti-smoking ads among smokers with a recent cessation failure. These study findings suggest that it is crucial for practitioners to construct verbal and visual threat appeals that could temper the smoking-related threat in anti-smoking ads to elicit adaptive coping responses (e.g., cessation intention) and suppress maladaptive coping responses (cognitive withdrawal and escape) among smokers with and without a recent cessation failure.

With the proliferation of the smartphone and advancements in mobile medical technology, mobile health interventions for smoking cessation delivered via smartphone applications have emerged as new forms of smoking cessation treatment. [29] The smartphone applications can reduce such barriers as cost, schedule conflict, spatial limitation when smokers try to engage with cessation treatments. In addition, smartphone applications are equipped to offer smokers interactive and customizable tools for real-time messaging of social support, self-monitoring, smoking cessation progress tracking, daily reminder and the like. A variety of these smartphone applications are made available by governmental agencies (e.g., Korea Health Promotion Institute) and corporations in Korea.

As past research has shown that both hopeful and fearful feelings can be positively connected to risk information engagement, [30] we provide the following recommendations to practitioners who wish to develop smartphone applications for smoking cessation in Korea. First, smokers should be classified into groups with and without a cessation failure in the last year when registering for the smartphone applications to allow for delivering tailored cessation messaging. Next, weak visual threat appeal in anti-smoking ads can be strategically timed for delivery to those smokers without a recent cessation failure to increase their cessation intention and decrease their wishful thinking from inaction. Third, when showing anti-smoking ads to the group of recently failed quitters to prevent occurrences of fatalism and hopelessness, these messages should reduce the fearful feeling and increase the hopeful feeling to help motivate smoking cessation action.

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NEEDS ANALYSIS OF PUBERTY REPRODUCTIVE HEALTH LITERACY FOR BLIND STUDENTS

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ABSTRACT

Digital health is a discipline encompassing the study and application of digital technology to enhance health systems. It involves using digital health technology to benefit the general public, healthcare professionals, healthcare service providers, and the industry by empowering individuals and promoting a comprehensive health agenda.

This study uses a qualitative methodology, explicitly utilizing the phenomenological design. This study included a questionnaire analysis to assess the reproductive health needs of adolescents experiencing puberty. Additionally, we conducted in-depth interviews to collect data. School teachers, peers, and the use of online sites for information retrieval are the primary sources for providing reproductive health education to adolescent children. The teaching process encounters several challenges due to societal taboos and discomfort surrounding sensitive topics like sexuality. Consequently, children, including those with special needs and who require specialized approaches, often experience delays in acquiring knowledge about reproductive health.

There is a pressing need for innovation in the healthcare sector to enhance the provision of digital services to various communities, including students.

KEYWORDS

reproductive health, blind, puberty, blind literacy, Subject classification codes: Reproductive Health, Blind, Puberty, blind literacy

BACKGROUND

Digital health studies and implementation of digital technology enhances health systems [1]. Applying digital health technology empowers individuals and creates a comprehensive health agenda for the public, health professionals, healthcare providers, and industry. The development of digital health is highly beneficial for dealing with groups with disabilities, such as people who are blind; however, the development of media must consider the limitations of blind individuals. [2,3]

In the healthcare sector, the uncritically shared information is unjustifiable, constituting a fraud that misleads the public. To address these issues, contemporary healthcare professionals must exhibit innovation in health promotion, mainly digital

health promotion. Social media and digital health promotion can enhance public health literacy, given that most Indonesians possess and use smartphones with internet connectivity.

In Indonesia, the government pays little attention to reproductive health education for blind teenagers. The lack of literature addressing reproductive health issues for blind teenagers is evident, despite the necessity for such information, as blind adolescents experience growth and sexual urges comparable to their sighted peers. [4–6]

Previous research has concentrated chiefly on specific facets of online learning, such as the adoption of technology, student engagement, or specific pedagogical methods. There is a paucity of studies that delve into the comprehensive interaction of technological, pedagogical, and institutional factors impacting the effectiveness of online education, particularly during rapid shifts like the COVID-19 pandemic. Moreover, existing literature lacks a robust framework for evaluating online learning programs that consider the varied needs of different stakeholders. This research contributes to developing reproductive health education literacy materials for blind and visually impaired students in Jambi Province. This study addresses the identified gap by proposing a holistic evaluation framework integrating technological, pedagogical, and institutional dimensions. It explores how these factors influence online learning experiences' quality and effectiveness. The research explicitly considers the sudden transition to online learning due to the pandemic, providing valuable insights into the challenges and opportunities during this period. It also collects data from multiple stakeholders (students, instructors, and administrators) to offer a more nuanced and comprehensive understanding of online learning effectiveness.

This study is part of broader research on developing reproductive health education literacy media for blind and blind students in Jambi Province, Indonesia.

RESEARCH METHODS

This explanatory study utilized a mixed-methods approach, combining quantitative and qualitative data collection techniques. The study population consisted of nine blind students (age range) from 12 to 18 years old, six parents of blind students, and six parents of blind students. To ensure a representative sample of blind students and their parents who could provide valuable insights into the research question, we employed purposive sampling. The study employed a phenomenological approach, focusing on the lived experiences of blind students and their parents regarding reproductive health literacy during puberty. This approach is suitable for understanding this population's unique perspectives and challenges. [7]

The Ethics Committee of the Jambi Ministry of Health Polytechnic approved the study ethically (Reference Number: No. LB.02.06/2/03 2022). The study aims to ensure participant anonymity and confidentiality while adhering to ethical norms for collecting sensitive data in adolescent research.

We successfully conducted a study with students and parents to evaluate visually impaired students' reproductive health literacy needs during puberty. Our approach included private interviews, impartial language, and clear instructions to ensure unbiased responses. By analyzing quantitative data through descriptive statistics and qualitative data through thematic analysis, we gained valuable insights into participants' experiences. This comprehensive methodology provided a deep understanding of these students' specific needs. This study aims to explore the complex interactions of various factors that influence the effectiveness of online learning, providing a framework for future research and practical improvements, especially for implementing health promotion media designs for people who are blind.

RESULTS AND DISCUSSION

ACCESS TO REPRODUCTIVE HEALTH INFORMATION DURING PUBERTY

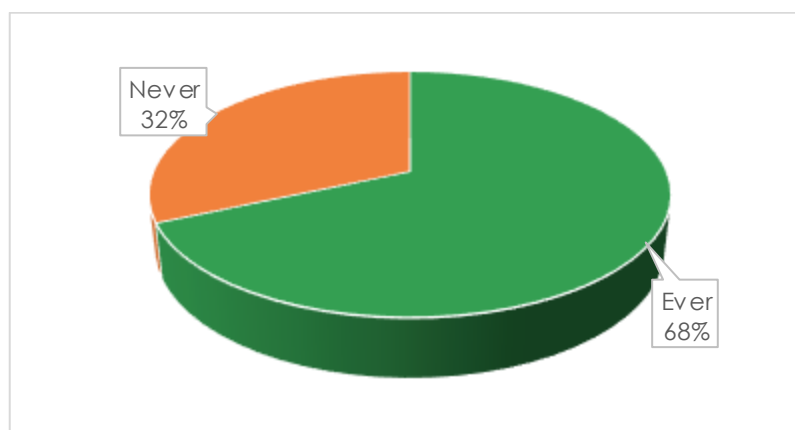
Student interviews were conducted in phases and were participated in by educators who instructed visually impaired students. The exhaustive description effectively yielded the results, demonstrating a thorough understanding and precision:

TABLE 1 FREQUENCY DISTRIBUTION OF ACCESS TO REPRODUCTIVE HEALTH PROMOTION FOR BLIND STUDENTS' REPRODUCTIVE HEALTH (N=20)

No	Statement	f	%
1	Experience of getting Reproductive Health Promotion/education at puberty by Health Workers		
	Ever	0	0
	Never	20	100
2	The experience of being asked/discussing changes in puberty by parents		
	Ever	0	0
	Never	20	100
3	The experience of being asked/discussing changes in puberty by friends		
	Ever	20	100
	Never	0	0
4	Experience Finding out reproductive health information via the internet/social media		
	Ever	20	100
	Never	0	0

Sources of health education regarding reproductive health during puberty experienced by blind students come from schoolteachers, peers, and looking for information on the Internet.

FIGURE 1 FREQUENCY DISTRIBUTION OF ACCESS OF DEAF STUDENTS REGARDING EXPERIENCES OF BEING ASKED/DISCUSSED ABOUT PUBERTY CHANGES BY TEACHERS



Teenagers require education on reproductive health, beginning with understanding and safeguarding their reproductive organs. We must convey information about sexual changes during puberty with extra care and patience. Use simple, straightforward, and easy-to-understand language. Adolescents in any condition have the right to live, grow, develop, and participate according to their dignity and worth. Without guidance, adolescents may struggle to adapt to their environment. Many parents are reluctant to tell their children about puberty, which results in the child looking for information about puberty on their own through the Internet and other media, which can have bad results. [2,4,5]

Participants stated that they had received health promotions regarding dental health from health workers before the COVID-19 pandemic.

".... I have received counseling about dental health once, but it has been a long time...." (Respondent 1, 15 years old)

"... I have received counseling about toothbrushes, but I have never had about reproduction. I got information about reproduction from searching on my cellphone or the Internet, as well as discussions with friends..." (Respondent 3, 17 years old)

All participants expressed a desire to receive health promotions from health workers more frequently, covering a wider range of topics. Students with hearing impairments also said they were curious about caring for their health. Puberty confusion resulted from a lack of information about changes.

Health workers face obstacles in their health promotion activities for blind students, primarily due to their limited communication skills. However, multimedia development can now overcome the difficulty of communicating with blind students. Multimedia will minimize the shortcomings of blind people.

Health workers can also maximize health promotion activities through social media, which maximizes captivating writing and images. Research has proven that social media technology can facilitate more social interaction between blind students and their social environment, thus assisting social and educational integration. We suggest adopting social media in online and mixed learning contexts. Adoption of social media can go beyond classroom studies. Blind and blind students can use social media to help them access academic and social interactions and reduce feelings of isolation. [8,9]

Few studies have looked at disability in rural areas; some have explicitly focused on disability and healthcare access. Prioritizing more remarkable quantitative research contributions to assess and improve healthcare access for persons with disabilities is necessary. People with disabilities have significantly lower well-being scores and limited access to health services, employment, rehabilitation, education, government social welfare, and disaster management is higher than non-disabled persons. Researchers identify disability and negative family attitudes as barriers for people with disabilities. People with disabilities participate in work, community meetings, and religious and social events. [8,10]

"...I was never told that I would menstruate when I was older. When I first started bleeding after taking a shower, I was confused and scared, and then I was told to wear sanitary napkins. I was taught how to use it, but I was not invited to discuss other matters (Respondent 7, 18 years old)"

Most students serving as resource persons expressed that they had never received an invitation to discuss the changes they would experience upon entering puberty. The female resource persons, particularly those who were Muslim, expressed that they received only instruction on how to use sanitary napkins and bathe after menstruation. Male resource persons who are Muslim are only taught how to "full ablution" without ever being invited to discuss what they experience and feel in the changes of puberty.

We must convey information about the sexual changes that occur during puberty with extreme caution and tolerance. This information necessitates the use of clear, straightforward, and easy-to-understand language. Young people can live, develop, grow, and contribute while maintaining their value and dignity, no matter their circumstances. Without

supervision, teenagers may struggle to adapt to their environment. Because many parents are reluctant to discuss puberty with their children, they may use the Internet and other media to research topics, which could be harmful.

The family plays a primary role in educational orientation by teaching reproductive health material earlier. Obstacles often occur in the teaching process because people still view it as taboo and deem it inappropriate to talk about sensitive areas such as sex. Many presume that children will comprehend their identity, the appropriate actions to take in such situations, and the terminology involved; nevertheless, this is not the issue for youngsters. Teaching children about reproductive health can be a lengthy process, particularly for those with special needs who employ unique methods. The delay in reproductive health knowledge will impact several aspects later, especially since many people take advantage of this to commit indecent behavior. [5,8,11]

LITERACY NEEDS FOR REPRODUCTIVE HEALTH EDUCATION IN PUBERTY FOR BLIND STUDENTS

All participants agreed that literacy is needed to prepare their children to face puberty.

"... I admit that I am perplexed about how to prepare our child for puberty, given our child's imperfections, and the topic is challenging to discuss..." (Parent, Y, 40 years old)

TABLE 2 ANALYSIS OF LITERACY NEEDS FOR REPRODUCTIVE HEALTH EDUCATION IN PUBERTY FOR BLIND STUDENTS (STUDENTS N=20, PARENTS N=6)

No	Statement	Student		Parent	
		f	%	f	%
1.	Reproductive Health Information Needs Puberty				
	Need	20	100	6	100
	No need	0	0	0	0
2.	Reproductive Health Education Topics				
	<i>(you can choose more than one option)</i>				
	Reproductive Organs Introduction	20	100	6	100
	Changes in Puberty	20	100	6	100
	How to care for reproductive organs	20	100	6	100
	Target Media promotion				
	Only Students	0	0	0	0
	Only Parent/Companion	0	0	0	0
	For students and parents/guardians	20	100	6	100
	Expected health promotion media				
	Digital Media	0	0	0	0
	Interactive Multimedia	20	100	6	100

Problems Parents of special needs children, as well as parents of teenagers in general, struggle to prepare their children for puberty, face communication challenges, and encounter a "taboo" culture when discussing reproductive health. Technological advances, such as the availability of information via the Internet, have significantly enhanced the quality of life for people with disabilities in developed countries. All people with disabilities, even those in developing nations, must have access to new technologies.

The World Health Organization (WHO) advises expanding access to health promotion information and communication for people with disabilities, including the following: Diverse communication approaches are employed to improve access

to health resources and public health information.: sign language or text, clear and easy-to-understand visual formats, large print or braille content, and information broadcasted through radio, television, or other non-print media. These efforts ensure inclusivity and comprehensibility for everyone. [6,8,12,13]

The results also demonstrate that parents and participants from blind school's desire access to interactive multimedia-based literacy anytime, anywhere.

This result is in line with the research results, which stated that research indicates that information sources directly affect the reproductive health behaviors of adolescents with visual impairments. Libraries, periodicals, newspapers, and the Internet all play an essential part in molding the behavior of impaired teens when it comes to understanding reproductive health issues. Health and non-health workers are highly esteemed as the most reliable sources of reproductive health information. Their guidance empowers adolescents to enhance their knowledge about reproductive health and adopt responsible sexual behaviors, fostering a healthier and well-informed community. Knowledge is linked to reproductive health behaviors in teenagers with disabilities because it allows them to discern between good and poor behaviors and avoid seeking information from friends or other sources. Participating in programs specifically designed to address adolescents' visual impairments can significantly enhance their comprehension and conduct in this domain. These tailored initiatives improve their comprehensive and empower them to meet their unique needs better, fostering a more inclusive and supportive learning environment. [2,9,14,15]

The literature study conducted by the research has not found any media that promotes the reproductive health of blind adolescents issued by the Ministry of Health or government agencies. Promotional media is necessary to promote reproductive health, considering more attractive media and information technology, which can expand the scope of targets for health promotion. Various promotional media for blind adolescents include interactive multimedia, digital media, health promotion activities, and accessible materials. Interactive multimedia, desired by both blind students and their parents, involves resources such as audio descriptions and tactile graphics. Despite the lack of explicit preference, digital media remains significant through accessible websites and mobile applications. Health promotion activities, like counseling, are crucial and delivered by trained professionals. We also emphasize the use of accessible materials like braille and large print. [16–18]

The study uses a qualitative approach with a phenomenological design and in-depth interviews, yielding rich data. However, limitations include a small sample size, lack of quantitative data, and limited geographic representation. Despite these limitations, the study underscores the significance of inclusive media for reproductive health education and calls for further research to validate and enhance these approaches.

CONCLUSIONS AND SUGGESTIONS

Blind students obtain health education about reproductive health during puberty from school teachers, peers, and online resources. All participants concurred that preparing their children for puberty requires literacy. To provide better digital services to the community, including blind students, innovation in health services is also necessary.

Health promotion media addresses not only blind youths but also their parents and companions, including families, educators, and therapists. Reproductive health resources are provided throughout puberty, ensuring that students receive support not only after experiencing puberty-related changes but also in preparation for puberty itself. This proactive approach equips students with essential knowledge and skills, fostering informed and healthy development.

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PERFORMANCE OF HEALTH OFFICERS AND FAMILY SUPPORT IN MOTIVATING FOR THE UTILIZATION OF INTEGRATED NON-COMMUNICABLE DISEASES (POSBINDU PTM)

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ABSTRACT

Integrated services for noncommunicable diseases (NCDs) are important public health services for the management and prevention of NCDs. However, lack of motivation to use these services remains a challenge. Factors such as health worker performance and family support may be associated with this problem. Therefore, this study aimed to examine the association of these factors with motivation to use integrated NCDs services (Posbindu PTM).

This study used an analytical survey with cross-sectional design, which included 380 samples from the general community around the working area of a Benteng public health centre, Palopo city, South Sulawesi, Indonesia. Sampling was selected using a purposive sampling technique. Data were analysed using chi-squared and multiple logistic regression tests.

The results show that there was an association between family support ($p < 0.001$) and health officer performance ($p < 0.001$) with motivation to use integrated NCDs services. In addition, health officer performance was the most influential factor in relation to motivation ($\text{Exp}(B) = 18.209$, $p < 0.001$). Motivation to use integrated NCDs services was more influenced by health officer performance. Health officers should sustainably improve their performance by focusing on service quality aspects related to integrated NCDs services.

KEYWORDS

health officer performance, motivation, family support, integrated NCDs services, health services

INTRODUCTION

One of the challenges facing health services is the prevention of noncommunicable diseases (NCDs), which have become highly prevalent in recent years [1-3]. NCDs are a global challenge that requires urgent attention. The high prevalence of NCDs contributes to 74% of all deaths worldwide, particularly in low- and middle-income countries [4].

The issue of health services for NCDs in low- and middle-income countries remains a significant challenge. Indonesia, as a country in this category, also reports a substantial prevalence of NCDs compared to other countries in the same category

[5]. Nevertheless, Indonesia has made efforts to improve NCD prevention through enhanced health services at the regional level by implementing integrated NCD services [6].

In 2018, the Directorate of Non-Communicable Disease Prevention and Control of the Ministry of Health Indonesia (P2PTM KEMENKES RI) recorded 38,486 integrated NCD services (*Posbindu PTM*) distributed throughout Indonesia [7]. Despite the long-standing use of many *Posbindu PTM* services, they continue to face various challenges in different regions. However, the utilization of these services remains low, primarily due to insufficient family support and unsatisfactory health worker performance [8].

The research by Zulkhairani and Gurning shows that the use of *Posbindu PTM* at Puskesmas is significantly related to family support. Individuals with high family support are four times more likely to use *Posbindu PTM* than those with less support [9]. Similarly, a study by Amanda et al. found that community participation in evaluating *Posbindu PTM* at public health centers was influenced by family support [10]. High family support serves as a strong motivator for family members to maximize the use of *Posbindu* services [11].

Additionally, health worker performance is expected to increase community motivation to use *Posbindu PTM*. Health workers play an essential role in making meaningful contributions through their professional expertise. Technically, health workers need to perform their duties to the best of their abilities, aiming to improve well-being and provide satisfaction [12,13]. However, some communities currently perceive NCD workers poorly, particularly regarding the quality of their services, friendliness, and inefficient working hours. Moreover, *Posbindu PTM* activities are often not tailored to the specific health needs and issues of the local community, which may affect the number of visits [14].

Research by Sari and Savitri indicates that the use of *Posbindu PTM* influences the performance of health workers [11]. The resources and work environment significantly encourage people to use *Posbindu PTM*, relying on health workers' skills and abilities, as well as their workload. According to Susanto and Hasan Basri's research, the utilization of health facilities is influenced by several factors, such as a decrease in people's purchasing power, reduced interest in seeking treatment due to dissatisfaction with services, dissatisfaction with the quality of medicines, dissatisfaction with service charges, and difficulty accessing health services geographically [15]. Additionally, this study found that wealthier communities use health services at twice the rate of poorer communities.

From the aforementioned, there is still a lack of specific details on how integrated NCD services like *Posbindu PTM* are being effectively implemented and their impact on reducing NCDs in Indonesia. Although family support and health worker performance are highlighted as key factors that may influence the use of *Posbindu PTM*, the exploration of how these factors enhance motivation is still lacking and needs further investigation. Additionally, there is a lack of data on the study of these factors and their potential effect on motivation to use *Posbindu PTM* in the research area. Therefore, the purpose of this study was to examine the relationship between family support and health worker performance on community motivation to use *Posbindu PTM* services.

METHODS

RESEARCH DESIGN

This study was an observational study using a quantitative approach with a cross-sectional design. A cross-sectional study is an observational study that analyzes data from a population at a single point in time [16].

LOCATION AND PARTICIPANTS

This study was conducted in Benteng Health Center, Palopo City, South Sulawesi, Indonesia. Based on data from the South Sulawesi Provincial Health Office, the prevalence of NCDs in Palopo City was high [17]. There are 12 health centers in Palopo City, with the highest number of NCD cases found in the Benteng health center area [16]. There are four *Posbindu PTM* units in the Benteng health center area, located in Malatunrung Village, Benteng Village, Surutanga Village, and

Salekoe Village, respectively. The number of community visits to Posbindu PTM in 2023 was 7,543 (49.48%) people out of a target population of 12,681 people or 80% of the total population (N=15,851 people).

Participants in this study enrolled the community in Benteng Public Health Center area. Data in 2023, there were 7,543 people who accessed *Posbindu PTM* services [16]. To calculate the required sample size, the Slovin formula was applied as follows:

$$n = \frac{N}{1 + N(e)^2}$$

n = number of samples

N = number of populations

e = estimated error (e=0.05; according to 95% CI)

Therefore, the required sample was 380 people. The sample was selected using purposive sampling method with the inclusion criteria: residents in Benteng Public Health Center area, actively visit or use the *Posbindu PTM* services, had no relative relationship with the health officer, and live with family. The sample that did not meet the inclusion criteria would be automatically excluded from the study.

INSTRUMENTS AND PROCEDURES

This study used questionnaires from previous studies to assess family support, health worker performance, and community motivation to use *Posbindu PTM* services [9-11]. Family support refers to the assistance provided by family members living in the same household, which can be received by respondents in the form of informational, evaluative, instrumental, and emotional support. Health worker performance refers to respondents' perceptions of health workers' behavior in providing NCD screening services to the community. Meanwhile, community motivation to use *Posbindu PTM* services refers to the internal or external factors that encourage respondents to utilize these services within the *Puskesmas* Benteng work area.

Data were collected using a Likert scale (1-5 points), consisting of 18 items on family support (e.g., "My family suggests attending *Posbindu PTM* activities"), 16 items on health worker performance (e.g., "While waiting for their turn to be examined, PTM officers conducted group counseling and provided interview sheets for participants to fill out"), and 10 items on community motivation to use *Posbindu PTM* services (e.g., "I use *Posbindu PTM* services because I want to know about my health condition"). The questionnaires passed validity testing with $r_{\text{count}} = 0.480-0.988$ ($r_{\text{table}} = 0.413$) and reliability testing with Cronbach's alpha (α) = 0.761-0.783 ($r_{\text{table}} = 0.60$).

Before participation, individuals were asked to voluntarily participate in the study. Upon agreeing, they were required to sign a written informed consent form and were given a self-administered questionnaire to complete in 10-15 minutes. The response rate was 100%. Participants were informed that they could withdraw from the study at any time.

The data collected from the participants were then quality checked to ensure that they met the data quality standards. After the quality check, the data was entered into the software with coding, then the final procedure was cleaning, organizing and storing the data for further analysis.

DATA ANALYSIS

Data were analyzed univariately to determine the frequency (n and %) distribution of respondent characteristics and each research variable. Chi-squared test was used in bivariate analysis to examine the association between family support and health worker performance with community motivation to use *Posbindu PTM* services. Meanwhile, logistic regression analysis was used to examine the factors that has impactfull affect to the dependent variable. The fitness of model and estimated power of the model were accessed using Hosmer and Lemeshow and the Negelkere R-squared tests. All the analysis performed using IBM SPSS version 22 with 95% level of confidence and 5% error ($\alpha=0.05$).

ETHICAL CONSIDERATIONS

This research has been approved by the Ethics Committee of the Faculty of Public Health with approval number: 1428/UN4.14.1/TP.01.02/2024.

RESULTS

TABLE 1. RESPONDENT CHARACTERISTICS

Characteristics	n	%
Gender		
Male	83	21.8
Female	297	78.2
Age (Years)		
20-30	80	21.1
31-40	69	18.2
41-50	110	28.9
51-60	121	31.8
Education		
None	3	0.8
Elementary school	39	10.3
Junior high school	60	15.8
Senior high school	173	45.5
Bachelor	95	25.0
Magister	9	2.4
PhD	1	0.3
Occupation		
Civil servants	41	10.8
Private	27	7.1
Fisherman	6	1.6
Labor	30	7.9
Housewife	174	45.8
Total	380	100

Table 1 shows that most of the respondents found in the working area of Benteng Health Center, Palopo City are female (78.2%), the dominant age group is 51-60 years (31.8%). In the distribution of education, it was found that the respondents had the highest level of education was senior high school (45.5%), while the distribution of occupations was known to be mostly housewives (45.8%)

TABLE 2. DISTRIBUTION OF HEALTH OFFICER PERFORMANCE, FAMILY SUPPORT, AND MOTIVATION TO USE *POSBINDU PTM*

Variables	n	%
Health officer performance		
Good	303	79.7
Less	77	20.3
Family support		
High	221	58.2
Low	159	41.8
Motivation to use <i>Posbindu PTM</i>		
High	256	67.4
Low	124	32.6
Total	380	100

Most respondents received high category family support (58.2%). In the distribution of health worker performance, it was found that most were in the good performance category (79.7%), while motivation to use *Posbindu PTM* was found to be high (67.4%, Table 2).

TABLE 3. THE ASSOCIATION BETWEEN HEALTH OFFICER PERFORMANCE AND MOTIVATION TO USE *POSBINDU PTM* SERVICES

Health officer performance	Motivation to use <i>Posbindu PTM</i> services						p-value
	High		Low		Total		
	n	%	n	%	n	%	
Good	234	80.2	60	19.8	303	100	<0.001
Less	13	16.9	64	83.1	77	100	
Total	256	67.4	124	32.6	380	100	

Table 3 shows that respondents who indicated that health worker performance was in the good category mostly had high motivation to use *Posbindu PTM* services (80.2%). Conversely, respondents who indicated that health worker performance was in the poor category mostly had low motivation to use *Posbindu PTM* services (83.1%). There is a significant relationship between health worker performance and community motivation to use *Posbindu PTM* services ($p < 0.001$).

TABLE 4. THE ASSOCIATION BETWEEN FAMILY SUPPORT AND MOTIVATION TO USE *POSBINDU PTM* SERVICES

Family support	Motivation to use <i>Posbindu PTM</i> services						p-value
	High		Low		Total		
	n	%	n	%	n	%	
High	185	83.7	36	16.3	221	100	<0.001
Low	71	44.7	88	55.3	159	100	
Total	256	67.4	124	32.6	380	100	

Table 4 shows that respondents who received high category family support mostly had high motivation in using *Posbindu PTM* services (83.7%), while respondents who received low category family support had more low motivation (55.3%) than high motivation (44.7%) in using *Posbindu PTM* services. Statistical test results showed that there was a relationship between family support and community motivation in using *Posbindu PTM* services ($p < 0.001$).

TABEL 5. MULTIVARIATE LOGISTIC REGRESSION ANALYSIS

Variables	Sig. (H & L Test)	Sig.	Exp (B)	N.R Square	O.P (%)
Family support	0.69	<0.001	5.766	0.456	80.8
Health officer performance		<0.001	18.209		

H & L = Hosmer and Lemeshow test. N.R square = The Nagelkere R-squared. O.P = Overall percentages

Table 5 shows that in terms of the fit of the analysis model to the observed data, the sig. (Hosmer and Lemeshow test) = 0.69 (sig. > 0.05), which means that the binary logistic analysis model is suitable for use. Of the two variables tested, family support and health worker performance were significantly associated with community motivation to use *Posbindu PTM* services. Health worker performance had the greatest impact on motivation to use the service. The Nagelkere R-squared value shows the magnitude of the relationship between all independent variables and the dependent variable. The results of the analysis show a value of 0.456 (45.6%), which means that the independent variables in this study have a relationship of 45.6% with the dependent variable. In addition, the total percentage value in the binary logistic test results obtained a result of 80.8%, which means that the accuracy of the analysis model in this study is 80.8%.

DISCUSSION

This study demonstrates that the performance of health workers has a substantial and statistically significant influence on community motivation to utilize *Posbindu PTM* services. Individuals who perceive health workers' performance as competent tend to exhibit higher motivation to engage with *Posbindu PTM* services. Effective performance among health workers is directly linked to the provision of high-quality health services, which, in turn, elevates community satisfaction and drives increased utilization of these health facilities [18,19]. The provision of quality health services satisfies both service providers and recipients, fostering a positive feedback loop in which increased satisfaction leads to greater service use [20,21]. The achievement of high-quality health services at *Posbindu PTM* is contingent upon the health workers' ability to perform their duties efficiently and effectively. This study corroborates findings by Oktarianita et al. [10], which indicate that community participation in the *Posbindu PTM* evaluation is strongly influenced by the perceived performance of health workers.

Furthermore, the professional demeanor and attitude of health workers significantly shape public perceptions of *Posbindu PTM* services. As Walgito suggests, external elements, including the attitude of service providers, can influence how communities assess health services [22]. Several factors, such as the attitude and behavior of health workers, the availability of appropriate health infrastructure, cost considerations, and the overall treatment environment, act as stimuli for health service utilization [19]. Therefore, the conduct of health workers is critical in shaping public perceptions and in motivating individuals to engage with *Posbindu PTM* services. When health workers' behavior meets community expectations and provides satisfaction, it generates a positive service experience, reinforcing continued engagement.

According to Azwar [23], delivering quality health services requires that health workers consistently align their performance with established standards of care. High productivity among health workers enhances community interest in utilizing these services, a conclusion supported by Zulfiandi et al. [24], who identified a positive relationship between health worker performance and *Posbindu PTM* service utilization. Similarly, research by Yanti et al. [20] highlights the importance of health workers' adherence to technical guidelines as a key factor influencing community engagement with *Posbindu PTM* services.

In addition to health worker performance, this study identifies family support as a critical determinant of community motivation to utilize *Posbindu PTM* services. Family support plays a pivotal role in educating and encouraging family members to recognize the importance of regular health check-ups at *Posbindu PTM*. Consistent family involvement

increases individual motivation to engage with these services. This finding aligns with research by Zulkhairani & Gurning [9], which illustrates a significant correlation between family support and the utilization of *Posbindu PTM* services.

Family support is defined as the provision of tangible and emotional assistance to family members, and it serves as a key motivating factor in health-seeking behaviors. Forms of family support may include reminders about scheduled check-ups, accompanying individuals to health facilities, or assisting in overcoming barriers to access [25-28]. Research conducted by Sari & Savitri [11] further emphasizes the influential role of family members—such as parents, siblings, and close relatives—in guiding individuals toward seeking medical care. Accordingly, strong family support fosters a conducive environment that promotes the active use of *Posbindu PTM* services.

This study has several limitations. The study design cannot draw a causal effect relationship between the independent variable and the outcome. This method also cannot address the possibility of confounding effect. Although the response rate is good, a self-administered questionnaire may be subject to response bias or inaccurate answers.

The study highlights the critical role that health worker performance and family support play in driving the utilization of *Posbindu PTM* services. This finding implies that strengthening health worker capacity through continuous training, performance monitoring, and promoting patient-centered attitudes is essential for improving service quality and community trust in healthcare systems. Additionally, fostering family support and educating communities about the importance of preventive health services can significantly boost engagement with *Posbindu PTM* services. Public health initiatives that integrate these elements—by enhancing the professional conduct of health workers and promoting family involvement—are likely to increase service utilization, contributing to better health outcomes and more effective prevention of non-communicable diseases.

CONCLUSION

The study concludes that there is an association between community motivation to use *Posbindu PTM* services with health worker performance and also family support. Motivation to use integrated NCD services was more influenced by health worker performance. Health workers should sustainably improve their performance by focusing on service quality aspects related to integrated NCD services. It is recommended that health systems implement integrated strategies that combine the role of family support with the performance of health workers to increase community motivation to use *Posbindu PTM* services. This can be achieved by promoting family-centered health education programs that empower families to support regular health check-ups, while simultaneously enhancing the training of health workers to deliver patient-centered care with professionalism and empathy. Health workers should also be trained to engage families actively in the care process, fostering a collaborative approach that maximizes both family involvement and service quality. By aligning the efforts of health workers with the influence of family support, public health programs can create a more supportive environment that encourages the regular use of preventive health services like *Posbindu PTM*.

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CONFLICT OF INTEREST

None to declare.

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ASSOCIATION BETWEEN HEALTH-SEEKING BEHAVIOR AND HEALTH SERVICE UTILIZATION AMONG SLUM RESIDENTS: A CROSS-SECTIONAL STUDY FROM A DEVELOPING COUNTRY

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ABSTRACT

BACKGROUND:

Health-seeking behavior (HSB) refers to how individuals respond to health issues and significantly influences health service utilization (HSU). This study examines the association between HSB and HSU among marginalized populations in Iran.

METHODS:

This cross-sectional study was conducted in 2020 and targeted adults (aged ≥ 18 years) residing in the slum areas of Kerman city, southeastern Iran. A cluster sampling method was employed based on population census data provided by the district health center, identifying 233 clusters. The final sample included 840 households. Data were collected through face-to-face interviews using two standardized and validated questionnaires assessing HSB and HSU. Three trained research teams conducted the interviews. Descriptive statistics and logistic regression analyses were performed using STATA 14 software.

RESULTS:

Multivariate analysis revealed that marital status, household size, treatment duration, current illness experience, disease acceptance, and stress were positively associated with inpatient service utilization ($p < 0.01$). In contrast, higher education levels and greater disease-related knowledge were inversely associated with inpatient service use ($p < 0.01$). Regarding outpatient services, factors such as insurance status, initial consultation for illness, perception of received healthcare quality, illness concealment, and situational factors were linked to lower outpatient service utilization ($p < 0.01$). Conversely, timely healthcare access and the influence of advertising and health information accessibility were associated with increased outpatient service use ($p < 0.01$).

CONCLUSION:

This study highlights the significant role of demographic factors and HSB in shaping inpatient and outpatient service utilization. Given the adverse effects of marginalization on healthcare access, policymakers should prioritize improving economic and cultural conditions and implementing targeted educational initiatives, including media campaigns.

Addressing financial barriers and introducing tailored interventions can reduce disparities and empower marginalized communities to access timely and appropriate healthcare services.

KEYWORDS

Health-seeking behavior, marginalization, slum, health service utilization, Iran

BACKGROUND

The global urban population has grown remarkably in recent decades, with over 50% of people residing in urban areas by 2010 [1]. This figure is projected to reach 66% by 2050, adding approximately 2.5 billion urban residents, 90% of whom will be in Asia and Africa [2]. This rapid urbanization has led to the proliferation of informal settlements, commonly known as slums [1].

Among the many social and economic challenges faced by slum residents, inadequate health conditions are particularly concerning. Slum populations generally exhibit poorer health outcomes than other urban populations due to environmental and individual factors, as well as increased health risks, disease complications, and higher mortality rates [3]. Roberts et al. further emphasize that individuals living in marginalized areas experience isolation, discrimination, and inadequate service availability compared to those in other urban settings [4].

A critical factor in this context is the limited accessibility of healthcare services for slum residents [5, 6]. Research indicates that insufficient healthcare availability in marginalized areas alters health-seeking behavior (HSB) patterns among their residents [7]. HSB refers to the actions individuals take when recognizing discomfort, experiencing symptoms (even without feeling unwell), or perceiving potential health risks and subsequently seeking medical assistance [8].

HSB is shaped by complex interactions between social, economic, and physical environments, as well as individual characteristics [9]. It has long been recognized as a crucial mechanism for enhancing patient knowledge, promoting healthier lifestyles, and improving health outcomes. Evidence suggests that active participation in disease management, self-reporting, and individual knowledge significantly contribute to better health outcomes [10]. This is particularly relevant in developing countries, where HSB directly affects healthcare utilization and individual health outcomes. In these regions, many deaths from preventable and treatable diseases result from delayed or lack of access to healthcare. Understanding and improving HSB can thus significantly reduce disease burdens and mortality. HSB plays a crucial role in shaping healthcare utilization and health outcomes, particularly in developing countries where access to healthcare is often limited [11, 12]. A significant proportion of deaths in these regions result from preventable and treatable diseases due to either inadequate or delayed healthcare access. Enhancing our understanding of HSB can therefore help mitigate disease burden and reduce mortality rates [13]. Various cultural, economic, and educational factors significantly influence HSB, making it essential to consider these dynamics when designing effective health interventions [12, 14]. Addressing HSB is a critical step toward achieving health equity, especially in settings where disparities in healthcare access are pronounced [15]. Consequently, healthcare policymaking should be informed by comprehensive data on health service utilization (HSU) patterns to ensure more effective resource allocation and intervention strategies [16].

As a developing country, Iran faces persistent challenges in ensuring equitable healthcare utilization among marginalized populations [17]. Despite efforts to improve healthcare access, there remains a limited understanding of specific HSB patterns and their impact on healthcare utilization within these communities. This knowledge gap hinders the efficient allocation of resources and the implementation of targeted interventions. By addressing this gap, the findings of this study can provide valuable insights for policymakers and healthcare providers, enabling the development of targeted strategies that improve healthcare access and equity. Recognizing the importance of understanding HSB and optimizing healthcare resource allocation [18], this study aims to examine the association between HSB and HSU among marginalized populations in Kerman.

METHODS

STUDY DESIGN AND SETTING

This study employed a survey design, conducted cross-sectionally, with adult participants (18 years and older) residing in the slum areas of Kerman city, an area located in southeastern Iran. Specifically, the study focused on the marginalized slum areas including Shahrak-e-Sanati, Imam Javad, and Chahardah Ma'soum neighborhoods during the year 2020. Kerman, recognized as one of Iran's most densely populated provinces, is home to a significant marginalized population. These marginalized areas primarily consist of informal and sub-standard settlements, characterized by high population density and low socioeconomic status.

SAMPLING METHODOLOGY AND SAMPLE SIZE

The study utilized cluster sampling method. Using population census data from the district health center, covering the period from January 1, 2020, to December 31, 2020, a total of 233 clusters were identified. From these, 42 clusters were randomly selected, with the number of clusters chosen being proportional to size: 18 clusters from the Shahrak-e-Sanati area, 18 from Imam Javad, and 6 from Chahardah Ma'soum. Within each selected cluster, eligible individuals were invited to participate. Starting from the first cluster, the required number of households in each cluster were consecutively selected towards the right. The inclusion criteria were individuals over 18 years of age, either the head of the household or those with comprehensive knowledge of household conditions, and a willingness to participate. If household members refused to participate, only their household number and refusal were recorded, and no further data were collected from them. The sample size was determined using the formula

$$n = \frac{z^2 pq}{d^2}$$

Where the parameters included a probability of 0.5 ($p = 0.5$), a confidence level of 95%, and a margin of error of 0.05. The initial sample size was calculated to be 385. However, considering a design effect of 2.2 [19], the final sample size was adjusted to 840.

STUDY INSTRUMENTS

Two primary instruments were used for data collection, both of which previously employed in Bahrami et al. study [20]. HSB questionnaire

The first instrument was a standardized questionnaire, validated and reliable, focusing on HSB. The first section collected demographic data, including age, gender, marital status, education level, and other relevant variables. The second section assessed various aspects of HSB, including: treatment-seeking behavior (5 questions), experiences with receiving care (5 questions), consumer evaluation of healthcare providers (6 questions), individual factors (6 questions), psychological factors (6 Likert-scale questions), socio-cultural and family factors (3 Likert-scale questions), situational factors (6 questions), and marketing factors (5 questions). The validity and reliability of this instrument was confirmed in Bahrami et al.'s study [20], and for this study, the Cronbach's alpha coefficient as reliability measure was recalculated at 0.71.

HSU QUESTIONNAIRE

The second instrument focused on HSU, which consisted of two sections: inpatient services utilization (7 questions) and outpatient services utilization (5 questions). Partial information related to the utilization section was included in another study.

DATA COLLECTION

Data were collected by trained interviewers, who were recruited and trained in a 4-hour workshop. Participants were informed about the study objectives, and written informed consent was obtained from each participant. All questionnaires were completed through face-to-face, structured interviews with the participants. Participants were assured that their information would remain confidential. If information was unavailable during the initial visit, up to three

follow-up meetings were scheduled to gather the necessary data. To ensure data accuracy, a quality assurance form was designed. One member of the research team visited 50 households, representing approximately 5% of the sample, to complete the quality assurance form. The data collected from the questionnaires were then compared with the information on the quality assurance forms to confirm consistency.

DATA ANALYSIS

Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to describe the dimensions of HSB. To examine the relationship between HSU and factors associated with HSB, logistic regression analysis was employed. Initially, all variables were examined through univariate analysis, and those with significance levels lower than 0.2 were included in the final multivariate analysis. The significant variables identified in the final model were interpreted.

The analysis was performed using Stata version 14 software. To reduce potential errors, similar questions were grouped together in the logistic regression analysis. Likert-scale questions with 5 and 4 response options were transformed into a 3-point scale for consistency.

The goodness of fit for the logistic regression model was assessed using the Hosmer-Lemeshow test. Since the significance level obtained was greater than 0.05, it was concluded that the model adequately fit the data.

RESULTS

DEMOGRAPHIC STATUS

Out of the 840 households initially studied, a total of 823 households residing in marginalized areas were included in the final analysis, as 2.1% of households were excluded due to non-response. The average age of the population living in marginalized areas of Kerman was 36.21 ± 10.87 years. On average, there were 1.18 households per residential unit in these areas, with an average population of 3.84 ± 1.19 individuals per household. Among the participants, 67.80% were females and 32.20% were males. Regarding marital status, 89.31% were married, 6.44% were single without any previous marriage, and 4.25% were individuals who had been married before but were currently single due to the death or divorce of their spouse. In terms of education, 9.36% of the participants were illiterate, 76.91% had a high school diploma or lower, and 13.73% had a university education. The study also revealed that 63.67% of the population in the marginalized areas of Kerman were unemployed.

Regarding income, 45.93% of participants had an income ranging from \$40 to \$80. Among the participants, 68.53% were homeowners, and 51.76% had social security insurance coverage. However, 14.22% of the individuals did not have any insurance coverage. In terms of supplementary insurance, 85.05% did not have any supplementary insurance, and 53.46% had a history of acute illness.

DESCRIPTIVE FINDINGS

The descriptive statistics on HSB in this study revealed several key findings. Among those who had been ill in the past three months, 90.42% took some action to treat their illness. Additionally, 96.35% of participants had a history of receiving healthcare services, and of this group, 50.25% believed they received care in a timely manner approximately. The usefulness of the healthcare services received was highly rated, with an average score of 3.95 ± 1.05 , indicating a positive perception of the services. In general, marginalized residents exhibited an average satisfaction level of 3.80 ± 0.85 regarding the services they received.

When assessing the received healthcare services, service quality emerged as the most crucial factor, with an average score of 4.60 ± 0.51 . On the other hand, factors such as the physical environment, attractiveness, and convenience were considered less significant, with an average score of 4.26 ± 0.93 . Individual factors analysis showed that the treatment duration was 3-7 days for 50.25% of participants, and nearly 47% had limited knowledge about their illness.

In terms of psychological factors, The importance of an individual's health for society, family, and acquaintances as influential factors, with an average score of 4.67 ± 0.66 . Approximately 90% of marginalized residents believed that concealing the illness is undesirable.

Cost was identified as the most impactful situational factor influencing the choice of healthcare provider among marginalized residents, with a score of 4.06 ± 1.06 . In terms of marketing factors, access to information were perceived to have an impact, with an average score of 4.05 ± 1.11 . (Table 1)

TABLE 1: DESCRIPTIVE STATISTICS OF HSB

Health- seeking behavior	
Variables	Frequency (%)
Action for disease	
Yes	576 (90.42)
No	61 (9.58)
The interval between the onset of symptoms and seeking medical attention	
Same day	156 (27.08)
The next day	140 (24.31)
Two days later	146 (25.35)
3-7 days	49 (8.51)
≥ 7 days	85 (14.76)
Stage of seeking therapy	
Mild symptoms	181 (31.42)
Full incidence of the disease	259 (44.97)
Recurrence and worsening	136 (23.61)
First consultation for illness treatment	
Health care centers	376 (65.28)
Specialist, hospital	145 (25.17)
Pharmacy without a prescription and consult a pharmacist	8 (1.39)
Pharmacy without consulting the pharmacist, traditional	8 (1.39)
Self-medication	39 (6.77)
The completion period of the treatment according to the opinion of the therapist	
Full recovery	340 (59.03)
To relieve symptoms	199 (34.55)
Not complete	37 (6.42)
Experience of receiving health care	
Variables	Frequency (%)
The experience of receiving health care services	
Yes	792 (96.35)
No	30 (3.65)
Getting health care at the right time	
Completely	351 (44.32)
To some extent	398 (50.25)
No	43 (5.43)
Variables	Mean $\pm$ SD
The usefulness of healthcare services	3.95 ± 1.05
The manner of interaction and responsiveness of healthcare providers	3.71 ± 0.98
Dignity and respect to healthcare service recipients	3.74 ± 1.02
Assessment of received health care services	
Variables	Mean $\pm$ SD

Providers behavior	4.29±0.88
The physical environment, attractiveness, and comfort of the service provider center	4.26±0.93
Time spent on receive services	4.50±0.80
Healthcare services cost	4.57±0.76
Reliability of healthcare outcomes	4.59±0.62
Healthcare services quality	4.60±0.51
Individual factors	
Variables	Frequency (%)
Duration of treatment	
3 to 7 days	398 (50.25)
7 to 14 days	133 (16.79)
14 to 21 days	32 (4.04)
More than 21 days	37 (4.67)
It needs constant care	192 (24.24)
Experience of current illness	
Yes	421 (53.16)
No	258 (45.20)
Do not know	13 (1.64)
Illness severity	
Mild	183 (23.11)
Medium	420 (53.03)
Severe	189 (23.86)
Information about the disease	
Low	367 (46.34)
To some extent	348 (43.94)
High	189 (23.86)
Another specific disease	
Yes	85 (10.73)
No	626 (79.04)
Do not know	81 (10.23)
Self-assessment of health status	
Weak	298 (37.63)
Good	377 (47.60)
Excellent	117 (14.77)
Psychological factors	
Variables	Mean ± SD
The importance of an individual's health for society, family, and acquaintances	4.67±0.66
The value placed on one's own health	4.18±1.04
Fear of treatment consequences and death	3.38±1.38
Feeling embarrassed about discussing an illness and seeking treatment	2.00±1.32
Accepting the illness	3.79±0.56
Stress related to illness and its treatment in the past three months	2.40±1.28
Cultural, social and family factors	
Variable	Frequency (%)
The preference for concealing the illness	
Yes	28 (3.43)
No	734 (89.95)
Do not know	54 (6.62)

Variable	Mean $\pm$ SD
Avoiding work and family responsibilities in receiving services	3.04 $\pm$ 1.28
The level of dependency on others in receiving services	3.18 $\pm$ 1.43
Situational factors	
Variable	Mean $\pm$ SD
The illness preventing the performance of daily activities (walking, dressing)	2.97 $\pm$ 1.34
Concern about the confidentiality of information in the health care facilities	3.18 $\pm$ 1.35
The impact of distance proximity on the choice of healthcare service providers	3.93 $\pm$ 1.13
The impact of cheapness on the choice of healthcare service providers	4.06 $\pm$ 1.06
The impact of previous experience in choosing a healthcare provider	3.55 $\pm$ 1.15
Variable	Frequency (%)
Access to medication without a prescription	
Totally	146 (17.89)
To some extent	394 (48.28)
No	276 (33.82)
Marketing factors	
Variable	Frequency (%)
Source of health information	
Newspaper/magazine	16 (1.96)
Radio and TV	567 (69.49)
Social networks	104 (12.75)
Training classes	11 (1.35)
Friends, colleagues, family	49 (6.00)
Other	69 (8.46)
Variable	Mean $\pm$ SD
The impact of advertising on medication, treatment methods, and healthcare service providers	3.00 $\pm$ 1.29
The level of access to information for obtaining healthcare services	4.05 $\pm$ 1.11
The ability to cover healthcare expenses	2.65 $\pm$ 0.95
The ability to pay for healthcare expenses before receiving healthcare services	2.36 $\pm$ 1.01

THE ASSOCIATION BETWEEN HSB AND HSU

The multivariate logistic regression analysis results examining the demographic factors and HSB in relation to hospitalization revealed significant associations ($p < 0.05$) between various variables and the utilization of inpatient services. Marital status ($p = 0.02$), education level ($p = 0.03$), household size ($p = 0.001$), duration of treatment ($p = 0.01$), experience of current illness ($p = 0.00$), information about the disease ($p = 0.03$), acceptance of the illness, and related stress ($p = 0.00$) were found to influence inpatient service utilization.

Individuals who were widowed or divorced had a 5.65 higher likelihood of utilizing inpatient services compared to never married individuals. Additionally, individuals with a high school diploma or lower education level were 46% less likely to use inpatient services compared to illiterate individuals.

The analysis further indicated that for each unit increase in household size, the utilization of inpatient services increased by 35%. Additionally, the duration of disease treatment was found to be a significant factor; individuals with treatment durations exceeding 14 days had a 2.59 times higher likelihood of utilizing hospital services compared to those with treatment durations of less than 14 days. Individuals with no experience of current illness were 14.23 times more likely to use inpatient services than those who had a history of current illness. Conversely, individuals who had extensive knowledge about their disease had a 39% lower likelihood of utilizing inpatient services compared to those who lacked information. The acceptance of illness and related stress also showed a significant relationship with the utilization of inpatient services.

The analysis suggests that for each unit increase in accepting one's illness and experiencing stress, the likelihood of utilizing hospital services increased by 79% (Table 2).

TABLE 2: MULTIVARIATE ANALYSIS OF THE ASSOCIATION BETWEEN HSB AND UTILIZATION OF INPATIENT SERVICES.

Variables	β Coefficient	Adjusted OR	95% CI for OR adjusted	
			Lower	Upper
Age	- 0.02	0.97	0.95	1.00
Marital status				
Single (referent)				
Married	0.13	1.14	0.39	3.28
Divorced/deceased spouse	1.73	5.65	1.22*	26.01
Education				
Illiterate (referent)				
Diploma and less	- 0.76	0.46	0.23*	0.94
University	- 0.35	0.69	0.29	1.67
Household size	0.30	1.35	1.12*	1.64
Type of Insurance				
No insurance (referent)				
Social security insurance	0.20	1.22	0.65	2.31
Armed forces	- 0.14	0.86	0.23	3.18
Relief committee	1.46	4.34	0.91	20.62
Health insurance organization	0.20	1.23	0.61	2.46
Other	0.00	1.00		
History of illness in the last three months				
Acute (referent)				
Chronic	0.60	1.82	0.98	3.39
Not sick				
The interval between the onset of symptoms and seeking medical attention				
2 days later (referent)				
2-7 days	- 0.33	0.71	0.44	1.16
≥ 7 days	- 0.60	0.54	0.28	1.04
First consultation for illness treatment				
Centers, specialists, hospitals (referent)				
Pharmacy, traditional healer	- 0.63	0.52	0.13	2.10
Self-medication	- 0.10	0.89	0.35	2.23
The completion period of the treatment according to the opinion of the therapist				
Full recovery (referent)				
To relieve symptoms	- 0.06	0.93	0.60	1.46
Not complete	0.27	1.32	0.56	3.07
Satisfaction with past experience	- 0.20	0.81	0.63	1.04
Duration of treatment				
3-14 days (referent)				
≥ 14 days	0.95	2.59	1.23*	5.45
Need to constant care	0.36	1.44	0.74	2.81
Experience of current illness				

No (referent)				
Do not know	2.65	14.23	2.65*	76.31
Yes	-0.13	0.87	0.55	1.39
Illness severity				
Mild (referent)				
Medium	- 0.13	0.87	0.49	1.55
Severe	0.23	1.26	0.65	2.45
Information about the disease				
Low (referent)				
To some extent	- 0.01	0.98	0.63	1.52
High	- 0.91	0.39	0.17*	0.91
Another specific disease				
No (referent)Do not know				
Yes	0.28	1.32	0.63	2.79
	0.02	1.02	0.53	1.93
Self-assessment of health status				
Weak (referent)				
Good	- 0.24	0.78	0.48	1.27
Excellent	- 0.18	0.82	0.36	1.87
Accepting the illness and related stress	0.58	1.79	1.27*	2.53
The preference for concealing the illness				
No (referent)Do not know				
Yes	- 0.30	0.73	0.29	1.83
	0.02	1.02	0.32	3.19
Avoiding work and family responsibilities and the level of dependency on others in receiving services	- 0.08	0.91	0.73	1.13
Situational factors	0.12	1.13	0.80	1.60
The impact of advertising and access to information for obtaining health care services	0.21	1.24	0.95	1.61
Ability to pay health care costs	0.03	1.03	0.78	1.36

* Significant at the 0.05 alpha level

UTILIZATION OF OUTPATIENT SERVICES

Significant findings also emerged from the regression analysis regarding the impact of demographic factors and HSB on the utilization of outpatient services in marginalized areas of Kerman.

Notably, the first consultation for illness treatment was found to significantly influence outpatient service utilization ($p = 0.01$). Individuals who resorted to self-medication as their first course of action were found to utilize outpatient services 87% less frequently than those who sought medical assistance from general practitioners, healthcare centers, specialist physicians, or government/private hospitals.

Additionally, insurance status ($p = 0.00$) played a significant role. Individuals covered by Relief Committee Insurance were 99% less likely to utilize outpatient services compared to those without insurance. The timing of healthcare services was another significant factor ($p = 0.01$). Those who received healthcare services at the right time had a 97% higher chance of utilizing outpatient services compared to those who did not receive timely care.

The assessment of received healthcare services also significantly influenced outpatient service utilization ($p = 0.00$). For each unit increase in the assessment of received healthcare services, the likelihood of utilizing outpatient services decreased by 89%.

Furthermore, individuals who preferred to conceal their illness were 99% less likely to use outpatient services ($p = 0.02$).

It is also important to note that for each unit increase in situational factors, the likelihood of utilizing outpatient services decreased by 66% ($p = 0.04$). However, for each unit increase in advertising and access to information regarding healthcare services, the likelihood of using outpatient services increased by 2.16 times ($p = 0.03$) (Table 3).

TABLE 3: MULTIVARIATE ANALYSIS OF THE ASSOCIATION BETWEEN HSB AND UTILIZATION OF OUTPATIENT SERVICES

Variables	β Coefficient	Adjusted OR	95% CI for OR adjusted	
			Lower	Upper
Age	0.02	1.02	0.97	1.08
Household income level (US\$)				
≤ 40 (ref)				
40-80	0.76	2.14	0.56	8.19
80-160	0.90	2.47	0.45	13.65
160-250	2.94	18.96	0.38	92.05
≥ 250	0.76	2.15	0.00	181.42
Education				
Illiterate (ref)				
Diploma and less	- 0.51	0.59	0.08	0.02
University	- 1.07	0.34	0.02	4.49
Household size	0.55	1.73	0.42	7.16
Type of Insurance				
No insurance (ref)				
Social security	- 1.01	0.36	0.06	1.89
Armed Forces	0.77	2.17	0.05	87.78
Aid Committee	- 4.10	0.01	0.00*	0.27
Health of Iran	- 1.15	0.31	0.06	1.65
Other	0			
Supplementary insurance				
No (ref)				
Yes	0.35	1.41	0.33	6.01
History of illness in the last three months				
Acute (ref)				
Chronic	- 1.06	0.34	0.07	1.59
Not sick				
The interval between the onset of symptoms and seeking medical attention				
2 days later (ref)				
2-7 days	0.27	1.31	0.39	4.37
≥ 7 days	0.84	2.32	0.49	10.9
Stage of seeking therapy				
Mild symptoms (ref)				
Full incidence of the disease	- 0.99	0.37	0.09	1.42
Recurrence and worsening	- 0.73	0.48	0.11	2.06
First consultation for illness treatment				
Centers, specialists, hospitals (ref)				
Pharmacy, traditional healer	- 1.31	0.27	0.01	6.38

Self-medication	- 1.95	0.13	0.03*	0.65
Getting health care at the right time				
No				
To some extent	- 3.28	0.03	0.01*	6.35
Completely	- 2.43	0.09	0.00	1.20
Assessment of received health care services	- 2.10	0.11	0.03*	0.38
Duration of treatment				
3-14 days (ref)				
≥14 days	0.75	0.70	0.08	5.57
Need constant care	0.17	0.63	0.13	2.96
Experience of current illness				
No (ref)				
Do not know	0.55	0.90	0.07	39.50
Yes	- 0.87	0.36	0.14	1.17
Illness severity				
Mild (ref)				
Medium	- 0.34	0.52	0.18	2.68
Intense	0.05	0.60	0.21	5.17
Information about the disease				
Low (ref)				
To some extent	0.65	1.84	0.64	5.73
High	2.09	7.81	1.17	45.67
Another specific disease				
No (ref)				
Do not know	0.34	1.37	0.21	9.26
Yes	1.23	3.32	0.73	15.89
Self-assessment of health status				
Weak (ref)				
Good	- 0.29	0.72	0.23	2.37
Excellent	- 0.66	0.48	0.08	3.01
Accepting the illness and related stress	0.23	1.17	0.56	2.79
The preference for concealing the illness				
No (ref)				
Do not know	- 0.45	0.64	0.09	4.45
Yes	- 4.56	0.01	0.00*	0.72
Situational factors	-1.02	0.34	0.13*	0.93
Access to medication without a prescription				
To some extent				
No	-0.38	0.70	0.23	2.03
Completely	-0.61	0.48	0.12	2.24
Source of health information				
Newspaper, magazine				
Radio and TV	- 1.09	0.30	0.03	3.45
Social Networks	- 0.10	0.78	0.06	13.07
Training Classes	0	1.00		
Friends, colleagues, family	- 0.82	0.46	0.03	6.11
Other cases		1.00		
The impact of advertising and access to information for obtaining health care services	0.77	2.16	1.06*	4.35

DISCUSSION

This study examined HSB and its association with HSU among marginalized populations in Kerman, Iran, as a developing country, aiming to provide a comprehensive understanding of their behavior and subsequently improve access to services. Additionally, this analysis contributes to policy decisions and improvements in the healthcare system, fostering greater utilization of health services in these areas. Individuals in marginalized communities often make treatment decisions influenced by the severity of their illness and their perception of its importance. Timely HSB is essential for early diagnosis. This study found that many individuals sought healthcare only when their illness had advanced, suggesting that marginalized groups may overlook preventive care due to insufficient health awareness. Musinguzi et al. support these findings, highlighting the role of symptoms and signs in prompting individuals to seek diagnosis and treatment. Patients assess their symptoms and decide on appropriate actions based on their perception of the illness's severity. When they consider the illness to be severe, they seek specialized care, whereas if they perceive it as less severe, they opt for self-care measures to alleviate discomfort [21].

Moreover, the choice of healthcare provider is influenced by several factors, as demonstrated by this research. Most individuals initially opt for government-designated health centers for their healthcare needs. A study by Latunji et al. in Nigeria also found a preference for official health centers [22], supporting our findings. Similarly, a study conducted in India reported that a significant proportion of slum dwellers preferred government centers for treatment [23].

Additionally, the findings indicate that, among contextual factors, the affordability of services plays a more decisive role in provider selection than other factors. This aligns with studies by Lilford et al. [24], Ajloni et al. [25], Aleemi et al. [26], and Latunji et al. [22], in separate studies. Marginalized individuals acknowledge the impact of healthcare costs on their access to services. The limited utilization of health services in these populations can be attributed to low income and poor economic status, consistent with findings by Lindsay et al. [27], Chung et al. [28], and Hussain et al. [29].

The analysis also reveals that radio and television are the primary sources of healthcare information among marginalized residents of Kerman city. However, research in Congo suggests that most individuals sought health information from healthcare professionals, with fewer turning to media or family/community resources. Among the study population in Congo, only a quarter reported obtaining information from the internet or media sources such as television or radio [30]. This discrepancy may arise from differences in infrastructure and access to technology in the two regions, as refugees in Congo may have limited access to the internet, radio, or television.

In the multivariate analysis, illness acceptance and related stress were found to have significant associations with the use of inpatient services. As acceptance of illness increases, so does the likelihood of using inpatient services. This aligns with Bahrami et al.'s research, which emphasized the role of illness acceptance in HSU [31]. Andersen's model of health and treatment beliefs also supports the idea that illness acceptance influences service utilization, particularly inpatient care. However, this acceptance has a distinct effect on outpatient service usage. Individuals who tend to hide their illness are significantly less likely to seek outpatient care, potentially avoiding treatment to conceal their condition, resulting in lower utilization rates [32]. Ganeshkumar et al. conducted a study examining HSB among children residing in slum areas and found that the main reason for seeking appropriate care was the perception that early detection could prevent the severity of illness [33].

Additionally, individuals who were divorced or widowed were more likely to use inpatient services than their single or married counterparts. This may be attributed to the older age of individuals who have experienced such events, as well as their higher likelihood of illness. The psychological effects of divorce or widowhood may also contribute to a higher incidence of illness. This finding is supported by Sarwar et al. who demonstrated that divorced individuals had higher inpatient service utilization in Pakistan [34].

Education level was also identified as an influential factor in HSU. Individuals with a high school diploma or below were less likely to use inpatient services compared to illiterate individuals. Illiterate individuals generally have less awareness about health conditions and personal hygiene maintenance, leading to higher illness incidence and greater reliance on inpatient services. This finding is consistent with Borhaninejad et al.'s research, which showed that illiterate individuals utilize inpatient services more than those with higher educational levels [35]. Similarly, Azimzadeh et al. emphasized the effect of education on HSU [36].

It is important to note that individuals with limited knowledge about their disease are less likely to use hospitalization services. This suggests that a lack of understanding about their condition may prevent them from seeking treatment early, leading to lower outpatient service utilization. This delayed care-seeking behavior may result in hospitalization when the condition worsens. These findings align with the study by Kalhor et al., which explored patient awareness levels [37].

Among marginalized residents in Kerman, there was a positive association between household size and the utilization of hospitalization services. This suggests that individuals living in larger households benefit from increased social support, which facilitates access to hospitalization services when needed. Larger households may provide additional care and assistance, making hospitalization more feasible. However, Manzi et al. discovered more unmet needs in larger families [38]. The discrepancy in findings may be explained by differences in insurance coverage. Larger families, facing financial challenges, may have limited access to services unless they are covered by insurance.

In this study, individuals who preferred concealing their illness were less likely to utilize outpatient services compared to those who were more open about their health. This indicates that individuals who hide their illness may delay treatment, resulting in lower utilization of outpatient services. Atashbahar et al. also highlighted this issue in their study [39]. Stigma leads individuals to avoid or delay seeking healthcare, especially for socially stigmatized conditions like mental illnesses and chronic diseases. This fear of judgment worsens health outcomes, particularly for marginalized populations facing additional challenges. Reducing stigma through education, supportive healthcare environments, and community-based interventions can encourage timely care, improve health outcomes, and reduce the overall disease burden [40-42]. The current study also found that individuals without health insurance were more likely to use outpatient services than those covered by Relief Committee insurance. This contradicts the findings of studies in Vietnam and Nigeria [43, 44], where increased health insurance coverage led to greater service utilization. It seems that Relief Committee insurance is more effective for inpatient services, while it may not cover certain outpatient services, leading individuals to seek care elsewhere. The findings suggest that advertising and access to information significantly influence HSB among marginalized populations. Increased advertising and better access to information improve awareness of available health services, leading to higher utilization of outpatient services. Marginalized individuals, often with lower education and health literacy, have limited awareness of primary healthcare services. Improved access to information can raise awareness, prompting individuals to seek care. Moreover, social marketing has proven to be an effective framework for improving public health [45]. Public support through community mobilization, advertising, and interpersonal communication can further enhance healthcare provision. Finally, the analyses revealed that situational factors, such as information confidentiality, the ability to perform daily tasks, and service affordability, reduce the utilization of outpatient services. Financial challenges faced by marginalized individuals may exacerbate this issue. In this context, Malmir et al. addressed the impact of cost-related factors on outpatient service utilization, confirming the current findings [46].

STUDY LIMITATIONS AND STRENGTHS

This study provides a comprehensive analysis of HSB among marginalized populations, offering valuable insights into the factors influencing inpatient and outpatient service utilization. Unlike many studies that primarily focus on economic barriers, this research considers a broader range of determinants, including psychological aspects such as illness concealment and the social factors like household size and education level.

This study has some limitations. First, the generalizability of this study's findings may be limited due to its focus on marginalized populations in a specific geographic region. The healthcare-seeking behaviors observed in this context may not fully represent those of individuals in different socio-economic settings or other regions with distinct healthcare

infrastructures, cultural norms, and policy environments. Additionally, factors such as the availability and accessibility of healthcare services, insurance coverage, and health literacy levels vary across different populations, which may influence the applicability of the results to broader or more diverse groups.

Another limitation is the potential for self-reporting bias. Participants' responses regarding their healthcare-seeking behavior and attitudes may be influenced by recall bias or social desirability, leading to an over- or underestimation of certain findings. Future studies using objective healthcare utilization records could help validate these results.

Finally, while the study explores various socioeconomic and psychological factors, it does not account for potential cultural and behavioral influences that might affect healthcare-seeking decisions. Cultural norms regarding illness disclosure, traditional healing practices, and gender-related healthcare disparities could provide further insights into variations in service utilization.

CONCLUSION

HSB among marginalized populations is influenced by multiple socioeconomic and demographic factors, including education level, marital status, household size, and access to health insurance. The findings indicate that individuals with lower education levels, those who are divorced or widowed, and those from larger households tend to utilize inpatient services more frequently. Additionally, financial constraints and a lack of awareness about available healthcare services contribute to delayed care-seeking behavior, potentially leading to more severe health conditions requiring hospitalization. The study highlights the critical role of targeted interventions in improving healthcare utilization. Enhancing public awareness through educational programs, social marketing, and mass media campaigns—particularly via television and radio—can effectively increase health literacy and encourage timely healthcare access. Moreover, financial and structural barriers must be addressed to ensure equitable access to both inpatient and outpatient services. Policymakers should focus on strengthening healthcare coverage, particularly for marginalized populations, by improving insurance effectiveness and expanding service coverage. Addressing situational and economic constraints can help reduce disparities in healthcare utilization and promote better health outcomes. Ultimately, a comprehensive approach that integrates economic support, health education, and policy interventions can lead to improved HSB and reduced health inequities among marginalized communities.

ETHICAL APPROVAL AND CONSENT:

This study received ethical approval from the ethics committee of Kerman University of Medical Sciences with ID number IR.KMU.REC.1397.053. All participants provided written informed consent before participating in the study, ensuring their voluntary and informed participation in accordance with ethical standards.

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AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request (in Persian language).

ABBREVIATION

Health-Seeking Behavior: HSB

Health service utilization: HSU

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THE INFLUENCE OF ACCESS BARRIERS ON THE USE OF PUBLIC HOSPITAL OUTPATIENT SERVICES AMONGST LOW-INCOME HOUSEHOLDS IN MALAYSIA

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ABSTRACT

AIM:

Many people, particularly those from low-income and marginalised communities, face barriers when accessing healthcare services. Therefore, this study examined the influence of household characteristics and perceived access barriers on the utilisation of outpatient services among low-income households living in urban and rural areas.

METHODS:

This cross-sectional study employed 454 university students as proxies for low-income households. Data on household characteristics, perceived household medical needs and perceived access barriers were collected using online and printed questionnaire forms. The measure of perceived access barriers included items that represented various dimensions, including personal barriers, structural barriers, financial barriers, perceived triviality, accessibility, and time limitations.

MAIN FINDINGS:

The distance between household dwellings and public healthcare facilities as well as perceived household medical needs significantly influenced the use of outpatient care for urban and rural households. However, the influence of employment status and household size was only significant among urban households. In terms of perceived access barriers, financial barriers were found to have a negative influence on the use of outpatient services among urban households, while time limitations were strongly associated with reduced outpatient use among rural households. Perceived triviality and accessibility also exhibited statistical significance in influencing the use of outpatient services among urban and rural households, with moderate to large effect sizes.

CONCLUSION:

The findings of this study provided valuable insights into the use of outpatient services, accessibility and barriers encountered by low-income households living in urban and rural areas. Efforts to improve access are crucial in addressing health inequities and promoting a more just and equitable society.

KEYWORDS

access, outpatient, urban, rural, barriers

INTRODUCTION

Access to healthcare is a fundamental human right that has significant implications for the health and well-being of individuals and communities. It refers to the ability of individuals to obtain necessary medical care, including preventive, diagnostic and treatment services. [1] However, access to healthcare is not equally distributed, and many people, particularly those from low-income and marginalised communities, face barriers. [2]

Malaysia has made significant progress in improving healthcare delivery over the past few decades. The country has implemented various reforms and policies to improve the quality, accessibility, and affordability of healthcare services. These reforms have included the establishment of universal health coverage through the National Health Insurance Scheme, the expansion of primary care services and the development of health care infrastructure, including hospitals and clinics. [3-5] Additionally, the country has placed great emphasis on disease prevention and health promotion by focusing on addressing non-communicable diseases such as diabetes and cardiovascular disease. [6]

Despite these efforts, challenges persist in achieving equitable access to quality healthcare services for low-income and rural communities. Studies conducted in Malaysia have identified various barriers related to healthcare access, including financial constraints, lack of information, transportation difficulties, and language and cultural barriers. [7-9] These barriers have significant implications for the health and well-being of individuals and communities, particularly for those with chronic diseases such as diabetes. [10]

Although the number is limited, studies conducted in Malaysia have highlighted the presence of social inequity in terms of healthcare access. [11] Risso-Gill et al. identified financial constraints, lack of information, language barriers and cultural differences as main factors that influenced access in a mixed-method study that examined barriers to hypertension management within the health system. [12] Barriers to access were analysed based on geographical locations and distances, revealing significant urban-rural disparities in healthcare access. [13-15] Consistently, rural residents were found to experience more barriers in accessing healthcare than urban residents. [14, 15] Besides, transportation difficulties and a lack of healthcare facilities were commonly reported issues among rural residents. [16, 17] Conversely, the limiting factors for access among urban-poor residents were conceptualised as personal, structural, and financial barriers. [7] In a study, these limiting factors were found to correlate significantly with marital status and household income. [8]

More studies are needed to explore healthcare access issues and barriers in Malaysia. Although some factors were identified in previous studies, it is crucial to examine these factors on healthcare utilisation. Thus, there is a need to quantify the extent to which these factors affect the utilisation of healthcare services, particularly outpatient services. This will enable policymakers make well-informed decisions and implement comprehensive and well-targeted interventions. Such efforts are essential to address specific needs of diverse populations, including those living in poverty, rural areas, and marginalised communities.

METHOD

STUDY DESIGN AND SETTING

This study employed a cross-sectional research design involving university students as household representatives. The study was conducted from May 1, 2022 to May 31, 2023. Universiti Teknologi MARA (UiTM) was selected as the recruitment setting due to its extensive network of campuses across Malaysia. The university offers significantly subsidised tuition fees to incentivise the enrolment of students from low-income families, with approximately RM600 or USD135 per semester for an ordinary undergraduate course. Recent statistics indicated that UiTM has approximately 160,000 students enrolled in various academic programs and levels, with 70% of them originating from low-income families.

DATA COLLECTION

Five hundred students who enrolled in an academic program at a single UiTM campus were invited to join this research. We included students who met the following criteria: 1) enrolled in a full-time undergraduate program in any discipline, 2) currently living with their parents, and 3) with combined parent incomes of less than RM4,850 (USD1,115). We excluded students who: 1) were enrolled in postgraduate programs, 2) were part-time students, 3) lived independently of their parents, or 4) had parents with a combined income of RM4,850 or more. In Malaysia, a household with a monthly income below RM4,850 falls within the bottom 40% of income earners (B40). [18] As proxies for households, the students were first briefed about their roles and the objectives of the research project. Those who agreed to participate were given a questionnaire form and were instructed to complete it within a week. Sufficient time was allocated to gather information from family members on household characteristics, perceived access barriers, and use of outpatient care.

MATERIALS AND STUDY TOOLS

A questionnaire was developed to collect data on various household characteristics, including household size, monthly income, marital and employment status of household head, residential area, region and perceived household medical needs. The questionnaire included items that measured perceived access barriers to public hospital outpatient care and captured the number of outpatient visits within the 12-month study period. Additionally, respondents were required to estimate the distance (km) from their household dwelling to the nearest public hospital outpatient facility.

The perception of access barriers was measured in 6 dimensions: personal, structural, financial, perceived triviality, accessibility, and time limitation. The personal barrier construct was developed based on patient-provider communication issues (3 items), perceived public stigma (3 items), and perceived side effects from consuming modern medications (4 items). The items measuring structural barriers were constructed based on perceived service availability (4 items), system and organisational efficiency (5 items), and perceived transportation issues (3 items). Items were also constructed to measure the dimension of financial barrier (4 items), perceived triviality (4 items assessing the disposition regarding the need for prompt medical care in the event of sickness), accessibility (4 items measuring agreement on the unavailability of services at nearby public facilities and the need to travel far to access them), and time limitation (4 items evaluating the practical difficulties in finding time to visit healthcare facilities and long waiting time to receive treatment). Psychometric assessments of the questionnaire items were conducted using exploratory factor analyses (EFA) and confirmatory factor analyses (CFA). The instrument was constructed accordingly, and the 6-factor model of access barriers demonstrated an appropriate fit. The corresponding alphas calculated for each dimension also indicated a high level of internal consistency for the measurement. Questionnaire items for perceived access barriers and perceived household medical needs were measured using a 5-point scale. For perceived access barriers, the scale ranged from 1 (indicating a strong disagreement) to 5 (indicating a strong agreement). The scale for perceived household medical needs ranged from 1 (indicating low medical needs) to 5 (indicating high medical needs). The measurement framework for perceived access barriers was adapted from studies that measured access barriers among the urban poor in Malaysia and other notable international studies examining access barriers to healthcare services. [7-8, 19-22].

STATISTICAL ANALYSIS

Descriptive analyses were conducted on studied variables using frequency and percentage for categorical variables, and interquartile range, mean and standard deviations for continuous variables. To measure the influence of household characteristics and perceived access barriers on outpatient use, *marginalised zero-inflated negative binomial* (MZINB) regression were performed. [23] In these analyses, household characteristics, perceived household medical needs and perceived access barriers were included as predictor variables. The number of outpatient visits within the past 12 months served as the outcome variable. Analyses were stratified based on the area of residence (urban and rural). All reported *P*-values were 2-tailed, and a significance level of $P < .05$ was used. Stata Statistical Software: Release 17 (StataCorp, College Station, TX) was utilised for data analysis.

ETHICS CONSIDERATION

This study received approval from the Institutional Review Board of Universiti Teknologi MARA, Malaysia (Ethics Committee of the Faculty of Business & Management, Universiti Teknologi MARA). Ethics approval code: REC/08/2023 (PG/MR/200)

RESULTS

A total of 454 completed questionnaire forms were returned to the investigators, indicating a response rate of 90.8%. The data from these questionnaire forms were extracted and analysed.

HOUSEHOLD CHARACTERISTICS

On average, rural households had slightly more household members than urban households. Rural household heads were primarily self-employed. Most household heads were married and completed middle-school education. Rural households had significantly lower monthly incomes than urban households. Many rural households were located in Malaysia's northern and east coast regions, while urban households were mostly located in northern and central regions.

The average distance to the nearest public healthcare facilities was significantly shorter for urban households (11 km) than rural household residents (13 km). Generally, rural households reported higher medical needs than urban households. 56% ($n = 260$) households utilised outpatient services in the past 12 months. The rate of outpatient service utilisation was higher among rural residents (62.2%, $n = 112$) than urban residents (52.9%, $n = 146$). Analyses comparing the characteristics of households based on the area of residence revealed statistically significant differences.

TABLE 1: SUMMARISES THE HOUSEHOLD CHARACTERISTICS ACCORDING TO THE RESIDENCE AREA.

Household characteristics	Urban ($n = 276$)		Rural ($n = 178$)		P
	n	%	n	%	
No. of Household members, M (SD)	5.27	(1.82)	6.56	(1.50)	<.001
Age					
30 - 39	8	2.9	-		
40 - 49	92	33.3	24	13.5	
50 - 59	120	43.5	62	34.8	
60 - 69	48	17.4	68	38.2	
≥ 70	8	2.9	24	13.5	<.001
Employment status of household head					
Government employee	68	24.6	10	5.6	
Private employee	82	29.7	10	5.6	
Self-employed	70	25.4	114	64.0	
Retired from government service	34	12.3	24	13.5	
Retired from private service	12	4.4	18	10.1	
Unemployed	10	3.6	2	1.1	<.001
Marital status of household head					
Married	228	82.6	116	65.2	
Divorced	20	7.3	8	4.5	
Spouse has passed away	28	10.1	54	30.3	<.001
Education Level of household head					
Primary Education	2	0.7	20	11.2	
Lower secondary education	8	2.9	40	22.5	
middle secondary education	104	37.7	48	27.0	
Higher secondary education	72	26.1	22	12.4	
College/university	84	30.4	12	6.74	
No formal education	6	2.2	36	20.2	<.001
Combined monthly income					
< RM2,500	64	23.2	128	71.9	
RM2,500 – RM3,169	74	26.8	28	15.7	
RM3,170 – RM3,969	18	6.52	12	6.7	

Household characteristics	Urban (n = 276)		Rural (n = 178)		P
	n	%	n	%	
RM3,970 – RM4,849	120	43.5	10	5.6	<.001
Region of residence					
Northern	86	31.2	56	31.5	
Central	78	28.3	20	11.2	
Southern	40	14.5	30	16.9	
East coast	54	19.6	44	24.7	
West Malaysia	18	6.5	28	15.7	<.001
Distance in kilometres; M (SD)	10.78	(7.07)	12.64	(7.64)	<.001
Medical Needs, M (SD)	2.51		2.80	(0.87)	<.001
	(0.77)				
Outpatient visit ^a , M (95% CI)	3.31 (2.84 –		3.28 (2.88 –		<.001
	3.61)		3.72)		

^aData were described using geometric mean with a 95% confidence interval (CI) in parentheses. The significant difference was estimated using the Mann-Whitney U test

ACCESS BARRIERS TO OUTPATIENT SERVICES

Descriptive statistics on measures of perceived access barriers are presented in Table 2. Rural households reported a higher perception of barriers compared to urban residents, except for perceived time limitations. The mean values of personal barriers, financial barriers and accessibility differed significantly between urban and rural households, with statistically large effect sizes.

TABLE 2: SUMMARY OF DESCRIPTIVE STATISTICS OF PERCEIVED ACCESS BARRIERS

Measure	α	Urban (n = 276)		Rural (n = 178)		Difference ^a			Effect size ^b		
		M	SD	M	SD	t	df	P	g	95% CI	
Personal barriers	0.95	2.84	0.95	3.40	1.20	-5.26	317.49	<.001	-	-0.72	-
									0.53	0.33	
Structural barriers	0.94	3.66	0.76	3.80	0.99	-1.58	309.59	0.12	-	-0.34	-
									0.16	0.02	
Financial barriers	0.94	3.31	0.96	3.75	1.09	-4.35	344.02	<.001	-	-0.62	-
									0.42	0.24	
Perceived triviality	0.85	3.30	0.95	3.38	1.17	-0.73	323.27	0.46	-	-0.26	-
									0.07	0.11	
Accessibility	0.91	3.02	1.19	3.64	1.18	-5.47	382.02	<.001	-	-0.71	-
									0.52	0.33	
Time limitation	0.90	3.75	0.90	3.67	1.11	0.79	324.58	0.43	0.08	-0.10	-
										0.27	

^a Significant difference was assessed using the Welch t-test.

^b Effect sizes were calculated using Hedges' g

INFLUENCE OF HOUSEHOLD CHARACTERISTICS ON OUTPATIENT SERVICES UTILISATION

An increase in household size is associated with increased outpatient visits among urban households ($\beta = 0.22$, $p < .001$). This estimate suggests that for each additional household member, the expected log count of outpatient visits increases by approximately 27%. Additionally, urban household heads who were employed by private companies were 1.7 times more likely to use outpatient services than government employees ($\beta = 0.51$, $p < .023$). Furthermore, unemployed urban household heads were 16 times [exp (2.79)] more likely to use outpatient services than government employees ($\beta = 2.80$, $p < .001$).

The use of outpatient services was affected by the distance between household dwellings and public outpatient facilities. A positive coefficient was observed in urban households, indicating that there was an increase in outpatient visits as the distance increased ($\beta = 0.03$, $p < .007$). In contrast, a negative coefficient was observed in rural households, suggesting that as the distance increased, the likelihood of households visiting outpatient facilities decreased ($\beta = -0.06$, $p < .001$). Urban and rural households with a higher perception of medical needs were more likely to use outpatient services than those who reported lower medical needs (urban: $\beta = 0.48$, $p < .001$; rural: $\beta = 0.12$, $p < .001$). Table 3 summarizes the result of regression analyses.

TABLE 3: RESULTS OF REGRESSION ANALYSES ON THE INFLUENCE OF HOUSEHOLD CHARACTERISTICS ON OUTPATIENT VISITS.

	Urban (n = 279)				Rural (n = 178)			
	Coef.	SE	95% CI	P	Coef.	SE	95% CI	P
Household member	0.22	.04	0.20 – 0.34	<.001	0.12	0.07	-0.02 – 0.25	0.087
Age								
30 - 39	Ref.				Ref.			
40 - 49	0.78	0.80	-0.78 – 2.36	0.325	-			
50 - 59	1.36	0.79	-0.22 – 2.87	0.093	-0.15	0.26	-0.64 – 0.33	0.569
60 – 69	1.48	0.79	-0.07 – 3.03	0.062	-0.08	0.75	-0.41 – 0.56	0.754
≥ 70	1.80	0.87	0.10 – 3.49	0.038	-0.36	0.35	-1.04 – 0.33	0.307
Employment status								
Government employee	Ref.				Ref.			
Private employee.	0.51	0.23	0.07 – 0.96	0.023	-1.73	0.46	-2.63 – -0.83	<.001
Self-employed	1.32	0.27	0.79 – 1.86	<.001	-0.71	0.51	-1.71 – 0.29	0.166
Retired (government)	0.57	0.33	-0.07 – 1.21	0.081	-0.01	0.50	-0.99 – 0.95	0.976
Retired (private)	0.78	0.42	-0.04 – 1.60	0.062	-1.04	0.53	-2.08 – 0.01	0.052
Unemployed	2.80	0.69	1.43 – 4.15	<.001	-55.0	-	-	-
Marital status								
Married	Ref.				Ref.			
Divorced	0.82	0.23	0.37 – 1.26	<.001	-0.24	0.28	-0.78 – 0.30	0.380
Spouse passed	-0.07	0.23	-0.53 – 0.39	0.756	0.14	0.18	-0.20 – 0.49	0.418
Education Level								
Primary	0.38	0.62	-0.84 – 1.59	0.544	0.69	0.44	-0.18 – 1.55	0.120
Lower Secondary	1.39	0.40	0.61 – 2.17	<.001	0.87	0.39	0.10 – 1.63	0.026

	Urban (n = 279)				Rural (n = 178)			
	Coef.	SE	95% CI	P	Coef.	SE	95% CI	P
middle secondary	-0.03	0.23	-0.48 – 0.43	0.905	0.87	0.38	0.12 – 1.62	0.023
Higher Secondary	0.03	0.19	-0.34 – 0.40	0.876	1.38	0.42	0.57 – 2.19	0.001
College/university	Ref.				Ref.			
No formal education	-0.68	0.35	-1.36 – 0.01	0.054	0.17	0.44	-0.70 – 1.04	0.698
Monthly Income								
< RM2,500	-0.02	0.18	-0.49 – 0.44	0.935	0.56	0.46	-0.34 – 1.46	0.224
RM2,500 – RM3,169	-0.91	0.20	-1.31 – 0.51	<.001	0.84	0.47	-0.08 – 1.76	0.074
RM3,170 – RM3,969	-0.89	0.34	-1.55 – 0.23	0.008	1.13	0.36	0.44 – 1.82	0.001
RM3,970 – RM4,849	Ref.				Ref.			
Region of residence								
Northern	-0.14	0.18	-0.49 – 0.20	0.417	-0.54	0.25	-1.03 – 0.05	0.030
Central	Ref.				Ref.			
Southern	-0.37	0.20	-0.75 – 0.02	0.061	-0.69	0.24	-1.16 – 0.22	0.004
East coast	-0.34	0.20	-0.73 – 0.05	0.091	-0.38	0.23	-0.83 – 0.07	0.100
West Malaysia	-0.84	0.29	-1.40 – 0.27	0.004	-0.18	0.27	-0.71 – 0.35	0.510
Distance in km	0.03	0.01	0.01 – 0.07	<.007	-0.06	0.01	-0.08 – 0.04	<.001
Medical needs	0.48	0.08	0.32 – 0.63	<.001	0.52	0.12	0.29 – 0.76	<.001

Abbreviation: SE = standard error; Ref. = reference

PERCEIVED ACCESS BARRIERS TO OUTPATIENT SERVICES.

Financial issues were found to influence outpatient visits negatively among urban households ($\beta = -0.44$, $p < .001$). Statistically, a higher perceived cost was associated with a lower likelihood of household utilisation of outpatient services. The perception of an illness as not severe and not requiring immediate medical attention, as measured by perceived triviality, was also a statistically significant factor influencing outpatient service use among urban ($\beta = -0.25$, $p < .006$) and rural households ($\beta = -0.39$, $p < .001$). The impact of this perception on outpatient use was more substantial among rural households than urban households.

Interestingly, the perception of the unavailability of medical services at the nearest healthcare facilities and the need to travel long distances did not have a negative influence on outpatient use, despite being statistically significant (urban: $\beta = -0.21$, $p < .025$; rural: $\beta = 0.15$, $p < .001$). Nonetheless, time limitations significantly reduced the likelihood of rural households using outpatient services ($\beta = -0.77$, $p < .001$). This perception had the most significant effect on the decision of rural households to use outpatient services compared to other factors, and it was statistically significant among rural households. Table 4 summarises the results of perceived access barriers and their influence on outpatient visits.

TABLE 4: RESULTS OF REGRESSION ANALYSES ON PERCEIVED ACCESS BARRIERS AND OUTPATIENT USE AMONG URBAN AND RURAL HOUSEHOLDS.

	Urban (n = 279)					Rural (n = 178)				
	Coef.	SE	95% CI		P	Coef.	SE	95% CI		P
Personal barriers	-0.09	0.13	-0.34 – 0.14	–	0.002	-0.82	0.17	-1.15 – -0.49	–	<.001
Structural barriers	0.05	0.13	-0.20 – 0.29	–	0.717	1.14	0.24	0.66 – 1.61	–	<.001
Financial	-0.44	0.11	-0.64 – -0.23	–	<.001	-0.07	0.16	-0.39 – 0.25	–	0.665
Perceived triviality	-0.25	0.09	-0.45 – -0.07	–	0.006	-0.39	0.11	-0.60 – -0.18	–	<.001
Accessibility	0.21	0.09	0.02 – 0.39	–	0.025	0.63	0.15	0.33 – 0.93	–	<.001
Time limitation	-0.02	0.09	-0.19 – 0.15	–	0.833	-0.77	0.14	-1.05 – -0.49	–	<.001
Log-likelihood	-421.88					-263.11				
AIC	913.76					592.22				
BIC	1040.47					697.219				
R-squared (Nagelkerke)	0.54					0.69				

Abbreviation: SE = standard error, CI = Confidence Interval, AIC = Akaike Information Criterion, BIC = Bayesian Information Criterion.

Models were adjusted for all study covariates.

DISCUSSION

The findings from regression analyses indicated that outpatient use among urban households was influenced by household size and the employment status of the household head. Perceived medical needs and the distance to the nearest public outpatient facilities also affected outpatient use in both rural and urban households. Financial issues were the most significant perceived access barrier for urban households, while perceived time limitations strongly influenced rural households' decisions to use outpatient services. Additionally, perceiving prompt medical care as less important during sickness negatively impacted outpatient care use across urban and rural households.

Previous studies corroborate the influence of employment status on outpatient visits. [24, 25] While the impact of household size on outpatient visits is less documented, increased demand is plausible since each household member may have distinct medical needs. Marital status and household income did not significantly influence outpatient visits. However, low-income individuals, particularly in remote areas, often hesitate to seek care due to accessibility issues compounded by transportation, financial, and time constraints. [26]

The study also revealed that individuals with low perceived needs for medical care, often marked by beliefs that their condition will improve on its own, tended to avoid healthcare. This aligns with earlier studies linking such perceptions to healthcare avoidance. [27, 28] Time limitations, indirectly evaluated by difficulties in scheduling outpatient visits and frustration with long waiting times, significantly affected patient satisfaction and healthcare utilization. Long waiting times discourage patients from returning to clinics and reduce overall healthcare use. [29]

These findings highlight the challenges faced by urban and rural households in accessing outpatient care in Malaysia. The Ministry of Health (MOH) and the Malaysian government must review policies and identify areas for improvement to meet community healthcare needs. Although the government provides substantial subsidies for outpatient care in public hospitals—general consultations costing RM1 (USD 0.24) and specialist consultations RM5 (USD 1.22), with waivers for certain groups including senior citizens, government employees, pensioners, and physically, mentally, or economically disadvantaged individuals—indirect costs such as transportation, meals, and lost workdays still impose financial burdens. Collaborations between MOH and other ministries could address these issues by subsidizing transportation, medical allowances, or daily allowances for missed workdays.

The MOH must also address long waiting times in outpatient services. Real-time data and analytics can help monitor patient flow, identify bottlenecks, and improve resource allocation. Hospitals can optimize staffing levels, allocate resources effectively, and streamline patient movement. Organizational changes, including demand-oriented scheduling, should be introduced to enhance outpatient care delivery.

Another significant finding was the negative influence of perceived triviality on outpatient visits. Viewing medical care as unnecessary or relying on self-medication can delay proper evaluation and treatment, potentially worsening conditions. This is particularly dangerous for diseases like dengue fever, where initial symptoms resemble those of common colds. To put this into perspective, Malaysia recorded 45,048 dengue cases from December 2019 to May 2023, with some mortalities linked to treatment delays. [30] Therefore, the government must fund public health outreach programs to improve health literacy, promote preventive care, build trust in healthcare services, and dispel misconceptions.

Strengthening primary healthcare services in underserved areas with high poverty rates is critical. This effort includes improving the availability and quality of primary care clinics, community health centers, and healthcare providers. Collaborative efforts among the community, NGOs, and the education system can further enhance healthcare access. Communities can mobilize resources, build trust, and support local healthcare initiatives. NGOs can fill gaps by delivering essential services, funding programs, and advocating for policy reforms. The education system can raise awareness about preventive care and available services, empowering individuals through health education. Together, these entities can reduce barriers, promote equity, and improve the well-being of underserved populations.

This study had limitations. Self-reporting and retrospective data may introduce biases related to memory and reporting issues. It remains unclear whether non-outpatient users refrained from seeking care due to the absence of illness or by choice. Additionally, some non-users may have received outpatient services from private facilities, particularly those with employment-based health plans. Future studies should examine these aspects.

Selection bias, inherent in the study design and convenience sampling method, may have led to underestimating or overestimating outcomes. Although efforts were made to minimize bias by including all studied variables in the statistical model and maintaining a sufficient sample size, the findings should be interpreted cautiously.

The estimates were derived using marginalized zero-inflated negative binomial regression, which effectively models count data with over-dispersion and excess zeros. This method has proven superior to traditional Poisson or negative binomial models. Analyses were conducted based on household location, enabling meaningful comparisons of estimates. The technique also facilitates estimating marginal means and interpreting coefficients as population-average parameters. Future researchers are encouraged to adopt similar methods when analyzing outpatient data.

CONCLUSION

This study underscores significant barriers to outpatient care access for both urban and rural households in Malaysia, primarily influenced by factors such as household size, employment status, perceived medical needs, and logistical challenges. While government subsidies for outpatient services are beneficial, indirect costs and long waiting times remain

substantial impediments. The negative perceptions surrounding medical care, particularly in the context of self-medication and triviality, further complicate the healthcare landscape, risking severe health outcomes for individuals.

To enhance access and utilization of outpatient services, it is crucial for the Ministry of Health to implement targeted policies, such as subsidizing transportation and meal costs and optimizing resource allocation through real-time data monitoring. Strengthening primary healthcare services in underserved areas, alongside collaborative efforts among communities, NGOs, and the education system, will be essential in promoting health literacy and preventive care. These collective actions can help reduce barriers, improve healthcare equity, and ultimately enhance the health outcomes of underserved populations, addressing healthcare access concerns comprehensively. Future research should delve deeper into non-user motivations and the implications of private healthcare usage to provide a more holistic understanding of outpatient care dynamics.

AUTHORSHIP

The manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. The order of authors listed in the manuscript has been approved by all authors.

AUTHOR'S DISCLOSURE STATEMENT

The authors declare that they have no conflicts of interest.

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THE ACCESSIBILITY AND ACCEPTABILITY OF HEALTH SERVICES IN REMOTE RURAL AREAS

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ABSTRACT

Health services depend on community facilities and infrastructure, particularly in rural areas. If facilities and infrastructure are not improved, it is feared that equitable distribution, including accessibility and acceptability of health services, will be difficult. This challenge still exists in underdeveloped villages. The purpose of this study was to analyze the effect of accessibility and acceptability factors on the level of patient satisfaction in underdeveloped villages. A quantitative research type, analytical survey with cross-sectional approach was conducted. Sampling, using the Slovin formula, resulted in 287 respondents. Data were collected using a questionnaire. There was a significant relationship between accessibility ($p=0.001$) and acceptability ($p=0.002$) on the level of patient satisfaction in underdeveloped villages. However, accessibility was the most significant factor influencing patient satisfaction at the multivariate level ($\text{Exp}(B)=3.639$ 95% CI=1.547-6.137, $p=0.019$). Health facilities in rural areas still need to be improved, especially in terms of accessibility, to attract the attention of the community to seek care.

KEYWORDS

acceptability, accessibility, health service, rural areas

INTRODUCTION

According to Law No. 17 of 2023 (Indonesia), the development of public health requires health efforts, health resources and health management to improve the highest level of public health based on the principles of welfare, equity, non-discrimination, participation and sustainability in the context of developing quality and productive human resources, reducing inequality, strengthening quality health services, increasing health resilience, ensuring healthy lives and promoting the welfare of all citizens and the competitiveness of the nation for the achievement of national development goals [1].

Five dimensions of accessibility (i.e., proximity, receptivity, availability of health services, ability to pay, and appropriateness) and five corresponding population capabilities (i.e., ability to understand, ability to seek, ability to reach, ability to pay, ability to engage) [2]. In low-income countries such as Benin, most people have poor access to health services [3]. Access to health care aims to bring people closer to the facilities, treatments and expertise they need, when

they need them. The long distance and time required to reach health facilities is a problem that contributes to delays and inequities in the delivery of promotive, preventive, curative and rehabilitative services at an affordable cost [4]. The geography of Indonesia, which has different regions with different characteristics, poses challenges for any health service delivery. One of these is the problem of rapid access to treatment, which is hampered by poor road access and long travel times to reach health services. This geography is the main obstacle in the health sector, which is still limited access or affordability [5].

Villages are considered underdeveloped, with limited access to development, infrastructure, education, social, economic and cultural resources [6]. Health inequalities among rural and remote populations are a global problem that affects developing countries [7]. Remote rural areas face severe demographic and socioeconomic challenges due to their distance from cities, which can limit opportunities for social and economic interaction [8]. Rural populations are more vulnerable to health problems [9]. Rural areas are often defined using classifications based on topography, access or distance to urban facilities, and even population density [10].

Data from the Village Development Index Year 2023 showed that Ongulara Village is categorized as an underdeveloped village out of 19 villages in South Banawa Subdistrict, Donggala Regency, Indonesia. The people are rural communities who still maintain strong customs and belong to the Kaili Da'a ethnic group, which is one of the Kaili sub-tribes in Central Sulawesi. Thus, almost all the people in Ongulara village use the Kaili Da'a regional language and do not understand or speak Indonesian [11].

Ethnicity and faith are among the factors associated with the use of health services in rural communities. Most indigenous people do not always trust health workers for fear of mistreatment and embarrassment. They often refuse to seek health services because of the shame and stigma associated with disclosing their health problems [12]. Beliefs about the culture and traditions of traditional medicine that exist in the community can reduce people's interest in seeking health services [13]. In addition, belief in the supernatural powers of healers or shamans occupies almost every structure in society, not only as a profession associated with someone believed to have medical skills, but also as a figure who influences the community [14]. In traditional medicine, which aims to provide healing, both physical and mystical, most of which are not known to be the cause of the pain experienced [15].

Health problems are more prevalent in rural areas, where access to basic health services such as immunization, prenatal care, and emergency care is limited. The lack of community trust, which makes it difficult to receive medical care in remote areas, contributes to the overall deterioration and increased health risks [16]. The purpose of this study was to analyze the effect of accessibility and acceptability factors on the level of patient satisfaction in underdeveloped villages.

METHODS

STUDY DESIGN

The method used in this study was an analytical survey with a cross-sectional approach.

SETTING

Ongulara Village, South Banawa Sub-district is an area categorized as underdeveloped and remote villages in Donggala Regency, Central Sulawesi Province, with the boundaries of Ongulara Village, namely bordering Pinembani Sub-district to the north, Banawa Tengah Sub-district to the south, Sigi Regency to the east, and Sigi Regency to the west. The area of Ongulara Village is $\pm 48.6 \text{ km}^2$ and the distance from Ongulara Village to the sub-district capital is between Malino Village and Ongulara Village using bamboo rafts. The village is divided into 4 hamlets, Dusun 1 Ongulara, Dusun 2 Tindungu where, Dusun 3 Pompa, and Dusun 4 Bambawakona.

POPULATION AND SAMPLING

The population in this study is the total population of Ongulara village, Donggala regency, which was 1,025 people. Based on the calculation using the Slovin formula as follows:

$$n = \frac{N}{1 + N(e)^2}$$

n = number of samples

N = number of population

e = estimated error (e=0.05; according to 95% CI)

The calculated number of respondents was therefore 287 people. The sampling technique used in this study was simple random sampling.

INSTRUMENTS AND PROCEDURES

Data were collected using a self-administered questionnaire with a 100% response rate. Variables included accessibility and acceptability. Accessibility is defined as how easily people can reach health facilities (7 items, $\alpha=0.725$, e.g., *Is the health center's location strategic?*). Acceptability is defined as the extent to which the community can trust medical health services over traditional health services such as traditional healers (7 items, $\alpha=0.778$, e.g., *People trust medical services*). Patient satisfaction is measure of how successfully health facilities and professionals meet the needs and expectations of their patients (7 items, $\alpha=0.766$, e.g., *Patients are satisfied with the access to or affordability of health care services*). The reliability of each variable of the questionnaire was tested using Cronbach's alpha test. Scoring was based on a Likert scale (strongly disagree=1 – strongly agree=5). All variables were grouped into binary categories: Accessibility and Acceptability (i.e. low and high) and Patient Satisfaction (i.e. not satisfied and satisfied) based on mean scores. Participants signed a written informed consent form before participating in the study. Participants were not coerced if they wished to withdraw during the study. There was no compensation given to the participants.

DATA ANALYSIS

The data obtained were analyzed by univariate, bivariate and multivariate analysis. Univariate analysis was performed to obtain a descriptive description of respondent characteristics. Bivariate analysis was performed to analyze the association between the independent variables, including accessibility and acceptability, with patient satisfaction with health services using the chi-squared test. In addition, multivariate analysis was performed using logistic regression to identify the variables that have the most significant impact on patient satisfaction. Hosmer & Lemeshow and Nagelkerke R-squared tests were used to test the fit and power of the model. All analyses were performed using IBM SPSS Version 22 with a 95% confidence level or 5% margin of error.

ETHICS APPROVAL STATEMENT

This study was conducted with the recommendation and approval of the Research Ethics Committee of the Faculty of Public Health, Hasanuddin University, Makassar with the number 1286/UN4.14.1/TP.01.02/2024.

RESULTS

Table 1 shows that the gender of the respondents in this study was predominantly female with 188 respondents (65.5%). Based on age group, it is dominated by the age group of 17-25 years (33.8%) with 156 respondents (54.4%) not attending school. Based on occupation, most of them were planters as many as 202 respondents (70.4%). Most of the respondents were not satisfied with the health services (81.9%). Accessibility and acceptability were also rated low by the respondents (81.9% and 82.9% respectively).

TABLE 1. RESPONDENT CHARACTERISTICS

Characteristics	n	%
Gender		
Male	99	34.5
Female	188	65.5
Age		
17 – 25 Years	97	33.8
26 – 35 Years	94	32.8

36 – 45 Years	65	22.6
46 – 55 Years	13	4.5
56 – 65 Years	18	6.3
Last Education		
None	156	54.4
Elementary	100	34.8
Junior High School	25	8.7
Senior High School	6	2.1
Occupation		
Planters	202	70.4
Laborer	59	20.6
Self-employed	26	9.0
Patient Satisfaction		
Low	235	81.9
High	52	18.2
Accessibility		
Low	235	81.9
High	52	18.1
Acceptability		
Low	238	82.9
High	49	17.1

Respondents who answered low service access were more dissatisfied (85.5%) than those who were satisfied (14.5%). Meanwhile, more respondents who answered high service access were dissatisfied (65.4%) compared to those who were satisfied (34.6%). In addition, more respondents who answered low service acceptability were dissatisfied (85.3%) compared to those who were satisfied (14.7%). Meanwhile, more respondents who answered high acceptance ability felt dissatisfied (65.3%) compared to those who felt satisfied (34.7%). The results of chi-squared analysis showed that there was a significant relationship between accessibility ($p=0.001$) and acceptability ($p=0.002$) with patient satisfaction with health services (Table 2).

TABLE 2. BIVARIATE ANALYSIS BETWEEN ACCESSIBILITY AND ACCEPTABILITY ON PATIENT SATISFACTION

Variables	Patient Satisfaction				Total		p value
	Not Satisfied		Satisfied				
	n	%	n	%	n	%	
Accessibility							
Low	201	85.5	34	14.5	235	100	0.001
High	34	65.4	18	34.6	52	100	
Acceptability							
Low	203	85.3	35	14.7	238	100	0.002
High	32	65.3	17	34.7	49	100	

Table 3 shows that Hosmer and Lameshow test shows the p-value was not significant ($p=0.301$), which means the model was fit. The test of two variables at the multivariate level showed that only accessibility ($\text{Exp}(B)=3.639$ 95% CI=1.547-6.137, $p=0.019$) had a significant impact on patient satisfaction.

TABLE 3. MULTIVARIATE ANALYSIS BETWEEN ACCESSIBILITY AND ACCEPTABILITY ON PATIENT SATISFACTION

Variables	Hosmer & Lemeshow Test	Sig.	Exp (B)	95% CI	Nagelkerke R Square	Overall Percentage (%)
Accessibility	0.301	0.019	3.639	1.590-6.160	0.149	82.9
Acceptability		0.269	2.139	0.547-5.137		

DISCUSSION

Remote areas have high rates of injury and mortality compared to people living in urban areas. The geographic, economic, and social barriers faced by rural communities limit their access to appropriate medical care, which adversely affects their health outcomes [17]. Therefore, there is a need to improve access to and quality of primary health care [18]. Spatial accessibility can be defined as a measure of the ease with which a population can reach a service provider within a defined area. Rural populations in particular are vulnerable to limited access to primary health care due to challenges such as poor road infrastructure, long distances to primary health care providers, and inadequate availability of primary health care services [19]. Access to quality health care is a fundamental right of every individual, regardless of geographic location or socioeconomic status. Rural areas still face significant barriers to accessing quality health services [20]. People living in rural and remote areas often have to travel long distances to access health services [21]. While access to quality health services is a fundamental responsibility of public health systems worldwide, many health services in these areas face barriers to access and use [22].

Geographic and financial inaccessibility, inadequate funding, inconsistent drug supply, and shortages of equipment and personnel have severely limited the reach, availability, and impact of health services in many countries [23]. Access is an important concept in health policy and health service delivery. Access is an important part of health in terms of the right of individuals to receive health services when they need them [24,25]. Physical accessibility shows the relationship between the location of health services and the population seeking access, taking into account transport infrastructure, travel time, distance and cost [26].

Based on the results (Table 2), 85.5% of the respondents who were dissatisfied had experienced low accessibility to health care, and 65.4% who had experienced high accessibility to health care were still dissatisfied. This may be because the location and distance from the village to the public health center (*Puskesmas*) is quite far, as well as the inadequate road access, especially when using transportation. In addition, some people living along the river feel that they have easier access to health services and that the *puskesmas* has easier access to the community. However, the dissatisfaction is still higher in this community.

Public health in disadvantaged areas remains a public concern. This is related to the lack of community acceptability of existing health services [27]. Rural communities prefer to use non-medical treatment (*dukun*). Non-medical treatment (*dukun*) does not require a lot of materials, but depends on the severity of the patient's illness. The treatment itself usually only requires water to be applied or sprayed on the patient's diseased body parts, and the water can also be drunk until the patient's disease is completely cured. Although medical illnesses can be cured by medical treatment, people still use shamanic treatment because they believe that shamanic treatment is very effective [28].

Socio-cultural factors such as beliefs, myths, and local practices can influence health services such as immunization programs and parents' decisions to vaccinate their children. Most people have fears and concerns about the side effects of immunization or lack knowledge about its benefits [29]. One of the ancestral or cultural practices that still exist among ethnic groups in Indonesia is traditional medicine, which is not like medical treatment, but rather treatment that is used as an alternative or outside of medical action. Some people believe that if someone is sick, such as experiencing diarrhea or toothache, they will go to a shaman to be treated by bringing water as a medium of treatment [30].

Traditional medicine believes that various illnesses can be cured if the process is carried out in accordance with all the medical instructions, it is also believed that there is value in each process carried out and it is believed that health will improve and the illness will be removed [29]. A particular peculiarity in the search for treatment in remote indigenous communities is that they still have customary beliefs in curing illnesses with spells (*jampi-jampi*) and use objects that are considered capable of self-protection [30].

CONCLUSIONS

This study concludes that there was a significant relationship between accessibility and acceptability on patient satisfaction in underdeveloped villages. However, accessibility was the most significant factor influencing patient satisfaction at the multivariate level. As recommendation, for the *Puskesmas* to pay more attention to the people who live in the village, especially those villages that are categorized as underdeveloped villages. Thus, health facilities in rural areas still need to be improved, especially in terms of accessibility, to attract the attention of the community to seek care.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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COMMUNITY PARTICIPATION IN PROGRAMME PLANNING FOR UNIVERSAL HEALTH COVERAGE IN INDIA: AN EXPLORATORY STUDY

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ABSTRACT

Health can never be adequately protected by health services without the active understanding and involvement of communities whose health is at stake. For attaining Universal Health Coverage, community participation is important, as their active role helps in sustained efforts, collaboration, and a commitment to addressing the underlying social determinants of health, leading to equity in healthcare. Traditional Indian society is cut across by rigid religion and caste lines, and the appropriate role for each caste group has been a serious obstacle in securing complete community participation.

This study employed a quantitative exploratory survey design aimed at understanding public health professionals' perceptions of community participation in healthcare planning. The questionnaire's development included expert consultation and a pilot test to ensure validity and reliability, while the implications of the low response rate on the study's findings was also reported transparently.

This study reflects the opinion on the importance of community participation in healthcare policy and program decisions, identifies the different barriers faced during such vital participation, and recommends measures to enhance community participation for a more equitable healthcare system in the local area.

KEYWORDS

Demedicalize, Community participation, Universal Health Coverage, Support network

INTRODUCTION

Health can never be adequately protected by health services without the active understanding and involvement of communities whose health is at stake. Until quite recently, throughout the world, people were neglected as a health resource; they were merely looked upon as sources of pathology or victims of pathology and consequently as a "target" for preventive and therapeutic services. This negative view of people's role in health has changed because of the realization that there are many things that the individual cannot do for himself except through a united community effort. Individual and community responsibilities are complementary, not antithetical. The current trend is to "demedicalize" health and involve communities in a meaningful way. This implies a more active involvement of families and communities

in health matters, viz., planning, implementation, utilization, operation, and evaluation of health services [4]. In other words, the emphasis has shifted from health care for the people to health care by the people.

The World Health Organization (WHO) has been instrumental in promoting this approach, proposing three core dimensions of universal health coverage: the proportion of a population covered by existing healthcare systems, the range of healthcare services available to a population, and the extent of financial risk protection available to local populations [5, 13].

Community participation came to the fore with the 1978 Alma Ata declaration, which framed the community as central to the planning, organizing, operation, and control of primary health care [7]. However, community involvement is not easy to obtain, as extensive experience has indicated. Traditional Indian society is cut across by rigid religion and caste lines, and the appropriate role for each caste group has been a serious obstacle in securing complete community participation.

Recent developments to enhance community participation include the integration of digital health technologies, the rise of community health worker programs, and an increased focus on social determinants of health in healthcare planning. Despite these advancements, gaps remain in our understanding of how to effectively implement and sustain community participation across diverse contexts.

This study aims to address this knowledge gap by exploring the perspectives of public healthcare professionals and policymakers on the importance of community participation in effective healthcare program planning to achieve Universal Health Coverage. Specifically, we seek to answer the following research questions:

- How do public healthcare professionals and policymakers perceive the importance of community participation in healthcare planning?
- What are the perceived barriers and facilitators to effective community participation?
- How can community participation strategies be further optimized to support the achievement of Universal Health Coverage?

This study is significant as it contributes to the evolving body of knowledge on community-based healthcare approaches. Practical implementation of policy is equally important as policy intentions, and this study can further bridge this gap and identify more potential strategies for effective community engagement in healthcare decision-making, leading to improved health outcomes, more equitable access to healthcare, and progress towards achieving Universal Health Coverage.

The insights gained from this study will be valuable to a range of stakeholders, including policymakers, healthcare administrators, community health workers, and public health researchers. Ultimately, by enhancing understanding of effective community participation, this research study intends to contribute to the development of more responsive, efficient, and equitable healthcare systems that truly meet the needs of diverse communities.

OBJECTIVES OF THE STUDY

1. To study the perception of healthcare professionals about community participation in program planning for Universal Health Coverage in the Delhi NCR region.
2. To identify barriers and facilitators to community participation in program planning for Universal Health Coverage.

RESEARCH METHODOLOGY

STUDY DESIGN:

This study employs a quantitative approach using an exploratory survey design. This design is appropriate for our research questions as it allows us to gather insights from a broad range of public health professionals on their perceptions of community participation in healthcare planning. The exploratory nature of the study is suitable given the complex and context-dependent nature of community participation in healthcare.

DATA COLLECTION METHOD:

Data were collected through a self-designed survey questionnaire comprising 20 items. The questionnaire was distributed in 2023 via Google Forms to public health professionals in two WhatsApp groups dedicated to public health professionals. A 5-point Likert scale was used for response options, allowing for a nuanced measurement of attitudes and perceptions.

INSTRUMENT DEVELOPMENT:

The questionnaire was developed based on a comprehensive literature review and expert consultation (Table 1). To ensure content validity, the instrument was reviewed by a panel of experts in public health and community engagement. A pilot test was conducted with a small sample ($n=10$) to assess clarity and reliability, with Cronbach's alpha calculated to ensure internal consistency.

SAMPLING UNIT:

Public Health professionals were the respondents for this study.

SAMPLING METHOD:

While initially planned as a census of all 415 group members, the actual responses resulted in a convenience sample of 52 public health professionals.

SAMPLE SIZE (FORMULA):

- The sample size was calculated based on Cochran (1963, p. 75) [14].
- Calculated for an infinite population: $n_0 = Z^2 \times P(1 - P) / e^2$
- Z = the critical value taken for the desired confidence level of 95%, which is 1.96
- e = the margin of error, which is 5% = 0.05.
- P = Maximum probability of variation in population distribution, that is, 50% = 0.5
- Now, putting all these values in the formula, we get the value of $n_0 = 384$.
- As the study was conducted in two groups of health professionals with a total of 415 (N) members, the values were adjusted against the known population of 415 and put in the given formula.
- $n = n_0 \times N / n_0 + (N - 1)$ Sample size was calculated as to equal 200 and a questionnaire was distributed, but only 52 responses were received and analysed.

TRANSPARENT REPORTING:

In our results and discussion sections, we clearly communicate the limitations due to the low response rate and discuss how this may affect the interpretation and generalizability of our findings.

SAMPLING PROCEDURE

A convenience sampling method was adopted.

TABLE 1: SURVEY QUESTIONNAIRE-COMMUNITY PARTICIPATION IN POLICIES RELATED TO HEALTHCARE PROGRAMME DECISIONS -RESPONSE FORM

S.No.	Questions	SD(1)	D (2)	I(3)	A (4)	SA (5)
1	Do you think healthcare facilities affect the community more than individuals?					
2	Do you agree that the community can play a vital role in raising healthcare awareness?					
3	Do you agree that the local community understands their healthcare needs better?					
4	Does the community understand the accessibility of healthcare services in their local area?					
5	Do you agree that the community can affect the acceptance of healthcare facilities by individuals in the local area?					
6	Do you think the local community plays a vital role in the pricing of healthcare services in their local area?					
7	Do you agree that the community can affect the adaptability of healthcare facilities for individuals in the local area?					
8	Do you think community participation ensures equity in healthcare delivery in the local area?					
9	Do you consider that community participation can help in useful data collection from the local area regarding healthcare services?					
10	Do you think the community can help in identifying efficient human resources for healthcare services?					
11	Do you agree that the community can help in identifying the financial resources for healthcare if needed?					
12	Does the community have the ability to help in controlling the environmental factors determining healthcare services?					
13	Do you think literacy can increase community participation in healthcare service planning?					
14	Do you think socio-cultural factors can affect community participation in healthcare service planning?					
15	Do you agree that community participation will help in customizing the healthcare policy in their local area?					
16	Do you agree that community feedback about healthcare services helps the healthcare delivery system?					
17	Do you agree that community participation helps to build a better relationship between the community and healthcare providers?					

18	Do you think community participation can play a vital role in reducing Out of Pocket Expenditure in healthcare?					
19	Do you think the community has better knowledge of its surroundings to adapt to any change effectively?					
20	Do you think the government should promote community participation in healthcare policy-making?					

SD-Strongly Disagree, D-Disagree, I-Indifferent, A-Agree, SA-Strongly Agree

DATA ANALYSIS

Quantitative Analysis: Descriptive statistics, such as frequencies and percentages, were used to analyze quantitative data. Data analysis was done by IBM SPSS Statistics V29.0 for the normality of the data, and descriptive statistics were used for analysis.

RESEARCH ETHICS:

Data used in the study was collected through a Google Form on an individual basis where independent respondent's identities were kept confidential. The study rests on the principles of confidentiality and informed consent. Further it is also confirmed that the selected study topic is general in nature and did not involve vulnerable populations which could lead any harm to an individual included in the study. The concerned university's policy did not require any ethical clearance in this regard.

FINDINGS AND DISCUSSION

Perceptions were received in qualitative form and converted into quantitative form for data analysis. Researchers assessed the reliability of the Likert scale to ensure that the measured construct is consistent and accurately reflects the underlying concept. The most commonly used measure of reliability is Cronbach's alpha, which has a value of 0.804 and is higher than an acceptable 0.7, suggesting the internal consistency of the scale used in this study is good to excellent. This range suggests a high level of reliability, indicating that the items are highly correlated with each other and consistently measure the same construct.

Table 2 suggests that most of the responses were in the categories of Strong Agree and Agree for all items. Questions with higher D or I responses (e.g., Q9, Q11, Q17) may indicate aspects where improvements in community participation are needed.

The mean, median, and mode of every item suggest great acceptability of the statement about the importance of community participation in healthcare program/policy decision-making (Figure 1).

TABLE 2: SUMMARY OF THE RESPONSES OBTAINED IN SURVEY QUESTIONNAIRE

Res	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8	Q 9	Q1 0	Q1 1	Q1 2	Q1 3	Q1 4	Q1 5	Q1 6	Q1 7	Q1 8	Q1 9	Q2 0
SA	24	37	11	13	12	15	11	8	18	7	4	12	27	20	13	21	17	6	11	28
A	22	15	27	24	39	22	37	27	32	32	28	33	24	31	36	30	35	24	27	24
I	1	0	7	8	0	7	2	7	1	5	12	4	0	1	1	0	0	11	6	0
D	3	0	6	7	1	7	2	9	1	8	8	3	1	0	2	1	0	11	7	0
SD	2	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Total	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52

FIGURE1. DESCRIPTIVE STATISTICS INDIVIDUAL ITEM-WISE

Descriptives	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
N	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Mean	4.21	4.71	3.79	3.83	4.19	3.83	4.1	3.62	4.29	3.73	3.54	4.04	4.48	4.37	4.15	4.37	4.33	3.48	3.77	4.54
Median	4	5	4	4	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	5
Mode	5	5	4	4	4	4	4	4	4	4	4	4	5	4	4	4	4	4	4	5
Standard deviation	1.02	0.457	0.977	0.964	0.525	1.06	0.634	1.01	0.605	0.888	0.851	0.74	0.61	0.525	0.638	0.6	0.474	0.96	1	0.503
Minimum	1	4	1	2	2	1	2	1	2	2	2	2	2	3	2	2	4	2	1	4
Maximum	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Skewness	-1.73	-0.96	-0.87	-0.59	-0.632	-0.766	-1.04	-0.681	-0.774	-0.829	-0.52	-0.968	-1.27	0.149	-1.08	-0.9	0.76	-0.29	-0.85	-0.159
Std error skewness	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Kurtosis	2.94	-1.12	0.406	-0.47	5	-0.168	3.47	-0.269	2.58	0.0601	-0.44	1.72	3.36	-1.07	3.66	3.02	-1.48	-0.92	0.2	-2.06
Std error kurtosis	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Shapiro-Wilk W	0.709	0.568	0.836	0.842	0.592	0.849	0.682	0.841	0.7	0.771	0.823	0.757	0.67	0.684	0.673	0.67	0.592	0.849	0.83	0.635
Shapiro-Wilk p	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001

The Mean, Median, and Mode of every item suggest great acceptability of the statement about the importance of community participation in healthcare program/policy decision-making.

TABLE 3: PERCEPTION DECISION FOR SURVEY RESPONSES OF INDIVIDUAL ITEMS OF SURVEY

S.No.	Item	SA(%)	A(%)	I(%)	D (%)	SD (%)	Mean	SD	Decision
1	Do you think healthcare facilities affect the community more than individuals?	46	42	2	6	4	4.21	1.02	High Perception
2	Do you agree that the community can play a vital role in raising healthcare awareness?	71	29	0	0	0	4.71	0.46	High Perception
3	Do you agree that the local community understands their healthcare needs better?	21	52	13	12	2	3.79	0.98	Low Perception
4	Does the community understand the accessibility of healthcare services in their local area?	25	47	15	13	0	3.83	0.96	Low Perception
5	Do you agree that the community can affect the acceptance of healthcare facilities by individuals in the local area?	23	75	0	2	0	4.19	0.53	High Perception

6	Do you think the local community plays a vital role in the pricing of healthcare services in their local area?	29	42	13	14	2	3.83	1.06	Low Perception
7	Do you agree that the community can affect the adaptability of healthcare facilities for individuals in the local area?	21	71	4	4	0	4.1	0.63	High Perception
8	Do you think community participation ensures equity in healthcare delivery in the local area?	15	52	14	17	2	3.62	1.01	Low Perception
9	Do you consider that community participation can help in useful data collection from the local area regarding healthcare services?	35	62	1	2	0	4.29	0.61	High Perception
10	Do you think the community can help in identifying efficient human resources for healthcare services?	13	62	10	15	0	3.73	0.89	Low Perception
11	Do you agree that the community can help in identifying the financial resources for healthcare if needed?	8	54	23	15	0	3.54	0.85	Low Perception
12	Does the community have the ability to help in controlling the environmental factors determining healthcare services?	23	63	8	6	0	4.04	0.74	Low Perception
13	Do you think literacy can increase community participation in healthcare service planning?	52	46	0	2	0	4.48	0.61	High Perception
14	Do you think socio-cultural factors can affect community participation in healthcare service planning?	38	60	2	0	0	4.37	0.53	High Perception

15	Do you agree that community participation will help in customizing the healthcare policy in their local area?	25	69	2	4	0	4.15	0.64	High Perception
16	Do you agree that community feedback about healthcare services helps the healthcare delivery system?	40	58	0	2	0	4.37	0.60	High Perception
17	Do you agree that community participation helps to build a better relationship between the community and healthcare providers?	33	67	0	0	0	4.33	0.47	High Perception
18	Do you think community participation can play a vital role in reducing Out of Pocket Expenditure in healthcare?	12	46	21	21	0	3.48	0.96	Low Perception
19	Do you think the community has better knowledge of its surroundings to adapt to any change effectively?	21	52	12	13	2	3.77	1.00	Low Perception
20	Do you think the government should promote community participation in healthcare policy-making?	54	46	0	0	0	4.54	0.50	High Perception

Note: N = 50, SA = Strongly Agree; A = Agree; I = Indifferent; D = Disagree; SD = Strongly Disagree.

In this study, the decision was made using the perceptions of the respondents, and for that, the weighted average value was considered. The weighted average value is calculated by summing up the mean values for the items divided by the total number of items.

- So, the weighted average in this study is $81.37/20 = 4.06$.
- The item that scores >4.06 is considered a high perception response, and the remaining are low perception responses.
- By analyzing the percentages calculated and mentioned in Table 3, it is inferred that most of the participants agree with the questions asked and have been identified as having a high perception for items numbers 1,2,5,7,9,13,14,15,16,17,20 2, 5, 7, 9, 13, 14, 15, 16, 17, and 20. A few participants also strongly disagreed with items numbers 3, 4, 6, 8, 10, 11, 12, 18, and 19 and were identified as having a low perception

High overall perception:

Most items show a positive perception of community participation in healthcare planning, with 11 out of 20 items categorized as "high perception."

Strongest agreement:

- Item 2: The community's vital role in healthcare awareness (100% SA/A)
- Item 20: Government promotion of community participation (100% SA/A)
- Item 17: Improved relationship between community and healthcare providers (100% SA/A)

Areas of high perception:

- Healthcare facility's community impact (Item 1)
- The community's influence on healthcare acceptance (Item 5)
- The community's role in data collection (Item 9)
- Literacy's impact on participation (Item 13)
- Socio-cultural factors' influence (Item 14)
- Customizing healthcare policy (Item 15)
- Community feedback's importance (Item 16)

Areas of lower perception:

- Understanding local healthcare needs (Item 3)
- Accessibility of healthcare services (Item 4)
- The community's role in healthcare pricing (Item 6)
- Ensuring equity in healthcare delivery (Item 8)
- Identifying efficient human resources (Item 10)
- Identifying financial resources (Item 11)

Mixed opinions:

Controlling environmental factors (Item 12): high agreement but categorized as "low perception".

Reducing out-of-pocket expenditure (Item 18): Divided opinions

A study shows that community participation in healthcare policy-making decisions is essential to making healthcare equitable for achieving Universal Health Coverage in the following manner:

Population Coverage:

- Community involvement helps cover more people with healthcare.
- It is especially good for reaching underserved groups.
- The high score (4.21) shows people think this is important.

Healthcare Services:

- Communities know their special health needs.
- Their input helps create services that fit local needs.
- The good score (4.12) suggests people agree that this is helpful.

Financial Protection:

- Out-of-pocket costs are a big worry.
- Community input can help make healthcare more affordable.
- The lower score (3.84) shows these needs more work.

Health Awareness:

- Communities are great at spreading health information.

- They can influence others to be healthier.
- Local knowledge helps make health messages more effective.
- Community groups can organize health events and support.

Policy Making:

- Community voices help make better health policies.
- It ensures policies match real needs and local situations.
- This approach builds trust and helps policies work better.

TABLE 4: LIST OF ITEMS REPRESENTING THE THREE COMPONENTS OF UHC WITH M

S.No.	Universal Health Coverage (UHC) Component	Question no represents the component	Mean Score
1	Population covered by existing healthcare systems	Q1, Q2, Q7, Q8, Q10, Q13, Q17, Q20	4.21
2	Range of healthcare services available to a population	Q3, Q4, Q5, Q9, Q12, Q14, Q15, Q16, Q19, Q20	4.12
3	The Extent of financial risk protection	Q6, Q11, Q18, Q20	3.84

Table 4 suggests that:

1. **Population Coverage:** It is represented by Q1, Q2, Q7, Q8, Q10, Q13, Q17, Q20 (Table No. 4) of used scale have a mean score of **4.21**, this component indicates strong performance in ensuring that a substantial portion of the population is covered by existing healthcare systems.
2. **Range of Healthcare Services:** It is represented by Q3, Q4, Q5, Q9, Q12, Q14, Q15, Q16, Q19, Q20 (Table No. 4) of used scale, have a mean score of **4.12** reflects a broad availability of healthcare services, demographics which is essential for comprehensive care and aligns with UHC goals.
3. **Financial Risk Protection:** It is represented by Q6, Q11, Q18, Q20 (Table No. 4), have a mean score of **3.84** for this component points to challenges in safeguarding individuals from financial hardships associated with healthcare costs. This underscores the need for further improvements to ensure that financial barriers do not prevent access to necessary health services.

Community participation plays a crucial role in the success of universal health coverage (UHC) programs in India. It ensures equitable access, quality, and affordability of health services [1]. However, there are challenges in operationalizing community participation and ensuring its effectiveness and equity [8]. Limited public awareness about health insurance and the importance of participation hinders the success of UHC [3]. Inadequate coordination among community members and health centres, the absence of proper guidelines, and a lack of resources also contribute to the limited success of community participation in health development [11]. To address these challenges, it is important to strengthen user associations and enhance public awareness about their role in decision-making processes [2]. Additionally, improving coordination, providing proper guidelines, and allocating resources for community participation can enhance the success of UHC programs in India.

Sustainability is very important in healthcare, and it needs knowledge of community resources, networks, and various initiatives taken at ground level. Integration of all this information in policymaking will help in leveraging local assets for better healthcare outcomes.

Various barriers exist to impede community participation in healthcare policy decisions due to a lack and asymmetry of information. Differences in language and culture create a communication gap. Socioeconomic factors, such as the struggle for basic needs, put the knowledge of local healthcare needs backward. Stigma about various health issues like mental health and substance abuse leads to underreporting of such cases, resulting in a paucity of information about such cases. This will further dent to efficient health care programs and policy decisions. Lack of resources and infrastructure may create impediments in identifying the various opportunities to address the specific healthcare challenges. Limited access to data, expertise, and financial information makes the local community unable to understand the pricing of various healthcare services.

LIMITATIONS OF THE STUDY

1. Limited Sample Size: The low response rate resulted in a smaller sample than initially planned, which may limit the generalizability of findings.
2. Potential for Selection Bias: The use of WhatsApp groups as the sampling frame may have led to a non-representative sample of public health professionals.

RECOMMENDATIONS

1. Community representation and consultation can be increased through town hall meetings, focus group discussions, and surveys that include individuals from different backgrounds, cultures, and ethnic communities.
2. To promote community participation in healthcare policymaking, governments can establish mechanisms such as public consultations, community forums, advisory committees, and partnerships with community organizations. They should actively seek input from a diverse range of stakeholders, including patients, healthcare professionals, community leaders, and advocacy groups.
3. Healthcare-related literacy within the community may be facilitated by increasing accessibility to information about healthcare policies, programs, and decision-making processes, making terminology understandable.
4. Leveraging digital technology and various social platforms for virtual participation in various healthcare policy decisions can enable the community to provide for their healthcare needs more effectively. Establishing a feedback mechanism for community views and opinions can play a vital role in healthcare policy decisions.

Ultimately, involving the community in healthcare policy-making fosters collaboration, inclusivity, and accountability, leading to policies that are better aligned with the needs and aspirations of the population.

CONCLUSION

In conclusion, the community plays a vital role in raising healthcare awareness by disseminating information, influencing social norms, tailoring interventions to diverse populations, providing support networks, and advocating for positive change. By harnessing the power of community engagement, we can improve health outcomes and promote a culture of wellness by the following means:

- Enhanced stakeholder engagement
- Addressing health inequities
- Capacity Building and Training
- Technology Integration
- Improved service delivery, etc.

DECLARATION OF CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

FUTURE RESEARCH AREAS

Further research can explore the effectiveness of various community participation models, the impact of digital technology, and intersectionality (gender, ethnicity, socioeconomic factors, etc.) on community participation.

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IS “E-HEALTH LITERACY” RELATED TO “CORONAVIRUS-RELATED HEALTH LITERACY”: FACILITATING DISSEMINATION OF HEALTH INFORMATION THROUGH SOCIAL MEDIA IN THE POST-COVID-19 ERA

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ABSTRACT

To use electronic health information resources correctly and effectively, a set of skills and capabilities called "electronic health literacy" is needed. . This study aims to assess the E-health literacy of patients with COVID-19 in a university-affiliated education hospital and its relationship with coronavirus-related health. Using convenience sampling, 190 patients were selected, filling out the eHEALS (eHealth literacy scale) questionnaire with their consent.

The mean level of E-health literacy was 27.74 (out of 40) indicating a medium level of E-health literacy. The participants reported the most difficulty using Internet information for health-related decisions and distinguishing quality and reliable health information sources from low-quality sources. There is a significant relationship between the E-health literacy level and the age, education, and income variables, but nothing was observed with the gender variable. E-health literacy was significantly related to coronavirus-related health literacy.

In the post-corona era, considering the comprehensive impact of electronic health literacy and disease-related health literacy on the process of control and prevention, it is suggested that health policymakers internationally first get information about the state of health literacy in both dimensions, electronic and disease-related. Also, it is expected of policymakers to find tested solutions to upgrade the level of E-health literacy and coronavirus-related health literacy.

KEYWORDS

E-health literacy, COVID-19, corona, social media, coronavirus-related health literacy, coronavirus

INTRODUCTION

Reliable information is a first necessity for people in a sickness crisis when they have to make accurate decisions. Advances in digital technology have greatly enhanced the accessibility and effectiveness of online resources for disease prevention and control. The widespread use of the Internet and mobile devices now allows people to quickly and easily access health information at any time and from any location, making the internet a vital source for health education and public health guidance. This rapid, on-demand access to reliable information plays a significant role in promoting healthier behaviors and improving overall public health outcomes. Social media shapes health literacy outcomes by increasing access to health information, enhancing digital literacy skills, boosting self-efficacy for health behaviors, and empowering users through shared experiences. However, maximizing these benefits requires addressing challenges related to misinformation and the ethical use of digital platforms [1]. Misinformation spreads rapidly in the digital era, often through social media and online platforms. This proliferation can manipulate public opinion, erode trust in institutions, and even contribute to public health crises so individuals require a specific set of skills to locate and assess accurate information online effectively. E-health literacy refers to the ability to seek, find, understand, and evaluate health information from electronic sources and then use that knowledge to address or solve health-related problems [2–4].

Overall, health literacy comprises a set of six basic competencies: Traditional literacy, health literacy, information literacy, practical literacy, media literacy and computer literacy. [5] Also, having data literacy is essential to effectively read and comprehend the necessary information. [6]. What is the meaning of data literacy? According to [7], "Some people can work nimbly with this data: gathering, analyzing, and finding stories in it with ease. Others don't have the awareness, knowledge, skills, or access to resources needed to do so. Data literacy generally refers to this ability to acquire, analyze, represent, and argue with this type of information." This type of literacy and social media are deeply interconnected in today's digital society, shaping how individuals interact with information, make decisions, and participate in online communities. [8].

All types of infectious diseases can affect our daily activities. For example, COVID-19 has affected daily life and slowed down the global economy. The epidemic affected thousands of people who were either dying or suffering from complications due to the outbreak. The virus spread exponentially in the region. Many countries have locked down their populations and imposed strict quarantines to control the devastating outbreak of this highly contagious disease. **COVID-19 has rapidly disrupted our daily lives, businesses, trade and global mobility. The effects of COVID-19 on daily life are widespread and have far-reaching implications. These can be divided into health care, economic and social categories. [9] Observance of extensive precautionary measures such as washing hands frequently, avoiding face-to-face interaction, social distancing and wearing masks, etc., which were made available to people through social media, would help them not to get involved in the disease. As mentioned, because COVID-19 is a common and highly contagious disease, the need for correct and reliable information through social media is more important than ever. [10] It is clear that since the outbreak of COVID-19, the production and consumption of information has increased rapidly and significantly. [11]

One of the first needs of people during a disease crisis is to obtain reliable information for making accurate decisions. For example, during the spread of the COVID-19 virus, preventive behaviours and personal hygiene were important measures that reduced the spread of the disease. [12,13]

Increasing public awareness about preventive measures improving the level of health and empowering society is the main key to solving this problem. This empowerment has a positive effect through health literacy programs and official campaigns using television, radio, and other media, especially in the context of epidemics. [14]

In fact, In the future, to face pandemic diseases such as COVID-19, we need to measure the level of E-health literacy of people, so that we can plan to improve it in various ways. One of these ways is to use the educational capabilities of

college and research libraries. In other words, recognizing the infrastructure problems from both individual and social aspects in an infodemic disease helps to better plan to face similar problems in the future.

Researcher studies show that a study is necessary to investigate the E-health literacy level of COVID-19 patients in a developing country, like Iran, which is facing many health problems. Although we found that the level of coronavirus-related health literacy is favourable in this study [15], we want to know if there is a relation between these two types of literacy. Therefore, this research examined E-health literacy among patients with the coronavirus and its relation between coronavirus-related health literacy at an educational Hospital. The results of this research can clarify the status of E-health literacy in affected patients and provide valuable information to policymakers and health trustees for effective and targeted planning as an effective experience to encounter the next pandemic.

METHODOLOGY

This study is a cross-sectional survey. The population of the study includes all patients diagnosed with COVID-19 referred to Imam Reza teaching hospital, University of Medical Sciences from December 5, 2020, to July 5, 2021. Because COVID-19 illness can range from mild to severe, with most cases being mild or moderate, we asked patients who were moderately ill at the time of referral and could fill in the questionnaire or reply to the questions of the interviewer.

Considering the minimum value of correlation between the E-health literacy score and demographic variables at the level of 0.20 and the significance level of 0.05 and the power of 80%, the sample size has been calculated using the formula below:

$$n = \left(\frac{z_{1-\frac{\alpha}{2}} + z_{1-\beta}}{0.5 \ln\left(\frac{1+r}{1-r}\right)} \right)^2 + 3$$

Because travel restrictions were in place during the coronavirus pandemic, we used the convenience sampling where participants are selected based on their easy availability and proximity to the researcher. Using convenience sampling, 190 patients were selected.

DATA COLLECTION:

At first, the researcher went to Imam Reza Hospital, Mashhad University of Medical Sciences, which had the highest number of hospitalized patients with COVID-19. Then she introduced herself to the hospitalized COVID-19 patients who were able to answer the questionnaire and explained the purpose of the study to them. If the patient expressed their desire and initial consent to complete the questionnaire, additional explanations were given to them to answer the questions. The questionnaires were completed in the presence of the researcher and collected at the same time so that if they had any questions or doubts about completing the questionnaire, they could ask the researcher.

PATIENT-REPORTED OUTCOME MEASURE:

The data collection tool has two parts: the first part includes consent form and background information. Some variables like age, income, education and gender were asked in this part because it seemed that they might have relationship with eHEALS literacy. The second part is the modified version of the eHEALS (eHealth literacy scale) standard [16]. In this part we asked the participants for their opinion and about their experience using the Internet for health information. We asked them to tell us which response best reflects their opinion and experience right now. This scale is an 8-item scale based on perceiving the skills or knowledge of individuals in each of the areas being measured. The questionnaire also includes 5-point Likert scale answers with a range of "strongly disagree" to "strongly agree." The researchers calculated this tool's total score from 8 to 40 scores, which represents a higher level of E-health literacy. This scale contains two additional questions designed to appraise the study population's interest in the use of E-health information. Using these questions, the importance of access to health information available on the Internet and the usefulness of the Internet in

health-related decisions is asked, and based on a 5-point Likert scale (from "completely useless" = 1 to "completely useful" = 5), with a total score between 2 and 10. According to the percentage, scores obtained were classified in four levels as low (zero to 25%), medium (25 to 50%), good (50 to 75%), and very good (75 to 100%).

This scale was first designed in 2006 by Norman and Skinner. [16]. In an Iranian study conducted by Bazm and coauthors (17), the Persian version's validity and reliability have also been confirmed. The data related to coronavirus-related health literacy was achieved from similar research with these participants. [15].

DATA ANALYSIS

Data was analyzed using IBM SPSS26 software. Descriptive statistics including frequency, percentage, mean, median and standard deviation are used to perform descriptive statistics. Pearson's correlation coefficient was used in the inferential statistics section.

RESULTS

BACKGROUND INFORMATION RESULTS

52.1% of the participants were female (n=99) and 47.9% of them were male (n=91). Most of the participants were between 30 - 50 years old (54.2%) and under-educated (41.6%). The monthly income of most participants was between 30-60 million Rials (64.2%). The level of education among participants was diploma and less (41.6%). The level of English proficiency among the participants was moderate (54.2%). (Table 1)

TABLE 1: DEMOGRAPHIC INFORMATION OF THE PARTICIPANTS

Variables	(n=190)	Frequency	Percentage
Gender	Male	91	47.9
	Female	99	52.1
Age	< 30	72	37.9
	30-50	103	54.2
	>50	15	52.1
Education	Diploma and less	79	41.6
	Associate	11	5.8
	Bachelor	73	38.4
	Master and higher	13	6.9
Work status	Unemployed	3	1.6
	Homemaker	9	4.7
	Retired	4	2.1
	Student	10	5.3
	Employed	164	86.3
Household income	Below 30 million Rials	7	3.7
	30 – 60 million Rials	122	64.2
	60 million Rials +	27	14.2
English language proficiency	Very High	17	8.9
	High	55	28.9

	Moderate	103	54.2
	Low	11	5.8
	Very Low	2	1.1

Most of the participants obtained the information related to COVID-19 mostly by asking "Physicians and health staff" (67.9%). After this, "Internet" (45.3%), "Radio/ Television" (22.6%), "Friends and acquaintances" (17.4 %) and "Brochure/Booklet/Leaflet" (14.2 %) were each respectively the source of health information related to COVID-19. Also among the internet-based sources of health information related to COVID-19 used among the participants were search engines such as Google, Yahoo, and Bing (51.1%) After this, social media (49.5%), life sciences and biomedical information databases (31.1%), health websites on COVID-19 (18.4%), and Website of infectious diseases specialists (16.3%) were the Internet-based sources for obtaining information related to COVID-19, respectively.(Table 2)

TABLE 2: TYPES OF HEALTH INFORMATION SOURCES RELATED TO COVID-19

Variables		Variable levels	Frequency	Percentage
1	Physicians and health staff	No	61	32.1
		Yes	129	67.9
2	Internet	No	104	54.7
		Yes	86	45.3
3	Interactive Voice Response	No	184	96.8
		Yes	6	3.2
4	Radio/ Television	No	147	77.4
		Yes	43	22.6
5	Magazine/ Newspaper	No	171	90
		Yes	19	10
6	Friends and acquaintances	No	157	82.6
		Yes	33	17.4
7	Brochure/Booklet/Leaflet	No	163	85.8
		Yes	27	14.2
8	Search engines (Google, Yahoo, Bing)	No	93	48.9
		Yes	97	51.1
9	Life sciences and biomedical information databases	No	131	68.9
		Yes	59	31.1
10	Social Media	No	96	50.5
		Yes	94	49.5
11	Health websites on COVID-19	No	155	81.6
		Yes	35	18.4
12	Website of infectious diseases specialists	No	159	83.7
		Yes	31	16.3
13	Others	No	171	90
		Yes	19	10
14	I do not actively search for information	No	182	95.8
		Yes	8	4.2

MAIN RESULTS:

The level of E-health literacy was measured by the eHEALS questionnaire and all participants answered the questions of this questionnaire. Most of the participants in most components of E-health literacy reported their response on a five-point Likert scale, at the "good " level. The items " I feel confident in using information from the Internet to make health decisions" which implies the degree of confidence in the health information available on the Internet" and " I can tell high-quality health resources from low-quality health resources on the Internet " which implies the ability to distinguish

Is "E-Health Literacy" Related To "Coronavirus-Related Health Literacy": Facilitating dissemination of health information through social media in the post-COVID-19 ERA

quality health resources from low or poor quality resources" received lower scores than other components with scores of 3.20 and 3.32, respectively which indicates that the participants reported the most difficulty in using Internet information for health-related decisions and distinguishing quality and reliable health information sources from low-quality sources .(Table 3)

TABLE 3. THE SCORE OF E-HEALTH LITERACY ITEMS IN THE RESEARCH POPULATION

	Items	Very Poor Frequency (percentage)	Poor Frequency (percentage)	Fair Frequency (percentage)	Good Frequency (percentage)	Excellent Frequency (percentage)	Mean
Access health information	1 I know what health resources are available on the Internet	6 (3.2)	19 (10.0)	62 (32.6)	78 (41.1)	25 (13.2)	3.51
	2 I know where to find helpful health resources on the Internet	6 (3.2)	14 (7.4)	62 (32.6)	84 (44.2)	24 (12.6)	3.56
	3 I know how to find helpful health resources on the Internet	8 (4.2)	19 (10.0)	40 (21.1)	89 (46.8)	34 (17.9)	3.64
	4 I know how to use the Internet to answer my questions about health	6 (3.2)	13 (6.8)	60 (31.6)	73 (38.4)	38 (20.0)	3.65
	5 I know how to use the health information I find on the Internet to help me	6 (3.2)	22 (11.6)	67 (35.3)	65 (34.2)	30 (15.8)	3.48
	6 I have the skills I need to evaluate the health resources I find on the Internet	5 (2.6)	34 (17.9)	58 (30.5)	70 (36.8)	23 (12.1)	3.38
Evaluate health information	7 I can tell high-quality health resources from low-quality health resources on the Internet	5 (2.6)	32 (16.8)	67 (35.3)	69 (36.3)	17 (8.9)	3.32
	8 I feel confident in using information from the Internet to make health decisions	10 (5.3)	31 (16.3)	75 (39.5)	59 (31.1)	15 (7.9)	3.20

From the total of 190 participants, the average score of the respondents to the questions related to the skill of "Access health information" is 10.71 out of a 15, which is equivalent to 71.40%. The average score of the respondents to the questions related to the skill of "Evaluate health information" is 17.03 out of 25, which is equivalent to 68.12%. This means that the skill of "Access health information" is in a better state than the skill of "Evaluate health information". And the overall average of E-health literacy is 27.74, which indicates that 69.35% of the total 40 E-health literacy scores have been obtained. Considering that the maximum score of this questionnaire is 40 and a score above 35 indicates an acceptable level of E-health literacy, therefore, the average obtained shows that people with covid-19 have a medium level of E-health literacy. (Table 4)

TABLE 4: THE LEVEL OF E-HEALTH LITERACY BY SKILLS

Skills	Score	Score range	Mean (Percentage)	Min (Percentage)	Max (Percentage)	SD (Percentage)
Access health information		3-15	10.71 (71.40)	3 (20.00)	15 (100.00)	2.63 (17.54)
Evaluate health information		5-25	17.03 (68.12)	5 (20.00)	25 (100.00)	4.09 (16.37)
E-health literacy		8-40	27.74 (69.35)	8 (20.00)	40 (100.00)	6.44 (16.11)

The minimum E-health literacy score is related to people over 50 years old, and the maximum score is related to people under 30 years old. There is a significant difference in the E-health literacy score at different age levels. In other words, E-health literacy score was significantly higher in patients less than 30 years old than others. (p-value < 0.05) (Table 5).

TABLE 5: THE IMPACT OF AGE ON E-HEALTH LITERACY LEVEL

Age	Min	Max	Mean	SD	p-value
< 30	14	39	28.18	5.31	0.027
30-50	11	40	28.05	6.43	
>50	8	40	23.46	9.70	

Inferential statistics of the pair wise comparison of E-health Literacy level by age shows that there is no significant difference in comparing the age of less than 30 years with 30 to 50 years. There is a significant difference between the age of less than 30 years and more than 50 years. There is a significant difference between the age of 30 to 50 years and the age of more than 50 years. (p-value < 0.05) (Table 6)

TABLE 6: INFERENCE STATISTICS OF THE PAIRWISE COMPARISON OF E-HEALTH LITERACY LEVEL

Age		Min	Max	MD (mean difference)	SD (standard deviation)	p-value
<30	30-50	-2.23	2.48	0.12	0.97	1.00
	>50	0.35	9.07	4.71	1.80	0.02
30-50	<30	-2.48	2.23	-0.12	0.97	1.00
	>50	0.34	8.83	4.59	1.75	0.02

The result in Table 7 shows that there is no significant difference between E-health literacy and gender variable (p-value < 0.05). Therefore, gender does not affect the level of E-health literacy. In other words, the E-health literacy score was not significantly different in men and women. (p-value < 0.05)

TABLE 7: THE IMPACT OF GENDER ON E-HEALTH LITERACY LEVEL

Gender	Min	Max	Mean	SD	p-value
Women	8	40	27.93	6.54	0.661
Men	10	40	27.52	6.36	

There is a significant difference between the E-health literacy level and the education variable (p-value <0.05). With the increase in the level of education, the level of E-health literacy has increased. (Table 8). It means that E-health literacy score was significantly higher in patients with high-level education. (p-value < 0.05)

TABLE 8: THE IMPACT OF EDUCATION ON E-HEALTH LITERACY LEVEL

Education	Min	Max	Mean	SD	p-value
Diploma and less	9	40	26.75	6.14	0.024
Associate	11	37	27.18	7.94	
Bachelor	18	40	29.36	5.12	
Master and higher	22	40	30.3	6.19	

The inferential statistics of the pair wise comparison of E-health Literacy level by education show that there is no significant difference between the variable of diploma and less, with associate degree. But there is a significant difference between the diploma and less variable, with the bachelor variable. Also, there is no significant difference between the variables of associate degree with bachelor and master degrees. There is no significant difference in the comparison between master degree and diploma and bachelor variables. There is no significant difference between master degree and other educational level variables. .(p-value < 0.05) (Table 9).

TABLE 9: THE INFERENTIAL STATISTICS OF THE PAIRWISE COMPARISON OF E-HEALTH LITERACY LEVEL BY EDUCATION

Education	Variables	Min	Max	MD	SD	p-value
Diploma and less	Associate	-5.46	4.62	-0.42	1.88	1.00
	Bachelor	-5.15	-0.06	-2.61	0.95	0.04
Associate	Bachelor	-7.25	2.87	-2.18	1.89	1.00
	Master and higher	-9.54	3.29	-3.12	2.40	1.00
Master and higher	Diploma and less	-8.23	1.14	-3.54	1.75	0.27
	Bachelor	-5.65	3.77	-0.93	1.76	1.00

Our study shows that E-health literacy has a significant difference with income (Table 10). In other words, E-health literacy score was significantly higher in patients with higher income. (p-value < 0.05)

TABLE 10: THE IMPACT OF HOUSEHOLD INCOME ON E-HEALTH LITERACY LEVEL

Household income	Min	Max	Mean	SD	p-value
Below 30 million Rials	24	32	27.85	2.79	0.020
30 – 60 million Rials	15	39	28.09	5.28	
60 million Rials +	22	40	31.55	5.39	

Based on the research of Motaghi et al. (15) showed in table 11, the mean (standard deviation) of health literacy in this community, was 84.31 (18.41). Among the dimensions of health literacy, the highest score belonged to "Understanding health information" (D3) with a mean (standard deviation) of 23.38 (5.66) and the lowest score belonged to "Evaluate health information" (D1) with a mean (standard deviation) of 19.03 (4.69).

TABLE 11: CORONAVIRUS-RELATED HEALTH LITERACY RATES IN PARTICIPANTS (15)

Variables	Dimensions		Min	Max	Mean	SD
Coronavirus-Related Health Literacy	D1	Evaluate health information	5	25	19.03	4.69
	D2	Access health information	6	30	22.21	4.88
	D3	Understanding health information	6	30	23.38	5.66
	D4	Apply health information	5	25	19.67	4.78
Total (N=190)			22	110	84.31	18.41

If we test the results of the mentioned research with the results of the present study (Table 4), we will find that there is a correlation between coronavirus-related health literacy and E-health literacy. It means that E-health literacy was significantly related to coronavirus-related health literacy. By increasing the level of E-health literacy, the level of health literacy of people with covid-19 can be improved. (p-value < 0.05) (Table 12)

TABLE 12: THE RELATIONSHIP BETWEEN CORONAVIRUS-RELATED HEALTH LITERACY AND E-HEALTH LITERACY

Items	Coefficient correlation	Significant level
coronavirus-related health literacy	0.589	0.001
E-health literacy		

DISCUSSION

Advances in Information and communication technologies have been continuously playing an important role in empowering communication and accessing information among people, which is one of its unique applications in library services. Indeed, the use of social network platforms in the health field, effectively, depends on E-health literacy [18]. In today's world, particularly in the digital world, there is no more important and influential role than social networks. They have had a profound impact on events in the real world, in particular on the lives of their members. Technology and social networks play a vital role in human life. People can also talk about health care with one another through social networks, as long as they can exchange ideas and information. Although this can be a paradoxical effect, in some cases, health information obtained on social networks has helped to treat disease, sometimes recommendations concerning the treatment of diseases are harmful because they do not include accurate scientific support. The widespread outbreak of COVID-19 affected various restrictions such as quarantine and social isolation, which affected the quality of life and interpersonal social interactions. At that time, all people, especially patients, needed accurate and reliable information, mostly published on social networks. If their E-health literacy status were favorable, they would be fewer victims of misinformation in social networks and all those disasters might not happen. Therefore, acting more thoughtfully to face future pandemic diseases and find solutions to improve people's E-health literacy is better. One of these solutions is E-health literacy education for people through all kinds of virtual or real libraries. Before the COVID-19 pandemic, many libraries had an important role to play in changing from information gathering and storage into a place of social exchange where knowledge was generated and disseminated. [19] However, more changes have occurred since the pandemic, and most libraries have moved their services to an online format, increasing access to digital materials and helping people get online with easy access to digital resources. [20] Libraries played a crucial role in the COVID-19 crisis, aiding the community in adapting to online environments. [20–22]

Any effort to improve the evaluation of health information will lead to the improvement of E-health literacy because we saw that the ability of the participants to be aware of online health information sources, the search method and finding information are at a higher level than the ability to evaluate and distinguish quality information sources from unreliable

Is "E-Health Literacy" Related To "Coronavirus-Related Health Literacy": Facilitating dissemination of health information through social media in the post-COVID-19 ERA

and low-quality information sources which is consistent with [14,23,]. The study highlights that participants often struggle to distinguish reliable health sources online. This challenge aligns with global trends where misinformation and difficulties in evaluating online health content are widespread issues. For example, research shows that while many individuals believe they have the skills to assess online health information, fewer express confidence in their ability to make health decisions based on that information, especially among older adults and certain demographic groups [24]

If there are some educational programs regarding E-health literacy for older adults in non-hospital settings like all kinds of libraries, then we can expect more favorable conditions in this matter. This suggestion is because that we concluded the age variable affects E-health literacy in such a way that the younger the age, the higher the level of E-health literacy which is consistent with [23,25]. The level of education and income have a direct relationship with health literacy, the higher the level of these two variables, the higher the level of E-health literacy which is consistent with. [3,26-27]. We found that higher education levels are consistently associated with higher E-health literacy. Individuals with advanced education (e.g., master's or bachelor's degrees) tend to have better health literacy scores compared to those with lower educational attainment such as diplomas or associate degrees. This is because education enhances the ability to access, understand, and use digital health information effectively. On the other hand; Lower family income is associated with lower E-health literacy levels. This may be due to limited access to digital resources, internet connectivity issues, and fewer opportunities for digital skill development. Income influences access to Internet services which in turn affects E-health literacy and self-efficacy related to online technologies.

By increasing the level of E-health literacy and improving access and evaluation skills, we found that the level of health literacy of people with COVID-19 can be improved. However, in general, the state of health literacy related to the coronavirus is better than digital health literacy, and this may be associated with the occupation of the people studied, who are mostly in the medical field.

CONCLUSION

In the post-corona era, considering the comprehensive impact of electronic health literacy and disease-related health literacy on the process of control and prevention, it is suggested that health policymakers in countries first get information about the state of health literacy in both dimensions- electronic and disease-related-. It is expected that they will be active in promoting and strengthening the E-health literacy of patients, especially in resource appraisal skills and ensuring health-related decisions. It can be done via educators and planners of the Ministry of Health in both formal and informal training. All courses and workshops on the mentioned training can emphasize E-health literacy. Besides, medical librarians and information professionals should be more active in this regard due to their expertise in retrieving and appraising information resources. It is suggested that this training starts at the older adult level to strengthen the patients' ability and skills

The following recommendations aim to bridge gaps exacerbated by age, education, and income while fostering equitable access to digital health resources:

- Targeted Educational Programs with Demographic-specific training. Implementing age- and education-tiered interventions and offering workshops for older adults or less-educated groups. It can be implemented and developed by both formal and informal education via libraries as Hubs for E-health literacy, health institutions and medical informatics centers as educational gateways, etc,
- Addressing Socioeconomic and Digital Divides with Infrastructure Investment. Expanding internet access and digital tool availability in rural, low-income, and minority communities to reduce disparities linked to socioeconomic status. Considering subsidized programs and providing free or low-cost digital devices and data plans for underserved populations, particularly during public health crises like COVID-19.
- Monitoring and Evaluation of E-health literacy across demographics and track progress
- Prioritizing studies on intersectional factors (e.g., gender, income, education) influencing E-health literacy.

Generally, the findings from these studies strongly suggest that enhancing E-health literacy should be a cornerstone of future pandemic preparedness strategies.

ETHICS STATEMENT

This research was approved by the Shahid Beheshti University of Medical Sciences (IR.SBMU.RETECH.REC.1400.111)

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AUTHOR CONTRIBUTIONS

Kazerani, Maryam: Conceptualization, writing, review and editing, supervisor.

Zandkrimi, Sana : Data Curation

Mottaghi, Mahdieh: Data gathering

Kazerani, Marzieh: Infectious disease specialist, advisor

Jambarsang, Sara: Statistical advisor

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QUALITY OF LIFE AND JOB SATISFACTION AMONG SCHOOLTEACHERS IN SAUDI ARABIA DURING THE COVID-19 PANDEMIC

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ABSTRACT

OBJECTIVE:

The 2019 coronavirus disease pandemic was one of the greatest global health threats of recent times. As many governments imposed lockdowns, schools closed and shifted their work environment and mode of instruction to online education. However, teachers' quality of life and job satisfaction during this period have not been thoroughly studied. This study aimed to investigate schoolteachers' health-related quality of life.

DESIGN:

Using convenience sampling, an online cross-sectional survey was conducted from the first week of September to the first week of October 2020.

MAIN OUTCOME MEASURES:

The main outcome measures were quality of life (mental and physical health), evaluated using the 12-item Health Survey (SF-12), and job satisfaction, assessed using the Caprara Teachers' Job Satisfaction Instrument.

RESULTS:

Significantly lower perceived physical and mental health ($p < 0.001$) was reported in teachers who were female, older, and those with health conditions, whereas job satisfaction was not associated with demographic factors.

CONCLUSION:

Saudi schoolteachers experienced suboptimal health-related quality of life levels during the pandemic. Therefore, they represent an important target group for future occupational health interventions. Enhancing teachers' occupational health should be incorporated into national sustainable health strategies.

KEYWORDS

Quality of life, Job satisfaction, SF-12, Teachers, COVID-19, Saudi Arabia

INTRODUCTION

The novel severe acute respiratory syndrome coronavirus, which causes coronavirus disease 2019 (COVID-19), is considered one of the greatest global health threats in recent history [1]. This virus spread exponentially since the first case was discovered in Wuhan, China, in December 2019, leading to a pandemic. Owing to the lack of effective pharmaceutical measures and to limit the spread of the infection, many governments implemented precautionary measures, such as case isolation and social distancing. As these measures were ineffective in controlling the pandemic, some countries imposed travel restrictions and closed schools for several months [2,3].

In Saudi Arabia, part of the government's response to the pandemic included closing all educational institutions at the beginning of March 2020. COVID-19 created unprecedented challenges and opportunities for national education systems, and teaching strategies had to unexpectedly shift to online learning [4]. Because of these unexpected changes, it is thought that the COVID-19 pandemic and its consequences on the work environment might have influenced public psychological health and quality of life. Recent international studies have reported the physical and mental health of the general population [5,6], health workers [7-9], and students [10]. However, few studies have explored schoolteachers' health-related quality of life and job satisfaction during the pandemic [11-13]. This study addressed this gap in the literature by examining teachers' levels of physical and mental health and job satisfaction. The impact of demographic factors is also investigated using Saudi public schoolteachers as the target population.

METHODS

PARTICIPANTS

This cross-sectional study was conducted during the fifth and tenth weeks of the first semester in 2020. Using convenience sampling, Saudi teachers working in public schools were invited to participate. Informed consent was obtained electronically before the study's initiation, ensuring that the participants were fully aware of the study objectives and that participation was voluntary. The protocol and informed consent forms were approved by the scientific committee at King Saud University (KSU-HE-20379, 15 January 2020).

MEASURES

Sociodemographic and work-related information

The demographic characteristics of the schoolteachers included gender, age, marital status, educational level, monthly income, work experience, and disease incidence. Marital status was categorised as single, married, divorced, or widowed. Monthly income in Saudi Riyal (SR) was categorised as $\leq 15,000$ SR and $> 15,000$ SR. To investigate health conditions, respondents were asked a simple dichotomous question about the incidence of common diseases, and a blank space was provided for any diseases not listed.

Assessment of health-related quality of life

The 12-item Short-Form Health Survey (SF-12) was used to assess the quality of life of schoolteachers. The SF-12 measures eight health concepts: general health, physical functioning, role physical, body pain, vitality, social functioning, role emotional, and mental health. These dimensions can be aggregated into a physical component summary and a mental component summary. Each summary score was calculated on a scale of 0–100, with the lowest score indicating a poor physical or mental state and the highest score indicating the best possible physical or mental health [14]. This instrument has been adapted syntactically and semantically for Arab idiosyncrasies [15,16].

Job satisfaction

Job satisfaction was assessed using two items from the Caprara Teachers' Job Satisfaction Instrument on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5) [17]. The statements were 'I am satisfied with what I achieve at work' and 'I feel good at work'. These items were adopted because the measures showed high reliability and validity in the instrument development study and in previous studies conducted on teachers [18,19].

DATA ANALYSIS

A Statistical Package for Social Science (SPSS) version 22 (Armonk, NY, USA) was used to analyse the data. The frequencies and percentages of the participants' demographic characteristics and questionnaire items were calculated. In addition, the means and standard deviations for all questionnaire scales and subscales were determined. The relative impact of demographic variables on teachers' SF-12 and job satisfaction scales was analysed using t-tests and ANOVAs. Finally, correlations between the teachers' health-related quality of life outcomes and job satisfaction were calculated using Pearson coefficients. To control potential confounders, a stratified analysis using a multivariable technique was conducted when necessary. For all analyses, a p-value of ≤ 0.05 indicates statistical significance.

RESULTS

TABLE 1. SOCIODEMOGRAPHIC AND CLINICAL CHARACTERISTICS (N=410)

Variables	Total n (%)
Gender	
Male	138 (33.6)
Female	272 (66.4)
Age (years)	
25–34	45 (10.9)
35–44	187 (45.7)
45–54	156 (38.1)
55 or older	22 (5.3)
Marital status	
Single	32 (7.9)
Married	358 (87.2)
Divorced/widowed	20 (4.9)
Income level	
≥ 15000 SR	209 (50.9)
< 15000 SR	201 (49.1)
Educational level	
Diploma	45 (10.9)
Bachelor's	317 (77.4)
Postgraduate	48 (11.7)
Experience (years)	
≥ 10	104 (25.3)
11–19	142 (34.7)
≤ 20	164 (40)
Health condition incidence	
Diabetes	56 (13.6)
Asthma	45 (10.9)
Hypertension	43 (10.6)
Bone disease	32 (7.9)
COVID-19	23 (5.7)
Stroke	14 (3.4)
Nervous system disease	12 (3.0)
Mental disorder	8 (1.9)
Immune deficiency diseases	6 (1.5)
Renal disease	5 (1.1)

Number of health conditions	
0	229 (55.8)
1	124 (30.2)
2 or more	57 (14.0)

COVID-19, coronavirus disease 2019; SR, Saudi Riyal.

SAMPLE CHARACTERISTICS

Table 1 presents the sociodemographic and clinical characteristics of the respondents. More than half of the participants were women (66.4%). Almost half were aged between 35 and 44 years and earned 15,000 SR per month. Most participants were married and held bachelor's degrees. Approximately 40% of respondents had worked for at least 20 years. Analysis of clinical characteristics indicated that 44% of the participants had health conditions, including diabetes (13.6%), asthma (10.9%), hypertension (10.6%), bone disease (7.9%), COVID-19 (5.7%), and other health problems (10%).

TABLE 2. PHYSICAL HEALTH, MENTAL HEALTH, AND JOB SATISFACTION BY DEMOGRAPHIC AND CLINICAL CHARACTERISTICS

N=410	PCS Scale 0–100	MCS Scale 0–100	Job Satisfaction Scale 1–5
Mean (SD)	72.5 (42.9)	59.2 (21)	3.88 (.69)
Gender			
Male	80.8 (15.3)	64.1 (19.5)	3.90 (.68)
Female	68.3 (22.5)**	56.7 (21.6)**	3.87 (.70)
Age			
25–34	76.9 (19.4)	54.5 (20.2)	3.87 (.87)
35–44	76.1 (19.6)	59.3 (21.0)	3.88 (.68)
45–54	68.5 (21.0)	60.1 (21.2)	3.86 (.66)
55 or older	60.7 (30.2)**	61 (24.6)*	4.1 (.65)
Marital status			
Single	72.3 (20.6)	50.1 (20.4)	3.95 (.65)
Married	72.8 (21.1)	60.5 (21.1)	3.88 (.70)
Divorced & widowed	67.7 (23.3)	50.1 (17.3)*	3.84 (.62)
Income level			
≥ 15000 SR	74.2 (20.3)	58.5 (20.5)	3.84 (.73)
< 15000 SR	70.7 (22.0)	59.9 (21.8)	3.92 (.64)
Educational level			
Diploma	64.8 (20.0)	59.1 (19.3)	3.93 (.74)
Bachelor's	72.2 (21.8)	58.8 (21.8)	3.91 (.66)
Postgraduate	81.4 (13.8)**	61.6 (18.5)	3.64 (.78)
Experience (years)			
≥ 10	79.1 (16.8)	56.9 (19.5)	3.90 (.72)
11–20	73.3 (21.2)	60.1 (21.0)	3.85 (.68)
< 20	67.5 (21.2)**	59.8 (22.3)	3.93 (.68)
Number of diseases			
0	78.5 (16.9)	61. (21.0)	3.90
1	68.1 (22.5)	60.1 (20.8)	3.94
2 or more	57.9 (24.5)**	48.9 (20.3)*	3.66

**p<0.01, *p<0.05.

PCS, physical component summary; MCS, mental component summary; SD, standard deviation; SR, Saudi Riyal.

PHYSICAL HEALTH, MENTAL HEALTH, AND JOB SATISFACTION

Table 2 presents teachers' health-related quality of life and job satisfaction scores. A detailed description of all eight SF-12 domain scores based on teachers' characteristics is provided in the supplementary document (Appendix). Females reported significantly worse physical and mental health than male teachers ($P < 0.01$). Married teachers had better mental health than single, divorced, or widowed teachers ($P < 0.05$). Additionally, younger and less experienced teachers reported better physical health ($P < 0.01$) than older teachers. Teachers with higher education degrees perceived themselves as having better physical health ($P < 0.01$) than teachers with lower educational levels. Several health conditions were found to have significant negative associations with physical and mental health ($P < 0.01$, 0.05 , respectively). No significant results were observed between job satisfaction and teacher characteristics.

TABLE 3. HEALTH AND JOB SATISFACTION CORRELATIONS

	Physical health	Job satisfaction
Mental health	.468**	.357**
Physical health		.291**

** $p < 0.01$, * $p < 0.05$

CORRELATIONS BETWEEN TEACHER HEALTH AND JOB SATISFACTION

Teachers' physical health was moderately to highly related to mental health ($r = 0.46$). Job satisfaction was moderately associated with mental and physical health ($r = 0.35$ and 0.29 , respectively) (Table 3).

DISCUSSION

This study aimed to explore Saudi public schoolteachers' perceived health-related quality of life and job satisfaction and to identify the relative impact of demographic and clinical factors on their physical and mental health. To the best of our knowledge, based on an extensive literature review, this is one of the few studies conducted on online education during the COVID-19 pandemic. The sample characteristics were similar to the sociodemographic and clinical characteristics reported in previous studies to some extent. In particular, the gender and age distributions were consistent with the overall distribution of public schoolteachers in Saudi Arabia. The disease incidence was similar to that reported in a recent national study; therefore, the study sample was representative of the Saudi Arabian population [20,21].

In the present study, the mean scores of the SF-12 subscales were lower than those of a similar study conducted among Flemish schoolteachers. For example, the following mean scores differed: 20.8 for 'role limitations due to emotional problems', 15.6 for 'social functioning', 14.8 for 'vitality', 11.5 for 'general mental health', and 10 for 'physical functioning'. The level of job satisfaction was similar between the Saudi and Flemish teachers [22]. The lower perceived physical and mental health scores among Saudi teachers might have been magnified by the pandemic in two ways. First, the shift in education towards online learning requires a longer sitting time in the office, which has been shown to negatively affect physical and mental health [23,24]. Second, a recent systematic review found that mass lockdowns were the main predictive factor for mental illness when combined with other factors linked to depression symptoms, such as sex, marital status, and living in urban areas. This was also found in the present study [25].

This study observed a significant association between demographic and clinical variables and poor perceived quality of life among Saudi schoolteachers. Female teachers reported significantly lower levels of perceived physical and mental health than did male teachers. This result aligns with previous studies, suggesting a higher prevalence of health conditions among females. Their greater responsibility for maintaining their households may be related to their lower physical and mental scores [22,26-28]. Moreover, older age and longer employment duration were significantly associated with poor health. A systematic review of the physical health of schoolteachers interpreted this association as an accumulated outcome of workload on the musculoskeletal system [25]. Finally, the incidence of health conditions strongly predicted physical and mental health in Saudi Arabia. This finding is also supported by previous findings in which health conditions,

particularly chronic diseases, are the largest threats to health status and impact individuals' daily functions and well-being [29,30].

It should be emphasised that this study has some limitations. First, the cross-sectional design limits the ability to examine causal relationships. Therefore, follow-up studies should explore whether major changes have occurred since the pandemic. Second, as a self-administered data collection tool was adopted, the results could be subject to reporting bias. Third, this a convenience sampling method was employed because of the constraints of the pandemic; therefore, the sample might not have fully represented the entire population. Finally, all the participants were from public schools in Riyadh, which limits the generalisability of this study, as teachers in other settings were not included. Nevertheless, this study has several strengths. First, this is one of the few studies to explore health-related quality of life among schoolteachers. Second, it was conducted during an exceptional period when the Saudi government imposed COVID-19 lockdowns. Furthermore, this study provides some of the first data on the quality of life and job satisfaction of teachers in Saudi Arabia. The results of this study are important in terms of occupational health and policy implications.

CONCLUSIONS

The study findings suggest that Saudi public schoolteachers reported suboptimal levels on most health-related quality of life subscales. Besides social isolation, changes in teaching processes could have affected teachers' physical and mental health, as the pandemic was an unprecedented event in Saudi Arabia. Teachers who were female, older, and those diagnosed with chronic diseases had the highest risk of lower perceived physical and mental health. Thus, a national occupational health plan should better support teacher health. In particular, females are an important target group for occupational health interventions.

AVAILABILITY OF DATA AND MATERIALS

The data generated from this study are not publicly available. The authors can provide additional data upon reasonable request.

CONFLICT OF INTERESTS

The authors declare no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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EFFECT OF COVID-19 ON PRIMARY HEALTHCARE NURSES' JOB SATISFACTION AND THEIR TURNOVER INTENTION IN SINGAPORE

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ABSTRACT

BACKGROUND:

Globally, COVID-19 has added pressure to the healthcare workforce, particularly nurses, who face an exacerbated shortage. Few studies have investigated job satisfaction and turnover intention among primary healthcare nurses in the long-drawn pandemic situation. Hence, this study aims to examine job satisfaction and retention among primary healthcare nurses.

AIMS:

To assess the level of job satisfaction and identify factors that affect job satisfaction and turnover intentions among primary healthcare nurses. This will serve to inform organisations on ways to improve processes and support mechanisms that promote job satisfaction and retention for primary healthcare nurses.

METHODS:

A cross-sectional quantitative study was conducted that involved 132 primary care nurses from seven healthcare centres in Western Singapore. Level of job satisfaction and turnover intentions was assessed using a 39-item questionnaire. Relationships between job satisfaction and turnover intentions were analysed using Pearson correlation and linear regression analysis.

RESULTS:

Among the five job satisfaction subscales, personal satisfaction had the highest score ($M=3.73$, $SD=0.47$), while satisfaction with workload had the lowest score ($M=3.24$, $SD=0.69$). The overall job satisfaction mean score of 3.47 ($SD=0.49$), is considered within the moderate range and is similar to other studies conducted during COVID-19 pandemic. Albeit the challenging period, more than half of the nurses reported their intention to stay in a primary healthcare setting.

CONCLUSION:

This study demonstrated the multifaceted nature of nurses' job satisfaction and its intricate interplay with various factors, including personal accomplishment, workload, professional support, pay and prospects, training and the challenges posed by the COVID-19 pandemic. The findings of this study provide insight for organisations to look at targeted factors to improve the rate of retention for primary care nurses.

KEYWORDS

primary care, nurses, job satisfaction, turnover intention, COVID-19.

BACKGROUND

The World Health Organization (WHO) declared Coronavirus disease 2019 (COVID-19) a global pandemic [1] and overtime impacted the healthcare system significantly, specifically the nursing workforce [2, 3]. Singapore received its first imported case on 23rd January 2020 [4]. Healthcare providers responded to COVID-19 pandemic, including nurses, who supported the healthcare system by providing care to meet patients' need. Study [5] have indicated that the pandemic has led to immense stress to nurses due to substantial surges in workload coupled with physical and psychological exhaustion, and fear of being infected at work and their family members. Many studies have examined the well-being of nurses impacted by COVID-19. Most of the studies are hospital-based [6] and relatively few studies have investigated job satisfaction and turnover intention amongst primary care nurses. The Ministry of Health Singapore announced that COVID-19 pandemic became endemic on 13 February 2023 [7]. Investigating job satisfaction within the nursing profession requires a nuanced approach, accounting for diverse settings and organisational environment to gain insights into unique challenges experienced by different nursing groups [8].

Nurses comprised almost half of the global healthcare workforce and nursing shortages can posit a big challenge for the healthcare systems [9]. In Singapore, the public primary healthcare centres provide services and care for acute illnesses, chronic diseases, preventive health, children and women health and well-being. Data showed that the pandemic has taken a toll resulting in rising attrition rates for both foreign and local nurses [10]. The attrition rate in the public acute hospitals reached a five-year high in 2021 at 7.4% for local nurses, and 14.8% for foreign public nurses [3]. However, there is a lack of reports on the situation for nurses in the primary healthcare setting. Excessive turnover can lead to staffing shortages, which have been associated with reduced continuity of care [11]. In view of the known impact of COVID-19 on nursing workforce, it will be useful to examine how primary care nurses have coped to inform nursing management on the support mechanism for retention.

Many researchers have provided definitions for job satisfaction that involves multiple elements. Lu et al. defined job satisfaction as encompassing not only an individual's emotional responses towards their work, but also the nature of the job and expectations regarding its attributes [12]. Studies have shown that job satisfaction is significantly associated with quality of health care, patient safety [13] and employee loyalty [14]. Job satisfaction is also considered a decisive factor strongly and positively associated with nurses' intention to stay [15]. Fasbender et al. (2019) found that job satisfaction is negatively correlated with turnover intentions [11]. Factors such as organisational support and job autonomy have shown predictive effect on job satisfaction [15].

"Intention to stay" can be defined as nurses' perception of the likelihood of remaining in their current role or staying within the present organisation and serves as a strong predictor for the retention of nurses [9,15]. High turnover of nurses in an organisation can be costly and to recruit and replace can affect the quality for continuity of care and productivity [16]. The percentage of nurses expressing their intention to leave ranged from between 5% and 17% across different countries [15].

AIM

The aim of this study is to assess the level of job satisfaction and turnover intention among primary care nurses. This research seeks to identify factors that promote job satisfaction and retention in primary care nurses' post-pandemic. Findings from this study will serve as a guide to inform management in developing targeted strategies to better improve processes aim at sustaining nurses' satisfaction level and retaining nurses in future pandemic situation. The research questions for this study are as follow:

- 1) What are the factors in the workplace that affect the level of job satisfaction of primary care nurses during COVID-19 pandemic?
- 2) What is the job satisfaction level of primary care nurses during COVID-19 pandemic?
- 3) What is the turnover intention of primary care nurses post-COVID-19 pandemic?

METHODS

DESIGN, PARTICIPANTS, SETTINGS, AND SAMPLE SIZE

A cross-sectional survey was conducted with a convenience sample of primary care nurses. A total of 218 nurses in seven primary healthcare centres in Western Singapore were invited to participate in an online questionnaire. The inclusion criteria include nurses who had worked for more than a year in the healthcare centres to render patient care. As the number of Nursing Administrators, Senior Nurse Managers and Senior Nurse Clinicians are small, it was subsumed under Nurse Manager or Nurse Clinicians in this study. Locum or temporary nurses were excluded from this study. A sample size of 131 nurses was required to achieve a 5% margin of error, 95 % CI with a response distribution of 50%.

DATA COLLECTION

An online platform (Form SG) was used to facilitate the completion of a set of anonymous, self-administered questionnaires on a voluntary basis from 6th March to 27th April 2023. The initial section of the questionnaire contained information to inform participants on the aim and objectives of the study, participation was voluntary and assurance on data confidentiality. The survey link was provided via staff institutional email invitation. The questionnaire sought to obtain demographic information without identifiers and assess nurses' job satisfaction and turnover intention. Completion of the survey constituted implied consent. Data were collected and stored in a password-protected excel spreadsheet only accessible by researchers.

INSTRUMENTS

Job Satisfaction

This study employed the Measure of Job Satisfaction (MJS), an instrument developed and validated by Traynor and Wade to assess the level of job satisfaction among community nurses [17]. Written permission was obtained to use the MJS which consists of 38-items and five subscales: Personal Satisfaction (10 items), Satisfaction with Workload (7 items), Satisfaction with Professional Support (9 items), Satisfaction with Pay and Prospects (8 items), and Satisfaction with Training (4 items). The original 38-items were worded and modified into individual questions to assess job satisfaction specifically during the COVID-19 pandemic. In Traynor and Wade's study, concurrent and discriminatory validity were satisfactory, and the Cronbach's alpha was 0.93 for MJS [17]. Cronbach's alpha for this study was 0.96 based on the responses of the participants in this study (see Table 1). No pilot study was conducted, as the instruments were appropriate for study's context. MJS has been demonstrated to be a valid and reliable instrument with sufficient sensitivity to discriminate between various groups of community nurses [17]. The coefficients for the scales were all higher than the usually recommended level of 0.70, indicating good internal consistency and reliability of the scale to measure job satisfaction. Responses were assigned a 5-point Likert-type scale, from 1 (strongly disagree) to 5 (strongly agree). The mean scores of all responses were analysed with higher scores indicating a higher level of job satisfaction.

TABLE 1: CRONBACH'S ALPHA VALUES OF THE MEASURE OF JOB SATISFACTION

Scale	Cronbach's Alpha
Personal Satisfaction	0.85 (0.88)
Satisfaction with Workload	0.91 (0.88)
Satisfaction with Professional Support	0.93 (0.86)
Satisfaction with Pay and Prospect	0.89 (0.87)
Satisfaction with Training	0.73 (0.84)
Overall Job Satisfaction	0.96 (0.93)

Note. () Cronbach Alpha in Traynor and Wade's (1993) study

Turnover Intentions

Intentions to stay were assessed using a single-item question: "Given the current COVID-19 situation, I intend to stay in the healthcare centres and contribute to primary healthcare nursing". Participants responded on a 5-point Likert scale, from 1 (strongly disagree) to 5 (strongly agree). The mean score reflects the level of intention to stay, with higher scores indicating a stronger intention to stay.

ETHICAL CONSIDERATIONS

Approval for the study was obtained from The National Healthcare Group Domain Specific Review Board (DSRB) Singapore, with protocol number 2022/00820. The study involved conducting employee surveys without personal identifiers.

STATISTICAL ANALYSIS

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) software version 29. Descriptive statistics were used to present social demographic characteristics of the respondents. Mean scores were calculated to determine the level of overall job satisfaction and the intention to stay. The Shapiro-Wilk test was used to test the normality of the sample distribution. Independent sample t-tests and one-way analyses of variance (ANOVA) were used to test the differences in the level of job satisfaction between demographic subgroups. Pearson's r correlation analysis was conducted to explore the relationships between job satisfaction, intention to stay, and demographic characteristics. Multiple regression analysis was employed to identify the linear relationship between subscales of job satisfaction and intention to stay among primary care nurses. For all analysis, an alpha-level of $p < 0.05$ was considered statistically significant.

RESULTS

DEMOGRAPHIC PROFILE OF THE PARTICIPANTS

This study had received responses from 136 nurses. Four survey responses were excluded as participants did not fulfil the inclusion criteria of having more than a year of work experience. The participants' demographic characteristics are presented in Table 2. Most participants ($n=106$; 80.3%) were Assistant Nurse Clinicians, Senior Staff Nurses, Staff Nurses, and Enrolled Nurses (ANC, SSN, SN, EN). Nurses aged 31-40 years old formed the majority (42.4%), 69.7% of nurses held a bachelor's degree and 37.1% of nurses reported having more than 10 years of experience in the primary care setting.

TABLE 2: SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS (N=132)

Social Demographic Characteristics	N	%
Designation		
Nurse Manager/ Nurse Clinician/ Advanced Practice Nurse	26	19.7
Assistant Nurse Clinician/ Senior Staff Nurse/ Staff nurse/ Enrolled Nurse	106	80.3
Age		
21 - 30 years old	17	12.9
31 - 40 years old	56	42.4
41 - 50 years old	35	26.5
51 - 70 years old	24	18.2
Highest Educational level		
Pre-University/ Vocational/ Certificate	7	5.3
Diploma	20	15.2

Social Demographic Characteristics	N	%
Bachelor's degree	92	69.7
Master's degree	8	6.1
Others (School of Nursing/ N, O level/ITE)	5	3.8
Years of Experience in Primary Care Setting, National University Polyclinics		
1-3 years	25	18.9
4-5 years	26	19.7
6-10 years	32	24.2
>10 years and above	49	37.1

PRIMARY CARE NURSES' JOB SATISFACTION AND INTENTION TO STAY

Mean score for overall job satisfaction was 3.47 ($SD=0.49$). The average scores and percentage of each item in the Measure of Job Satisfaction are shown in Table 3. The subscale "Personal Satisfaction" was ranked the highest ($M= 3.73$, $SD =0.47$) while "Satisfaction with Workload" ranked the lowest ($M = 3.24$, $SD = 0.69$). The mean score for intention to stay in the current workplace was 3.43 ($SD=0.81$). More than half of the nurses (53%) indicated their intention to stay in primary healthcare, 13% indicated otherwise while 34% chose to remain neutral in their decision.

TABLE 3: DESCRIPTIVE STATISTICS OF PRIMARY CARE NURSES' JOB SATISFACTION SCORES AND INTENTION-TO- STAY SCORES

Item/Subscale		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
		(%)	(%)	(%)	(%)	(%)		
Subscale Personal Satisfaction							3.73	0.47
1	I had a feeling of accomplishment from my work during Covid-19	0.8	6.8	33.3	50.0	9.1	3.60	0.78
2	I can use my skills during Covid-19	0	0.8	19.7	67.4	12.1	3.91	0.59
3	I made contribution to patient care during Covid-19	0	1.5	6.8	64.4	27.3	4.17	0.61
4	There were challenges in my job during Covid-19	0	0.8	9.8	56.1	33.3	4.22	0.65
5	My job was varied and interesting during Covid-19	1.5	9.1	39.4	40.2	9.8	3.48	0.85
6	I had accomplishment when I went home at the end of the day during Covid-19	3.0	12.1	40.2	39.4	5.3	3.32	0.87
7	I was able to provide standard care to patient during Covid-19	0.8	3.8	20.5	65.9	9.1	3.79	0.69
8	I achieved personal growth and development from my work during Covid-19	3.8	5.3	37.9	46.2	6.8	3.47	0.85
9	My work with patients during Covid-19 were in good quality	0	3.0	28.8	62.1	6.1	3.71	0.62
10	I could exercise independent thought and action in my work during Covid-19	0.8	3.8	31.1	61.4	3.0	3.62	0.65

Item/Subscale	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
Subscale Satisfaction with Workload						3.24	0.69
11 I had sufficient time to get through my work during Covid-19	4.5	15.9	34.8	42.4	2.3	3.22	0.90
12 The amount of time was sufficient to finish everything I have to do during Covid-19	4.5	16.7	39.4	39.4	0	3.14	0.85
13 I spent sufficient time for providing patient care during Covid-19	3.0	9.8	35.6	48.5	3.0	3.39	0.83
14 I was able to manage my workload during the Covid-19 pandemic	4.5	12.1	32.6	49.2	1.5	3.31	0.88
15 I was happy with the way that I cared for patients during Covid-19	2.3	2.3	32.6	60.6	2.3	3.58	0.69
16 In my work area, there were enough staff to safely care for patients during Covid-19	7.6	22.0	40.2	28.8	1.5	2.95	0.94
17 The amount of time spent on administration was sufficient during Covid-19	3.0	19.7	45.5	31.8	0	3.06	0.80
Subscale Satisfaction with Professional Support						3.54	0.60
18 I received adequate support and guidance from my supervisor during Covid-19	3.0	9.1	33.3	52.3	2.3	3.42	0.81
19 I had opportunities to discuss my concerns during Covid-19	3.0	6.8	37.1	53.0	0	3.40	0.75
20 I feel supported for my job during Covid-19	3.0	7.6	30.3	58.3	0.8	3.46	0.78
21 I received good quality of the supervision in my work during Covid-19	0.8	11.4	37.9	50.0	0	3.37	0.71
22 I received respect and fair treatment from my boss during Covid-19	1.5	12.9	33.3	50.0	2.3	3.39	0.80
23 I feel that I belong to part of the team during Covid-19	1.5	3.8	25.8	62.9	6.1	3.68	0.71
24 I am happy with the people I talked to and worked with during Covid-19	0.8	1.5	29.5	62.9	5.3	3.71	0.63
25 I was kept informed by my supervisor of Covid-related changes in my workplace	0.8	3.8	12.9	71.2	11.4	3.89	0.67
26 Good values were placed on my work by my supervisor during Covid-19	1.5	7.6	31.8	55.3	3.8	3.52	0.76
Subscale Satisfaction with Pay and Prospect						3.39	0.61
27 I am satisfied with the pay and remuneration that I received	6.8	14.4	31.8	43.9	3.0	3.22	0.97
28 I am happy with my performance grading	3.0	7.6	37.1	52.3	0	3.39	0.76
29 I am fairly paid for what I had contributed to the healthcare centre	3.0	12.9	40.2	43.9	0	3.25	0.79
30 I am satisfied with my prospects for promotion	2.3	18.2	40.2	38.6	0.8	3.17	0.82
31 I have opportunities to advance my career	3.0	13.6	35.6	45.5	2.3	3.30	0.85
32 My job description matches what I do at work	1.5	7.6	30.3	56.1	4.5	3.55	0.77

Item/Subscale	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	SD
33 The future in the healthcare centre looks secured for me	2.3	6.1	37.1	50.8	3.8	3.48	0.77
34 I have a sense of job security	0	5.3	25.0	60.6	9.1	3.74	0.70
Subscale Satisfaction with Training						3.25	0.68
35 I had opportunities to attend courses during Covid-19	4.5	22.7	24.2	44.7	3.8	3.20	0.99
36 I could take time off to attend courses during Covid-19	5.3	25.0	39.4	28.8	1.5	2.96	0.90
37 The courses that I attended during Covid-19 were being funded	0.8	6.1	49.2	42.4	1.5	3.38	0.66
38 I received adequate training to manage my current job scope during the COVID-19 outbreak	0.8	7.6	35.6	56.1	0	3.47	0.67
Intention To Stay							
39 Given the current situation, I intend to stay in the healthcare centre and contribute to primary healthcare nursing.	1.5	11.4	34.1	48.5	4.5	3.43	0.81

CORRELATIONS BETWEEN NURSES' INTENTION TO STAY, OVERALL JOB SATISFACTION AND VARIOUS DEMOGRAPHIC VARIABLES

The correlations between perceived intention to stay, perceived job satisfaction and various demographic variables were examined using Pearson product-moment correlation coefficient. Preliminary analysis was performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Perceived overall job satisfaction and perceived intentions to stay were found to be moderately positively correlated ($r=0.57$). This means that as job satisfaction increases, so does intentions to stay. Additionally, a small positive correlation was found between perceived overall job satisfaction with age ($r=0.26$), designation ($r=0.23$), and years of experience ($r=0.22$). Detailed results of the analyses are shown in Table 4.

TABLE 4: DESCRIPTIVE STATISTICS AND CORRELATIONS FOR STUDY VARIABLES

Variable	M	SD	1	2	3	4	5	6
1. Age ^a	1.53	1.00	—					
2. Designation ^b	0.20	0.40	.27**	—				
3. Educational Level ^c	1.88	0.75	.05	.23**	—			
4. Years of Experience in Primary Care Setting ^d	2.80	1.14	.58**	.21*	.04	—		
5. Intention to Stay	3.43	0.81	.27**	.07	.00	.14	—	
6. Overall Job Satisfaction	3.47	0.49	.26**	.23**	.12	.22*	.57**	—

Note. a 0 = 21-30 years old, 1 = 31-40 years old, 2 = 41-50 years old, 3 = 51-70 years old

b 0 = Assistant Nurse Clinician/ Senior Staff Nurse/ Staff Nurse/ Enrolled Nurse, 1= Nurse Manager/ Nurse Clinician/ Advanced Practice Nurse

c 0 = Pre-University/ Vocational/ Certificate, 1=Diploma, 2= bachelor's degree, 3= master's degree, 4= Others

d 0 = 1 year, 1 = 1-3 years, 2 = 4-5 years, 3 = 6-10 years, 4 = above 10 years

* $p < .05$, ** $p < .01$

The analysis further revealed a significant positive medium correlation between intention to stay and personal satisfaction, satisfaction with professional support and satisfaction with pay and prospect. Furthermore, significant small positive correlations were identified between intention to stay and satisfaction with workload and training (see Table 5).

TABLE 5: DESCRIPTIVE STATISTICS AND CORRELATIONS BETWEEN INTENTION TO STAY AND JOB SATISFACTION SUBCALES

Variable	M	SD	1	2	3	4	5	6
1. Intention to Stay	3.43	.81	—					
2. Personal Satisfaction	3.73	.47	.46 ***	—				
3. Satisfaction with Workload	3.24	.69	.33 ***	.53 ***	—			
4. Satisfaction with Professional Support	3.54	.60	.55 ***	.73 ***	.66 ***	—		
5. Satisfaction with Pay and Prospect	3.39	.61	.59 ***	.59 ***	.56 ***	.77 ***	—	
6. Satisfaction with Training	3.25	.68	.34 ***	.44 ***	.47 ***	.54 ***	.60 ***	—

*** p < .001

COMPARISONS OF DIFFERENCES IN THE LEVEL OF JOB SATISFACTION BETWEEN DEMOGRAPHIC SUBGROUPS

Analysis using ANOVA indicated significant difference in overall job satisfaction between age subgroups (21-30, 31-40, 41-50 and 51-70 years old), $F(3,128) = 3.4, p = .02$. Specifically, the Scheffe post-hoc analysis showed that age group 51-70 ($n = 24, M = 3.67, SD = 0.30$) exhibited a significantly higher mean score for overall job satisfaction compared to the 21-30 years old group ($n = 17, M = 3.21, SD = 0.49$), $p = .03$, eta squared = 0.07 indicating a small effect size. No statistically significant difference in overall job satisfaction mean scores was found related to educational level, $F(4,127) = .71, p = .58$. However, there was a significant effect of years of experience in primary care on overall job satisfaction, $F(3,128) = 3.29, p = .02$, eta squared = 0.07, indicating a small effect size.

The NM, NC, APN group reported significantly higher level of overall job satisfaction, satisfaction with workload, professional support, pay and prospect, and training than ANC, SSN, SN, EN group ($p < 0.05$). However, no significant differences were found between the two categories of nurses in the subscales for personal satisfaction (Table 6).

TABLE 6: COMPARISON OF OVERALL AND SUBSCALE JOB SATISFACTION MEAN SCORE BY DESIGNATION

	Nurse Manager/ Nurse Clinician / Advanced Practice Nurse		Assistant Nurse Clinician/ Senior Staff Nurse/ Staff nurse/ Enrolled Nurse		t	p	Cohen's d
	M	SD	M	SD			
Overall Job Satisfaction	3.69	.33	3.42	.51	3.42	.001	.58
Personal Satisfaction	3.88	.39	3.69	.49	1.89	.061	.41
Satisfaction with Workload	3.53	.45	3.16	.72	3.28	.002	.55
Satisfaction with Professional Support	3.77	.41	3.48	.62	2.89	.005	.49
Satisfaction with Pay and Prospect	3.59	.53	3.34	.62	2.14	.038	.42
Satisfaction with Training	3.53	.65	3.19	.67	2.35	.020	.52

THE EFFECT OF JOB SATISFACTION SUBSCALES ON NURSES' INTENTION TO STAY

Regression analyses were conducted to examine the linear relationship between subscales of job satisfaction and intention to stay among primary care nurses (Table 7). The R-square value .34 indicates that approximately 34% of the variance in intention to stay is explained by the five predictor variables of job satisfaction subscales with $F(5,126) = 15.69$, $p < .001$. Satisfaction with pay and prospect ($\beta = 0.42$, $p < .001$) exhibit statistical significance in predicting intention to stay, indicating the higher the job satisfaction in pay and prospect, the higher the intention to stay.

TABLE 7: LINEAR REGRESSION ANALYSIS: SATISFACTION SUBSCALES AND INTENTION TO STAY

Satisfaction Subscales	95%CI				β	p
	B	SE	LL	UL		
Personal Satisfaction	.19	.18	-.14	.55	.12	.240
Satisfaction with Workload	-.12	.11	-.34	.10	-.10	.294
Satisfaction with Professional Support	.31	.19	-.06	.68	.23	.101
Satisfaction with Pay and Prospect	.56	.16	.25	.87	.42	<.001
Satisfaction with Training	-.04	.11	-.25	.17	-.03	.709

Note, participants = 132. B= unstandardized coefficients; SE= standardised error; β =standardized coefficients; CI = confidence interval; LL = lower limit; UL = upper limit.

DISCUSSION

Job satisfaction is critical in care quality, influence on attaining good performance and efficiency [13]. Previous studies suggested that nurses' job satisfaction level tends to be generally moderate or low [13]. A study in 130 Israeli nurses during the COVID-19 pandemic reported a mean score ranging from 3.4 to 3.9 and interpreted as moderate to high level of job satisfaction [18]. This study showed an overall job satisfaction with a mean score of 3.47, is considered within the moderate range and is consistent with scores from other studies albeit the challenging period. Nevertheless, job satisfaction is a multifaceted concept that results from a complex interplay between organisational setting, professional experience, and individual factors [13]. Findings may also be affected by cultural contexts and values [19].

Nurses reported higher level of personal satisfaction, but lower satisfaction with their workload. Similarly, a study conducted in South Korea with 200 hospital healthcare workers found that heavier workload involving direct patient interaction emerged as a conflicting factor that contributed to personal accomplishment [20]. Hence, this study data suggests that while personal satisfaction is high, workload challenges may still exist. The increasing numbers of patients, constant manpower shortage, and the need to respond to frequent changes at short notice due to the rapidly evolving needs of an ageing population remains prevalent. Addressing workload dynamics could be vital to promote a balanced and supportive work environment for nurses. Exemplary initiatives in a public health institution in Singapore include working with nurses on adjusting workloads and job scopes to better suit their needs and allowing more autonomy over shift schedules. As a result, there were increased rest periods between shifts and trials of digitalisation, robotics, and artificial intelligence to reduce repetitive and labour-intensive tasks [21]. Data in this study showed that there was higher personal satisfaction in items pertaining to skill utilisation, making contributions to patient care, and recognising job-related challenges during the COVID-19 pandemic. Findings are aligned with previous research, indicating that components related to personal accomplishment such as the ability to provide skilled and quality care to patients, and professional challenges were the most important component of job satisfaction even during a pandemic [18].

Lower satisfaction with workload indicated the challenges faced by many organisations in staffing level during the COVID-19 pandemic. Findings are consistent with previous research, as heavy workload [12,13,19] and inadequate staffing [13]

were negatively associated with job satisfaction. Workload is considered a stressor strongly correlated with lower levels of job satisfaction.[12]. The COVID-19 pandemic has further intensified persistent challenges related to workload and staffing. To retain nurses amid concern about manpower shortage, some hospitals in Singapore initiated shuttle bus service to transport nurses living in neighbouring country Johor Bahru, Malaysia to and from their workplace. The shuttle bus services helped to reduce commuting time, enabling nurses to spend less time on commuting, thus promoting more time for rest and quality time with their families. Employer's support demonstrated care about the nurses' well-being and in fostering a positive culture. As for primary care, healthcare assistants are being trained to take on higher-level caregiving support roles, allowing nurses to better focus on clinical care [21]. For the primary healthcare centres in Western Singapore, initiatives that have taken place include training podiatry assistants to perform diabetic foot screening and healthcare assistants to conduct diabetic retinal photography for patients annual screening with an aim towards off-loading workload for nurses. Organisations may need to make necessary adjustments to skill mix or adjust nurse-to-patient ratios during a pandemic. Innovative strategies, careful planning, coordination, and a higher staffing budget could be fundamental in maintaining adequate staffing levels [22].

Nurses were less satisfied on the opportunities in taking time off to attend courses during the COVID-19 pandemic. This could be attributed to the challenges in accessing training opportunities due to constraint in manpower. In the primary care setting, despite converting in-house training online to address their learning needs, nurses sometimes missed the training due to lack of manpower highlighting a significant challenge. During disease outbreak, nurses often take on additional responsibilities beyond their typical duties [23]. Labrague & Santos highlighted that it is essential for healthcare organisations and nursing administrators to develop training plans to improve the nurses' capacity to manage and care for patients effectively during COVID-19 period [23]. The emergence of the COVID-19 pandemic had affected clinical nursing education globally. Organisations could consider exploring flexible learning approaches, such as a blending virtual and in-person clinical education with capacity planning to overcome the challenges posed by the COVID-19 pandemic [24].

Nurses comprising of nurse managers, nurse clinicians and advanced practice nurses reported higher overall job satisfaction than assistant nurse clinician, senior staff nurses, staff nurses and enrolled nurses. These findings coincide with a study that demonstrated higher job satisfaction amongst nursing managers compared to assistant staff [25]. Difference could be attributed to a higher frequency of managerial roles amongst the nurse managers, nurse clinicians and advanced practice nurses. Managerial positions are associated with greater autonomy and responsibility, hence leading to higher satisfaction [18]. According to Frederick Herzberg's two-factor theory, intrinsic factors such as higher-skilled work, performance recognition, autonomy, meaningfulness, and decision-making involvement lead to positive job satisfaction [18].

Study data revealed that 53% of the nurses indicated their intention to stay. In contrast, a study conducted in Taiwan during the COVID-19, which involved 333 novice nurses, reported that the average intention-to-stay score was close to disagreement [16]. In a pre-pandemic study among 2,352 hospital nurses in China reported an average intention to stay score (3.37/ 5) [15], while this study data revealed a slightly lower average score (3.21/ 5). Though the intention to stay data are comparable to other empirical findings, additional strategies should be explored and put in place to enhance long-term retention and address the situation more effectively. To this effect, the Ministry of Health in Singapore conducted a country wide survey post-pandemic and implemented The Ministry of Health's Award for Nurses' Grace Excellence Loyalty (ANGEL) scheme to support the retention of nurses in the public healthcare institutions by offering financial incentives of up to \$100,000 over a 20-year period. This initiative was launched in September 2024 and aimed at encouraging nurses to build lifelong careers in Nursing [26].

Study data showed that overall job satisfaction had significant medium positive correlations with nurses' intention to stay. This finding is aligned with previous literature that found job satisfaction highly positively associated with an intention to stay and serves as a decisive factor that safeguards intention to stay [9,15]. Significant medium positive correlations were observed between an intention to stay and satisfaction with professional support and pay and prospect. Our healthcare setting supports employee well-being by fostering a culture that commits to caring for every member and enables

employees to speak up without fear of judgement or retaliation. A dedicated well-being office plays a central role in developing holistic strategies, emphasising the importance of caring for employees. Key measures include access to confidential counselling services, externally or in-house, as well as peer support programs and helplines. Clear reporting channels address disruptive behaviour with strict confidentiality, and an employee grievance policy ensures fair resolution of concerns. These initiatives reflect organisational commitment to a positive workplace environment. Opportunities for professional development of nurses are available through scholarships and course sponsorships. In February 2024, the Ministry of Health (Singapore) released its first-ever salary guidelines to help community care organisations offer competitive salaries and improve fairness in pay structure [27]. Existing literature have shown that presence of professional relationships significantly contributes to nurses' intention to stay [9]. Fostering better support from colleagues and organisations [12], a sense of acknowledgement and mutual respect among individuals [13] as well as providing fair promotion opportunities [12] and remuneration [13] enhances job satisfaction. Study findings allude that nurses choose to stay when professional relationships offer support, trust, and a sense of belonging [9].

STRENGTHS AND LIMITATIONS

This study provides knowledge that serve as a useful guide to promote job satisfaction and reduce turnover intention. Some limitations of the study include the use of convenience sampling and recruitment of nurses from a single cluster of healthcare centres, which may not be representative of all primary care nurses in Singapore. Future research may consider obtaining study samples across different healthcare sectors to ensure generalisability. Furthermore, there might be non-job-related factors such as personal factors [13] that contribute to the level of job satisfaction and their turnover intentions. The use of cross-sectional design in this study is another limitation. Longitudinal studies would allow for a better understanding of the impact of COVID-19 on job satisfaction and turnover intentions.

CONCLUSION

The COVID-19 pandemic has affected and stressed the healthcare system, further straining the nursing workforce. This study sheds light on the multifaceted nature of nurses' job satisfaction and its complex interplay with various factors. Nurses reported higher personal satisfaction from utilising their skills, contributing to patient care, and managing job-related challenges but lower satisfaction with their workloads during the pandemic. Organisations could consider strategies such as adjustments to skill mixes or nurse-to-patient ratios, fostering professional support, providing fair promotion opportunities, and exploring flexible training approaches to promote job satisfaction and retention rate. It is heartening to find that amidst the unprecedented challenges, more than half of the nurses in primary healthcare had chosen to stay and commit to caring for the community.

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A GLOBAL BIBLIOMETRIC ANALYSIS OF LONELINESS DURING THE COVID-19 PANDEMIC: FUTURE RESEARCH AND POLICY IMPLICATIONS

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ABSTRACT

INTRODUCTION

Under the profound impacts of the COVID-19 pandemic, loneliness has become a major public health concern worldwide. This study is conducted to systematically evaluate existing literature on loneliness during the pandemic to identify research trends and knowledge gaps for future studies and policy developments.

METHODS

Original articles and reviews related to COVID-19 loneliness, published from 2020 to 2023, were retrieved from the Web of Science database. Research collaboration and keyword co-occurrence analyses were performed using VOSviewer software. Latent Dirichlet Allocation algorithm from STATA was used to analyze common topics and research trends.

RESULTS

From 2020 to 2023, a total of 3,817 publications on COVID-19 loneliness were extracted. Regarding international collaboration, the United States and England produced the largest research output and had the most extensive network collaboration with other countries in the field. Main research topics included the risk factors for loneliness during the pandemic, its impacts on people's well-being, and social support interventions. However, there is a lack of research on adolescents, children, and behavioral changes such as increased smoking, unhealthy alcohol consumption, and substance use due to loneliness during the pandemic.

CONCLUSIONS

Our study highlights an increasing interest in research on loneliness during the pandemic and suggests the need for enhanced global cooperation between developed and developing countries. Moreover, researchers and policymakers should focus more on the long-term effects of COVID-19 loneliness on adolescents and children, behavioral lifestyle changes, as well as targeted social support programs using family-based interventions and communication technologies.

KEYWORDS

COVID-19, loneliness, bibliometric, mental health, adolescent, children, social support

INTRODUCTION

Loneliness during the COVID-19 pandemic is drawing significant public interest as a major health challenge and policy concern worldwide. Although loneliness was recognized as an emerging public health issue even prior to the pandemic [1,2], the stringent enactment of social distancing measures during the pandemic, such as quarantine, lockdown, and school closures, has severely compromised ongoing efforts against this health issue. Given the worsening levels of loneliness globally induced by the pandemic [3] and its attendant negative impacts on people's well-being [4–7], numerous relevant articles from various research fields such as psychology, geriatrics, healthcare sciences, and social sciences have been promptly published during the COVID-19 timeline (2020–2023) [8]. This requires a comprehensive and systematic summary of the heterogeneity of ongoing COVID-19 loneliness research from diverse sectors, for effective policy development and intervention updates. Therefore, in this study, we conducted a bibliometric analysis to quantitatively and qualitatively synthesize existing studies on loneliness during the pandemic, providing further insights into this critical area of research.

Although there are several systematic reviews of loneliness during the pandemic, our bibliometric study extends from the scope and methods of previous research by incorporating publications from multiple domains. Pai & Vella (2021) conducted one of the first reviews of the literature on COVID-19 loneliness, focusing on the adverse health impacts of loneliness on people's well-being during the pandemic [9]. Subsequently, Ernst et al. (2022) provided meta-analysis evidence on levels of loneliness before and during the pandemic, confirming an overall increase in loneliness since the onset of the health crisis [3]. Other review efforts have further examined varying degrees of loneliness among older adults [10], and adolescents and children [11]. Despite providing robust evidence and well-established summaries on how the COVID-19 crisis impacted loneliness, systematic reviews and meta-analyses typically focus on one single topic, such as vulnerable groups, risk factors, or interventions. It is imperative to reinforce the knowledge of loneliness during the pandemic from a multifactorial perspective, as the design of targeted public health interventions to mitigate loneliness requires collective efforts from multiple domains, ranging from psychology, medical sciences, to social sciences. Therefore, to address the scope limitation of previous systematic reviews, we utilized a bibliometric analysis – an advanced and reliable review method – combined with the Latent Dirichlet Allocation (LDA) technique, a cutting-edge topic modeling method, to comprehensively characterize the broader research landscape on loneliness during the pandemic.

Furthermore, unlike other previous bibliometric analyses on loneliness, this is the first scientometric study that specifically focused on loneliness during the pandemic. Bibliometric analysis has garnered greater attention in recent years as an advanced literature analysis tool. This scientometric method is commonly used in the scientific community to explore emerging trends in a particular research field, identifying collaboration patterns among countries, organizations, authors, and eliciting insightful directions for future research [12–14]. By rigorously combining data from academic databases such as the Web of Science (WoS) Core Collection, Scopus, and PubMed, bibliometric analysis enables scholars to map the progress of relevant articles within a specific time frame, providing an accurate overview of cumulative scientific data [15]. In terms of loneliness, this topic has been previously studied in several bibliometric studies. For example, Banerjee et al. (2023) reported the characteristics of the top 100 highly cited articles on loneliness in general [16], while Prasad et al. (2024) conducted a comprehensive bibliometric analysis on the relationship of internet pornography, loneliness, and social media addiction [17]. Another scientometric research by Marziali et al. (2024) investigated the literature on the use of voice assistants to reduce loneliness and social isolation of older adults [18]. However, none of these studies have assessed the unique development of research landscapes related to COVID-19 loneliness. The objective of this study is to thoroughly examine the increasing volume of scientific papers that investigated loneliness during the pandemic. We contribute to the existing literature in at least two ways: (1) assessing the bibliometric characteristics of pioneering works on loneliness during the pandemic, and (2) analyzing research patterns in this field using advanced topic modeling algorithms. This information will provide a better understanding of the dynamic changing patterns of research in the field, thus effectively guiding future research directions and policy recommendations for addressing loneliness in the post-pandemic era.

To the best of our knowledge, no studies have applied a mix of bibliometric and topic modeling methods to analyze the current literature on loneliness during the pandemic. This study represents the first bibliometric study conducted to systematically identify research growth and uncover latent research themes related to COVID-19 loneliness. By adopting a mixed analytical approach that combines both scientometric and topic modeling methods, we were able to characterize a large volume of relevant research in terms of research productivity, collaboration patterns, emerging topics, and knowledge gaps in various domains. Since the elevated prevalence of loneliness is not only confined to the COVID-19 pandemic but also continues to be significant beyond this period, our bibliometric results serve as a timely evidence-based reference to guide future research directions. This information is useful for researchers to navigate future studies and address research gaps in the existing literature. Furthermore, it helps healthcare providers and policymakers develop a nuanced understanding of emerging issues in COVID-19 loneliness, thereby improving interventions and public policies for people against loneliness.

METHODS

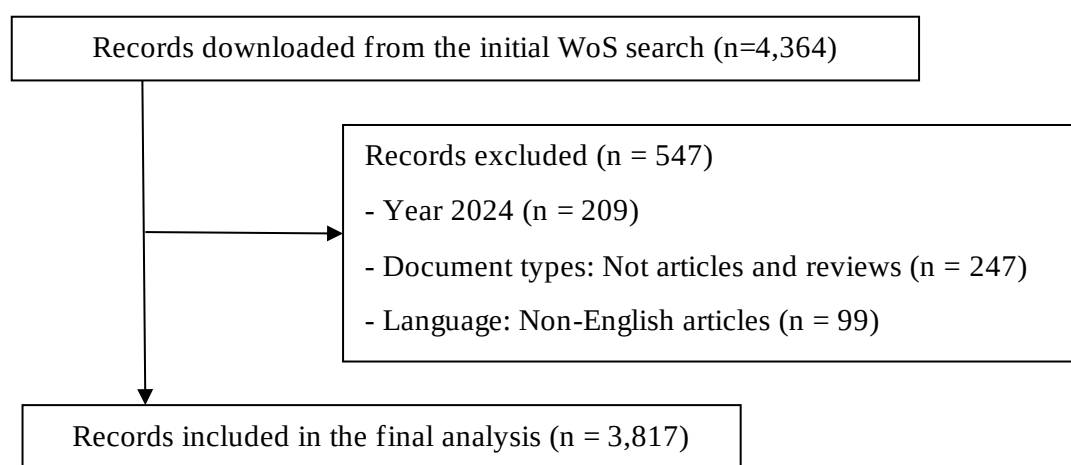
DATA SOURCE AND SEARCH STRATEGY

We performed a bibliometric analysis using the Web of Science (WoS) database. This is an optimal data source for scientometric studies, providing detailed information on high-quality articles and covering a comprehensive set of records since 1900.

The search process was divided into two steps. First, we applied a thematic search string using the "Topic search" function, combining keywords related to loneliness and the COVID-19 pandemic using Boolean logic AND/OR. The specific search string was TS= ("loneliness" OR "lonely" OR "loner") AND ("COVID-19" OR "coronavirus disease 2019" OR "2019-nCov" OR "2019 novel coronavirus" OR "SARS-CoV-2" OR "Severe acute respiratory syndrome coronavirus 2" OR "novel coronavirus disease 19" OR "novel coronavirus disease-19" OR "SARS2" OR "SARS-2" OR "COVID-2019" OR "COVID19"). Second, we applied several filtering processes to accurately extract records of loneliness during the pandemic. Only original articles and reviews, conducted in English, and published between 2020 and 2023 were included. Our final sample size is concluded with 3,817 papers.

Each paper's detailed information, including authors' names, paper titles, author keywords, institutions, citation counts, usage times, research areas, and abstracts, was manually downloaded from the WoS database. This data extraction step was independently conducted by two researchers and subsequently scrutinized by the study supervisor to ensure the consistency of the retrieved data. A flow chart of the search process is described in Figure 1.

FIGURE 1. PAPER SELECTION IN THE SEARCH PROCESS



DATA ANALYSIS

A summary of analytical techniques is presented in Table 1. Since the extracted data did not contain any information on human or animal objects, ethical considerations were not applicable in this study.

TABLE 1. ANALYTICAL METHODS AND RESULT PRESENTATION BY DATA TYPES

Type of data	Unit of analysis	Analytical methods	Result presentation
Countries, keywords	Words	Frequency of co-authorship and keyword co-occurrence	Cluster mapping by country, and keyword
Titles, Abstracts	Papers	Latent Dirichlet allocation	Classifications of 10 major research themes
Research areas	WoS classifications of research areas	Haberman distance	Dendrogram of research fields

To demonstrate the worldwide collaboration network of countries in COVID-19 loneliness research, we utilized the VOSviewer software (version 1.6.20, Center for Science and Technology, Leiden University, the Netherlands). This visualization tool has been widely used in various bibliometric studies, enabling the authors to create network graphs showing academic collaborations among different countries and organizations [16,18]. In this paper, it was also employed to identify the most frequent keywords appearing in Authors' keywords of each document.

Furthermore, we utilized STATA 18.0 to examine the hierarchical relationship of research areas and emerging research trends in loneliness during the pandemic. Specifically, for the hierarchical clustering of major research disciplines, a dendrogram was used to visualize the intricate association of various research areas categorized by the WoS database. For research trend assessment, we first utilized the Latent Dirichlet Allocation (LDA) technique to model 10 latent topics from the included papers and then labeled research themes for these topics.

The LDA technique, a Bayesian probabilistic algorithm, is commonly used in scientometric analysis for topic modeling [19]. It is considered a state-of-the-art analytical method for topic clustering, by grouping words with relevant meanings into specific topics [20,21]. The LDA's text mining principle is depicted in Figure 2 [22,23].

FIGURE 2. DIAGRAM OF LDA'S GENERATIVE PROCESS

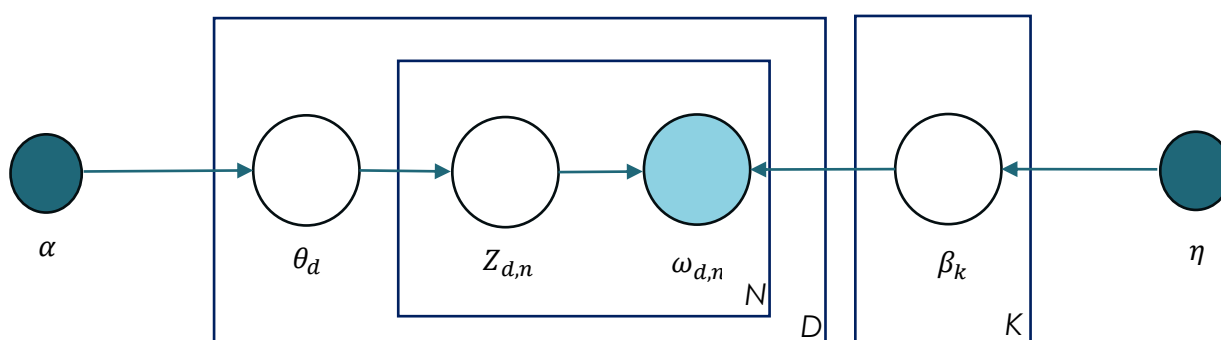


Figure 2. Diagram of LDA's generative process, where K : number of topics; D : number of documents; N : number of words; θ_d : the probability of topic k for document d ; β_k : the probability of word n created for topic k ; α : the prior distribution of topic k by document; η : the prior distribution of word n by document; $Z_{d,n}$: the topic for the n th word in the d th document; $\omega_{d,n}$: the n th word in the d th document

To identify major research trends, first, we applied STATA's LDA command to determine 10 latent topics using words from the titles and abstract of each publication [24]. Second, after exporting the resulting output of the LDA model into an Excel file, we labelled the latent topics. Topic labeling was conducted by (1) analyzing the top 20 words with the highest

probability within each topic, and (2) intensively reviewing titles/abstracts of the highly cited publications within each topic. Furthermore, we assessed the growth of identified research topics by estimating the number of publications by topic and changes in topic shares by year. In essence, the LDA's topic modeling facilitates defining the 10 common topics about pandemic-related loneliness and helps characterize the development of research landscapes from 2020 to 2023.

RESULTS

ANALYSIS OF DESCRIPTIVE INFORMATION FROM SELECTED PUBLICATIONS

Table 2 shows the descriptive statistics of selected papers on loneliness during the pandemic. The number of studies in this field experienced an overall upward trend, increasing dramatically from 367 publications in 2020 to 1,273 publications in 2022, before slightly decreasing to 978 in 2023. Publications in the year 2020 were cited the most, with a total of 29,684 citations and an average citation of 20.22 per year. On the other hand, articles published in 2021 received the highest total usage (29,588 downloads) over the 4-year period, while publications in 2023 achieved the highest downloading times over the past 6 months.

TABLE 2. GENERAL CHARACTERISTICS OF THE INCLUDED PAPERS

Year	Total Papers	Total Citations	Mean Cite Rate Per Year	Total Usage Last 6 months	Mean Use Rate Last 6 months	Total Usage Last 4 years	Mean Use Rate Last 4 years
2020	367	29,684	20.22	1,442	3.93	16,128	10.99
2021	1,199	27,078	7.53	3,109	2.59	29,588	6.17
2022	1,273	7,197	2.83	3,677	2.89	19,675	3.86
2023	978	649	0.66	3,686	3.77	7,137	1.82

ANALYSIS OF INTERNATIONAL COLLABORATIONS

Figure 3 illustrates the collaboration network of 69 countries with at least five co-authorships, among a total of 117 countries producing research on COVID-19 loneliness. There were 7 major clusters formed based on the volume of their collaborations, with respective regional representatives including Germany, China, Spain, the Netherlands, Canada, England, and the USA. The USA and England were the largest contributors to the overall research landscape, with the strongest collaboration networks.

FIGURE 3. MAP OF COLLABORATION NETWORK BY COUNTRY/REGION

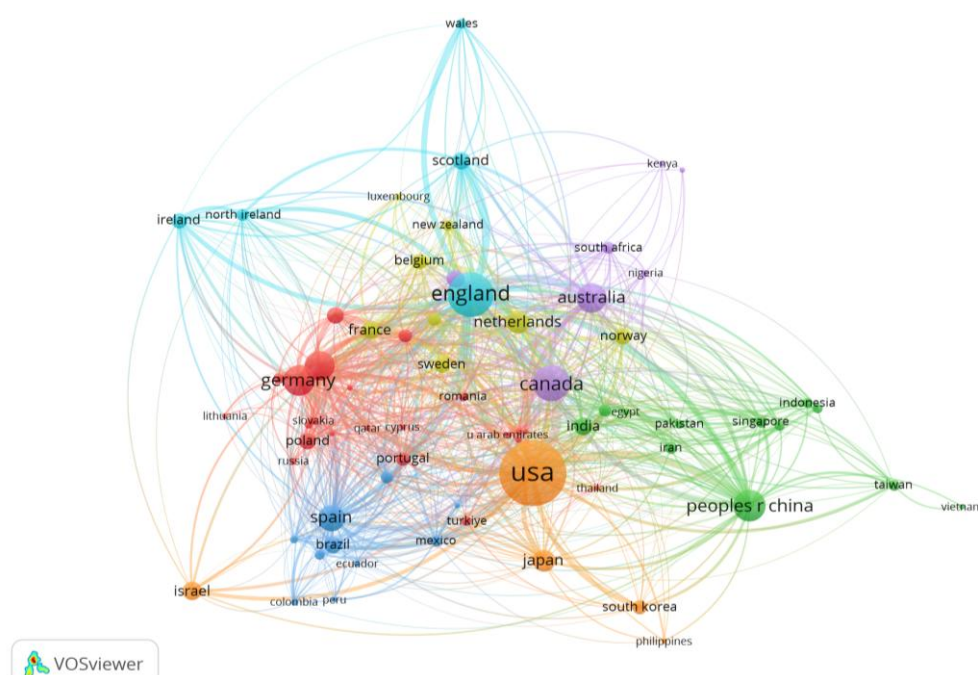


Figure 3. Map of collaboration network by country/region regarding loneliness during the pandemic from 2020 to 2023 (Red cluster: Germany, Portugal, and Eastern European countries; green cluster: China, India, and Southeast Asian countries; blue cluster: Spain, Central and South American countries; yellow cluster: New Zealand, Northern and Western European countries; purple cluster: Australia, Canada, and African countries; bright blue cluster: the United Kingdom; orange cluster: the USA and East Asian countries)

ANALYSIS OF KEYWORD CO-OCCURRENCE

Figure 4 shows the co-occurrence analysis of the terms extracted from the authors' keywords of selected papers, demonstrating the most frequent keywords used in publications related to COVID-19 loneliness. Of the 6,067 keywords, 77 met the minimum threshold of 20 occurrences. The most frequently appearing keywords were grouped into four major clusters, including (1) "older people", "technology", "long-term care", "nursing home" (red), (2) "adolescents", "emotions", "depressive symptoms", "perceived stress" (green), (3) "risk factors", "suicide", "telehealth" (dark blue), and (4) "children", "psychological impact" (yellow).

FIGURE 4. MAP OF CO-OCCURRENCE OF AUTHORS' KEYWORDS

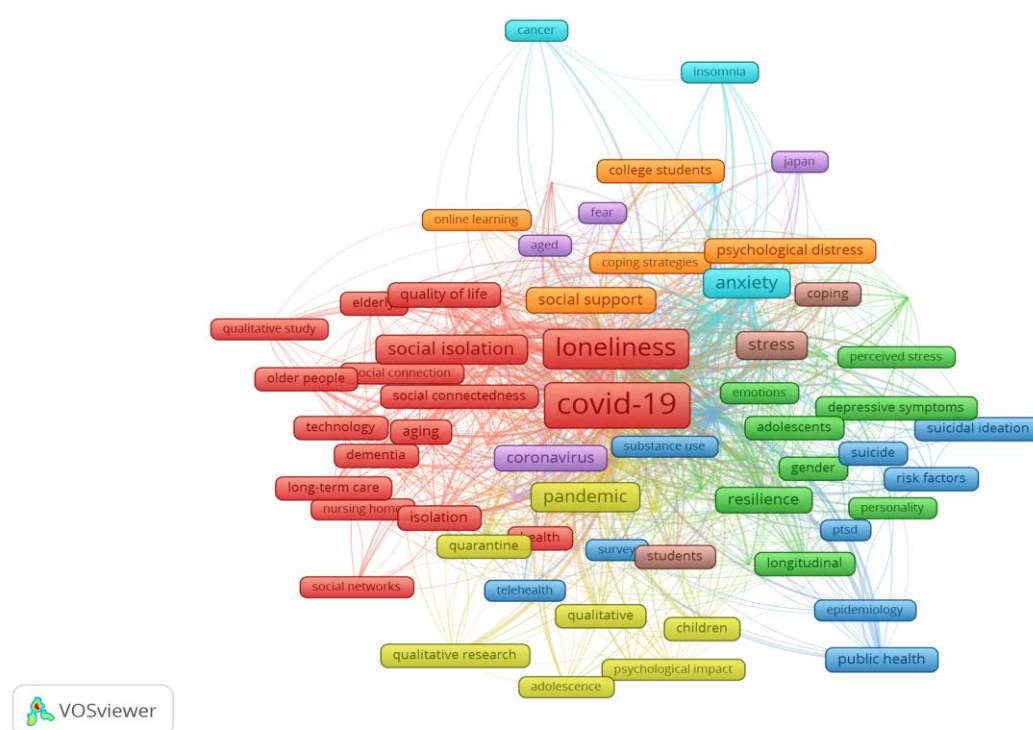


Figure 4. Map of co-occurrence of Authors' keywords (The size of the term represents its weight. The color indicates the cluster. The line between two terms indicates their relatedness. Red cluster: loneliness of the elderly, green cluster: loneliness of adolescents, blue cluster: risk factors of loneliness and relevant behavioral changes, yellow cluster: loneliness of children, purple cluster: fear of aged people in Japan, bright blue cluster: psychological impacts of loneliness, orange cluster: social support to deal with COVID-19 loneliness, and brown cluster: loneliness-coping strategies among students)

ANALYSIS OF RESEARCH DOMAINS

Table 3 shows the 10 latent research topics identified using the LDA topic modeling technique. To label these research themes, we conducted an intensive review of the titles and abstracts of the most impactful publications in each category, as well as the most commonly appearing words extracted from the LDA word analysis. After careful reviews, each topic was thematically identified, except for topics 3 and 4, which were combined into one new topic (topic 3) based on similar shared themes. During the pandemic, the topic of socioeconomic and clinical risk factors for loneliness (topic 9) achieved the highest research output, accounting for 24.65% of total publications. The next most popular research topics focused on the impacts of pandemic control measures on loneliness and its impacts on people's overall well-being (topic 3), as

well as social support issues (topic 10), constituting 23.4% and 11.47%, respectively. The least popular research topic was loneliness and psychosocial problems experienced by vulnerable groups of adolescents and children.

TABLE 3. TEN RESEARCH TOPICS IDENTIFIED BY LDA

Topic	Research themes	N	%
Topic 1	Technology use during the pandemic	185	4.85
Topic 2	Loneliness and psychological pressures of patients and healthcare workers	141	3.69
Topic 3	Impacts of COVID-19 loneliness on physical, mental, and social well-being	336	23.40
Topic 4	Impacts of COVID-19 loneliness on physical, mental, and social well-being	557	-
Topic 5	Impacts of COVID-19 loneliness on behavioral changes	300	7.86
Topic 6	Loneliness of older adults and their coping strategies	265	6.94
Topic 7	Loneliness of younger adults and their coping strategies	199	5.21
Topic 8	Loneliness of adolescents, children and their coping strategies	68	1.78
Topic 9	Socioeconomic and clinical risk factors for loneliness during the pandemic	941	24.65
Topic 10	Social support challenges and social services interventions	438	11.47

Figure 5 visualizes trends of the 10 most common topics from 2020 to 2023. All topics saw substantial increases in the number of publications at the beginning of the period (2020-2021), reflecting an immediate surge in research interest in the field of COVID-19 loneliness. Throughout the next 3 years, publication shares in topics 3, 9, and 10 remained much larger than those of other topics and followed an overall upward trend, highlighting the significant and growing interest from academic researchers in these three topics. By contrast, topic 5 on behavioral changes driven by COVID-19 loneliness received less scholarly interest, with a relatively downward trend in the volume of publications.

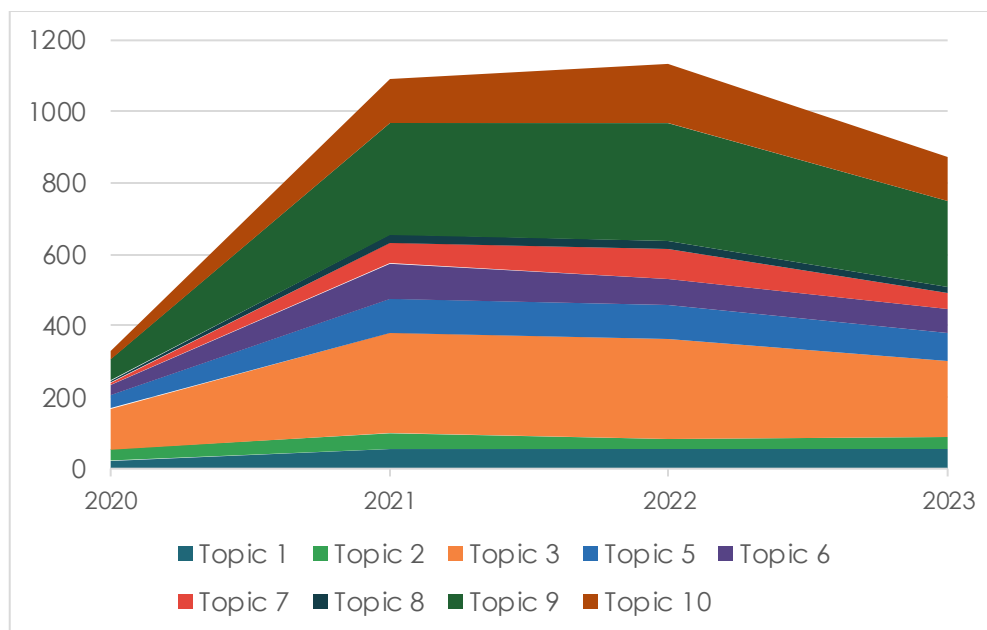
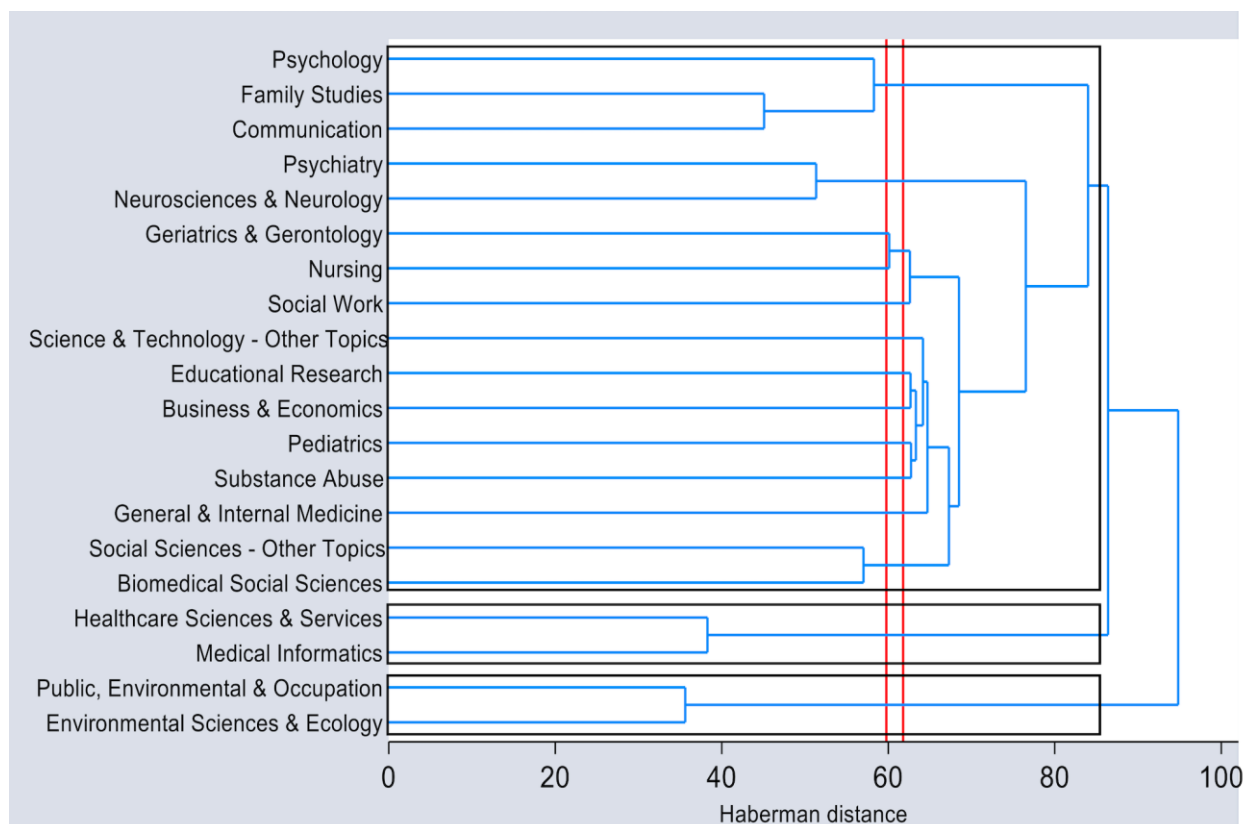
FIGURE 5. RESEARCH TRENDS GROUPED BY 10 MAJOR THEMES IN COVID-19-RELATED LONELINESS

Figure 6 presents the hierarchical clustering of research areas related to the COVID-19 loneliness field. Research disciplines such as Psychology, Psychiatry, Geriatrics & Gerontology, and Social Sciences garnered considerable traction from researchers. In contrast, Healthcare Sciences & Services, and Medical Informatics received comparatively less attention. It is also noted that the cluster of Family Studies and Communication substantially diverges from the cluster of Pediatrics and Substance Abuse, suggesting a lack of social support interventional studies for young individuals who experienced loneliness and substance use issues during the pandemic.

FIGURE 6. DENDROGRAM OF HIERARCHICAL GROUPING OF RESEARCH AREAS

DISCUSSION

This study presents the first attempt to summarize the existing literature on loneliness during the COVID-19 pandemic from 2020 to 2023. The review is conducted to analyze the bibliometric characteristics of each study and to evaluate content developments in the field. Based on the aggregated volume of selected scientific papers, we found a steady increase in research productivity on COVID-19 loneliness over time, highlighting growing interest in this field from both academia and policy making. Furthermore, by analyzing changes in research contents, we discovered that the most common research topics included investigations into how COVID-19 mitigation measures affect loneliness, its impacts on people's well-being, associated risk factors, and social support interventions. Our results provide valuable insights into the advancement of research on COVID-19 loneliness, helping to identify knowledge gaps and inform future impactful research proposals.

Our bibliometric analysis revealed that developed countries, such as the USA, England, and Canada, play an important role in contributing to the rapidly expanding research landscapes on COVID-19 loneliness. The dominance of research output from educational institutions in these countries is consistent with findings from a previous paper that reviewed the top 100 studies on loneliness from 1989 to 2021 [25]. This trend is not surprising, given the high research capacity in these nations, characterized by abundant research resources and efficient management systems. Moreover, we found that inter-country collaborations predominantly occurred within the same region, likely attributed to geographic proximity that facilitates the expansion of research networks. Given the cultural differences in how loneliness is conceptualized across different countries [26], more research is needed to better understand COVID-19-related loneliness in developing countries.

In addition, our keyword co-occurrence analysis provides a glance at the most frequent keywords in the literature. This information is useful to effectively capture research hotspots in the field of COVID-19 loneliness. To illustrate the co-occurrence map, the VOSviewer software categorizes different clusters by analyzing the links and weights (cited frequency) between items. The bigger the cluster is, the more extensively the topic is investigated in the field. Our co-occurrence map of author keywords divided COVID-19 loneliness into 8 distinct clusters. The first cluster (red) is centered on research of the elderly during the pandemic, which includes keywords such as aging, long-term care, dementia, older people, technology, social networks, and nursing home. Loneliness among younger adults dominates the second cluster (green) with keywords such as adolescents, emotions, perceived stress, and depressive symptoms. The third cluster (blue) describes topics related to compounding factors of COVID-19 loneliness and its related health outcomes, which consists of keywords like risk factors, suicide, substance use, epidemiology, and post-traumatic stress disorder (ptsd). The fourth cluster (yellow) highlights psychological impacts of pandemic-induced loneliness on children and adolescents, while the fifth cluster (purple) focuses on aged populations and feelings of fear, particularly in the Japanese context. The sixth cluster (bright blue) depicts people's poor health conditions, such as anxiety, insomnia, and the exacerbated effects of COVID-19 loneliness on cancer patients' health outcomes. The seventh cluster (orange) relates to social support, college students' coping strategies, and online learning. Finally, the eighth cluster (brown) shows psychological problems like stress among students during the pandemic. This visual keyword co-occurrence allows us to identify research topics with heightened citation activity, where most studies investigate elderly populations and emerging topics of COVID-19 loneliness focus on university students, children, and adolescents.

Based on the keyword co-occurrence map and the research topic table, this study provides confirming evidence on the most significant topics related to loneliness during the pandemic, including the impacts of COVID-19 public measures and the resulting loneliness on people's well-being, associated risk factors, and social support interventions. In particular, the onset of the pandemic (2020) saw a sudden increase in publications on the influences of social distancing policies on loneliness and its effects on people's physical and mental health. Since loneliness was a topic of concern even before the pandemic, with its relevance to deteriorating health outcomes, it is evident that most researchers sought out to comprehensively examine the changing levels of loneliness during the early stages of the pandemic. In the following years, emerging research topics began to focus more on the factors that contribute to loneliness and the role of social support services during the health crisis. There is ample evidence on the effects of socioeconomic determinants on COVID-

19 loneliness, such as living alone and lower income due to the pandemic [27,28], as well as clinical risk factors like prior mental symptomatology [29,30]. Similarly, the preventive role of social support in mitigating loneliness has received increasing attention from scholars. The disruption of social interconnectedness due to anti-pandemic measures posed significant challenges to social support services, especially for individuals with preexisting psychological issues [31,32] and elderly residents in nursing homes [33]. Research topics related to social support during the pandemic have been widely studied, regarding how to improve the quality of social relationships and how to increase the accessibility of social support services [3,34]. Examples include intergenerational communication programs within the community [35], widespread applications of digital technologies (e.g., video calls and social media) [36], and visiting schedule arrangements in healthcare settings [37].

On the other hand, our topic modeling analysis highlights a lack of publications that explored loneliness among adolescents and children. Adolescence is recognized as a crucial developmental stage in human life, marked by significant physical and emotional changes [38]. During this developmental phase, it is vital for young people to form relationships, engage in peer groups, and develop mentality. However, children and adolescents became one of the most affected populations during the crisis, facing severe restrictions due to mass quarantine measures, including studying from home and the cessation of in-person extracurricular activities with their friends. These restrictions indirectly exposed this age group to increased risks of physical, social, and mental health problems. Extant literature from various countries, such as the USA, Canada, and China, reported that children experienced increased physical inactivity and sedentary behavior during the pandemic [39–41]. On top of that, these younger adults were severely prone to heightened social isolation, worsened mental health, and increased depressive symptoms. In addition to external factors, like school disconnection, children and adolescents were also heavily affected by internal factors, like family conflicts driven by social and economic changes during the pandemic [42]. Such combination of these internal and external factors made the youth even more susceptible to fear, uncertainty, and diminished psychosocial functioning during the health crisis. Moreover, children and adolescents have been empirically evidenced to be at higher risks of developing mental health issues than young adults, if getting exposed to the same health threats [11,43]. Therefore, given the potential for adverse health outcomes to be exacerbated by the pandemic among this demographic [44], further research is needed to explore how COVID-19 loneliness, which has been shown to persist beyond the pandemic, affects the well-being of children and adolescents in the long run.

Furthermore, we found that there is limited research on how loneliness affects lifestyle behaviors, such as smoking, alcohol consumption, physical inactivity, and substance abuse. Loneliness is well-established as a major contributor to adverse health outcomes and negative health behaviors, such as smoking and substance misuse. While it has been widely documented that the COVID-19 pandemic has intensified feelings of loneliness and poorer health status, empirical evidence on how increased loneliness during this period impacts behavioral changes remains limited. Proposed by Cacioppo et al. (2013), the Evolutionary Theory of Loneliness posits that loneliness is an adaptive evolutionary tool that encourages individuals to reengage socially and repair or replace relationships, resulting in a series of behavioral, neural, and hormonal adjustments [45]. This framework lays the foundation for researchers to investigate the potential effects of loneliness – as an exposure leading to health risk behaviors, like smoking and alcohol misuse, as maladaptive strategies to cope with social isolation. Empirically, scientific evidence has supported the underlying mechanisms that explain the effects of loneliness on negative health behaviors, derived from physiological changes channeled via the stress response [46,47]. Allen et al. (2022) highlighted the potential for long-lasting negative health consequences linked to the pandemic, with a 37% and 29% increase in the likelihood of higher alcohol consumption and weight gain, respectively, among people who often or always felt lonely [48]. Similarly, a cross-sectional analysis by Vanderbruggen et al. (2020) found that loneliness was positively associated with higher alcohol consumption and cigarette smoking than pre-pandemic levels [49]. A heightened risk of non-cannabis drug use was also reported among individuals with constant daily increases in loneliness above the baseline levels during COVID-19 [50]. However, most pandemic-related behavioral research has revolved around samples of the general population, rather than specific vulnerable groups. Hence, more attention should be paid to conducting research on behavioral changes in relation to COVID-19 loneliness, with the aim of identifying distinctive groups of populations who are at risk of increased substance use and developing long-term adaptive interventions.

This study has several important implications for research and policy. First, our results suggest that future research agenda should investigate the effects of COVID-19 loneliness on health-related behavior during and after the pandemic, as well as the prevalence of loneliness among children and adolescents to predict its impacts in their long-term mental health developments. Second, we recommend prioritizing research on adolescents' loneliness using multidisciplinary approaches, such as family support, communication strategies, technology use, and behavioral changes (e.g., substance abuse). Furthermore, it is imperative to encourage research on effective use of information and communication technologies to improve the quality of social support, both in healthcare settings and everyday life aspects. Finally, strengthened collaboration between developed and developing countries could provide a comprehensive understanding of global patterns of COVID-19 loneliness, offering insights into this health issue from a diversity of cultural perspectives.

Some limitations should be considered when interpreting our findings. First, our selected literature was exclusively derived from a single database. By relying solely on the WoS database, our results may not fully encompass all relevant publications and research areas in relation to COVID-19 loneliness. Nonetheless, despite some criticisms on the relative lack of coverage of social sciences studies compared to natural sciences, WoS remains a highly credible database for the broad inclusion of high-quality indexed journals and multi-functional citation analysis [51]. Second, focusing only on English-language documents may limit the comprehensiveness of our review in a global context. This is because in countries such as China and Japan, many studies are conducted and published in local languages. Finally, our topic modeling method to identify latent research themes over time was based on data extraction from the titles and abstracts of each publication, rather than from the full texts.

CONCLUSIONS

This bibliometric analysis is the first review study conducted to characterize research productivity of existing literature on loneliness during the pandemic from 2020 to 2023, as well as exploring recent research trends in the field. Based on the findings, it is recommended to expand research networks between developed and developing countries to explore the long-term effects of loneliness after the pandemic. The most common research topic is the investigation of risk factors associated with COVID-19 loneliness. Furthermore, while the impacts of loneliness on people's well-being and social support interventions have been extensively studied, inadequate attention has been paid to COVID-19 loneliness among children and adolescents, as well as its effects on behavioral changes. Future studies on pandemic-related loneliness should focus on these topics and adopt a cross-disciplinary approach, incorporating family-based interventions, communication technologies, and behavioral analysis.

Family plays a crucial role in providing consistent emotional support to children and adolescents. Social support from family members helps young people overcome feelings of disconnection from friends and community due to COVID's protective measures, and maintain positive daily routines, which are essential to prevent them from unhealthy lifestyle habits and depressive symptoms. For instance, a study in Germany found that adolescents with stable family environments reported reduced mental strain during the pandemic [42]. Likewise, a study in Indonesia presented the significant influence of family relationships on adolescents' loneliness, highlighting the need for family-centered interventions to improve mental health of this demographic [52]. Furthermore, family support serves as a critical protective factor against the risk of harmful online relationships and negative behaviors among children and adolescents. On the one hand, although social media use can help adolescents foster a sense of peer connections during the pandemic, whether these tools can build genuine friendships to deal with loneliness remains a public concern. On the other hand, loneliness is suggested as a compounding factor for increasing incidence of smoking, alcohol consumption, and substance abuse among young people. Such evidence presents an intricate network of loneliness, its protective and risk factors, and its health consequences, especially concerning the context of vulnerable populations.

Based on the latent research topics identified and the hierarchical dendrogram of various research areas related to COVID-19 loneliness, our bibliometric study highlighted the need to promote cross-disciplinary research that explores the

impacts of family roles, combined with technology use, in mitigating loneliness among children and adolescents. The implications of this study's findings are crucial for guiding future research and policies aimed at addressing adolescent loneliness in the post-pandemic era. For future research, it is imperative to investigate the mediating role of loneliness in the effects of family support on quality online relationships formed during the pandemic and behavioral health changes in young people. Families should provide persistent support to strengthen adolescents' emotional health and create healthy living environments, while giving guidance to promote quality online friendships. Although the WHO declared the end of the COVID-19 pandemic as a global health emergency in May 2023, the risk of new pandemics cannot be overlooked, given the emergence of numerous COVID-19 variants. As a result, multidisciplinary implications targeted at vulnerable groups of COVID-19 loneliness and urgent measures to promote positive health behaviors should be prioritized in future public health policy.

DECLARATIONS

CONFLICTS OF INTEREST

The authors have declared that no competing interests exist.

DATA AVAILABILITY STATEMENT

Data is available upon reasonable request from the first author.

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THE PHENOMENON OF WAITING TO KNOW: THE LIVED EXPERIENCE OF ADULTS EXPOSED AND TESTED FOR SARS-COV-2

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ABSTRACT

OBJECTIVE:

The study explored the lived experience of adults exposed and tested for SARS-CoV-2 while waiting for their test results.

METHODS:

A Husserlian phenomenological approach was utilized to capture the participants' experience as they answered the question "What is the experience like to be waiting for your SARS-CoV 2 results?". Purposive sampling was done, and twelve participants were interviewed. Colaizzi's method was then utilized to analyze the data.

RESULTS:

Four emergent themes were discovered namely: (1) feeling negative emotions, (2) interrupted physiologic patterns, (3) strengthening physical health, and (4) managing mental health.

CONCLUSIONS:

The experience was filled with negative emotions with changes in physiological patterns, but it opened avenues for enhancing physical and mental well-being. Findings suggest care interventions including technology-driven approaches during waiting periods, especially in emerging diseases.

KEYWORDS

SARS-CoV-2, waiting, uncertainty, anxiety, mental health, lived experience, Philippines.

INTRODUCTION

Waiting for uncertain news such as the outcome of a medical test is relatively ubiquitous and complex [1]. More often than not, the waiting period breeds feelings of anxiety, resentment, and fear [2]. It is a tough and agonizing experience like waiting for a SARS-CoV-2 swab test result.

SARS-CoV-2 is a disease-causing virus that has caused severe morbidity and mortality across nations [3,4]. To reduce disease transmission, testing is done on a person at risk for contracting the virus as an essential health strategy for early

screening and case identification [2]. There are several types of viral tests available to detect SARS-Cov-2 infection. Yet, the Reverse Transcription Polymerase Chain Reaction (RT PCR) test remains the gold standard [6]. In its earlier version, RT-PCR test results may take a while, and a person waits for a few days. During this period, most of the suspected patients have to wait for the official results which can take 24 to 72 hours [2] or longer for about 3 to 5 days. However, the relaying of results may take more than 5 days.

In lower-middle-income countries like the Philippines, testing and contact tracing of people who manifest signs and symptoms of COVID-19 outside of health facilities are usually done by contact tracers assigned in each community. The same will visit their homes to perform a swab test, and the suspected victims are informed that they will receive an update on the result through a text message or a phone call [7]. More often than not, these updates will come in late due to varied reasons. One of which is the low testing capacity manifested by an overwhelming number of tests to be done vis-à-vis the accredited laboratory that can perform the RT-PCR test [8]. Another problem involves the system of testing and case reporting with feedback on delayed results [9]. The longer the waiting time, the more that patients are exposed to the uncertainty of acquiring a fatal disease.

Similar to the experience is "scan-xiety", it describes the distressing feeling before and/or after a medical imaging procedure to determine certain conditions. It is often associated with people suspected of cancer [10]. It has been revealed that the waiting period between the scan and the release of the result is particularly a distressing experience and warrants healthcare professionals to help those patients manage their anxiety [11].

Succinctly, waiting to know if one has acquired a disease can be distressing. The perceived delay in time brings frustration, irritation, and anger [2]. Studies revealed that negative emotions accompany the waiting time and that the experience of waiting generates anxiety [12,13]. Similarly, the experience produces undesirable outcomes of hopelessness, helplessness, and languishing [14]. Also, the social stigmatization just from perception of having the disease raises anxiety, depression, and social isolation [15]. Negative emotions and stressful situations, which accompany the experience of waiting, harm the overall physical and mental well-being of a person. A vital consideration for healthcare professionals to ensure positive health outcomes.

The magnitude of the adverse effects of waiting on an individual's health and well-being enforced the need for inquiry. Even if researchers have studied the phenomenon of waiting in different contexts such as in health, business, and economics, there is a need for more information that focuses on waiting for the medical result of a relatively new, highly fatal, and emerging disease. Additionally, the findings of this study may provide information on health management strategies that will help transform the waiting experience into a more manageable one. Hence, this study aimed to describe the experience of what it is like to wait for a SARS-CoV-2 test result.

METHODS

RESEARCH DESIGN AND LOCALE

The researchers utilized a phenomenological approach to explore the experiences of persons waiting for the results of SARS-CoV-2 testing. It was grounded on Husserlian Phenomenology to examine and describe the meaning of their conscious experiences. This research design emphasizes consciousness as it is experienced and that consciousness is intentional. It is rooted in describing or analyzing a phenomenon allowing a thorough exploration of the structures of consciousness [15]. Furthermore, this design accepts that individuals engage with the world, acknowledging its existence as given and shaping the reality of persons [16].

The study was conducted in a highly urbanized city in the Philippines where an RT-PCR test can be done within the locality. It also has one of the highest COVID-19 cases in the country [17]. This city is highly dense leading to multiple strict community lockdowns and social distancing measures, including travel bans and work-from-home arrangements. Almost all are confined in their homes except those whose work is considered "essential" and healthcare related.

RESEARCH PARTICIPANTS, SAMPLING TECHNIQUE, AND DATA GENERATION

Twelve participants were purposely selected using the following inclusion criteria: (a) age of 18 years and older, (b) living or residing in an urbanized city, (c) has undergone RT-PCR Test for SARS-CoV-2, (d) has internet access, and knowledgeable in the use of online platforms for communication such as Zoom, FB Messenger, Facetime, etc., (e) able to comprehend and converse in English or the local language, (f) and willing to share their experiences.

The data collection commenced after obtaining approval from the Ethics Review Board of Cebu Normal University (CNU REC Code 965/2021-08 Castillo). Initially, participants for the study were recruited through an online poster published on Facebook. The poster included essential information about the study. Upon receiving a message from interested participants, an informed consent was sent via electronic mail (e-mail). Snowball sampling was also utilized to recruit possible participants. All participants who the researchers approached agreed to join. They read, signed, and submitted the informed consent through e-mail signifying their voluntary participation in the study. Interviews averaging between 30 to 50 minutes were done on agreed schedules and via a chosen medium (e.g., Zoom, FB messenger, and FaceTime) following a free-flowing discussion. The data collection was primarily done through an in-depth online interview averaging between 30 to 50 minutes. The research question that guided the study was, "What is the experience like to be waiting for your SARS-CoV-2 results?" With permission, the researchers took notes and audio-video recordings during the interviews to enhance the richness of the data contributing to better data analysis. Collection of data ceased upon reaching saturation with the 11th participant, but the researchers added one more to ensure that no new information was uncovered related to the research question.

DATA ANALYSIS

The study then utilized Colaizzi's method, which involved identifying significant statements from transcribed verbatim participants' accounts [18]. Out of these statements, the researchers generated formulated meanings, and formulated meanings that formed similar patterns were grouped to form theme clusters. Two data coders made use of a shared 'code book' and coding was done inductively from observing specific details to draw insights and relationships between and among codes. The researchers used Microsoft Excel, a spreadsheet software to organize the data and perform the analysis.

Theme clusters that describe comparable meanings became emergent themes that best illustrated the lived experience. Table 1 presents an exemplar of how the data was analyzed using this method. Further, exhaustive descriptions of the emergent themes were ensured to provide the fundamental structure of the phenomenon of inquiry. Lastly, key informants' feedback was obtained to ensure accurate transcripts and that descriptions resonated with their experience.

TABLE 1. PROCESS OF DATA ANALYSIS USING COLAIZZI'S METHOD

Significant Statement	Formulated Meaning	Theme Clusters	Emergent Themes
I was rattled by the situation since there was no cure - no vaccines yet (SS6P1)	FM7 Feeling anxious while waiting for the results since there was no cure for the disease.	Feeling Anxious	Theme 1: Feeling Negative Emotions
It's COVID that we are talking about. We really do not know the odds. (SS67P5)	FM77 Feeling unsure of the circumstances while waiting for the results	Uncertainty	
I was angry with the delayed release of the results. It added to the worry of the many consequences of the delay.(SS37P3)	FM44 The overwhelming feeling of anger and worry due to the lack of information on the result of the test	Anger	

Significant Statement	Formulated Meaning	Theme Clusters	Emergent Themes
After my swab, I cannot control my anxiety. I did not eat or feel hungry at all. (SS97P10).	FM108 Having no appetite while waiting for the test result due to uncontrollable anxiety	Disturbed eating patterns	Theme 2: Interrupted Physiologic Patterns
I had difficulty sleeping. I found myself wallowing in bed instead of doing my usual exercise routine. Worry filled my mind that my body would not even move. (SS49P3)	FM57 The feeling of worry affected sleep and exercise patterns.	Altered rest and activity Patterns	
I took my vitamins, ate fruits, and drank more water to boost my immune system. (SS105P11)	FM117 Trying to boost the immune system by taking vitamins and eating fruits	Taking care of physical health	Theme 3: Strengthening Physical Health
I was using a face mask and occupied a separate room. I had to do it to protect others from possibly getting the disease if the result turned out to be positive. (SS34P2)	FM41 Practicing minimum health measures and isolation protocols at home	Practicing minimum health measures	
All we did was pray to God. We bowed down on our knees. We cried out. (SS84P8)	FM95 Communicating with a higher being	Coping with anxiety	Theme 4: Managing Mental Health
I did video calls and watched videos on Facebook to keep myself busy. (SS76P6)	FM87 Doing exercise and using the internet to do video calls and watch videos from content platforms	Coping with anxiety	
My friends and I were able to connect through social media, I found comfort in our conversations (smiles) (SS59P4)	FM68 Receiving comfort from friends through social media FM 69 Media becoming an outlet to express concerns	Staying connected	

RIGOR OF THE STUDY

The researchers used the four criteria of trustworthiness – credibility, transferability, dependability, and confirmability [19]. Persistent observation, and member checking guaranteed credibility and confirmability in the findings. The researchers considered verbal and non-verbal cues during interviews, while peer debriefing and member checks lessened subjectivity, and verified the study findings respectively [20]. Transferability was ensured by employing a set of selection criteria for participants who can provide a thick description of the lived experience so behaviors and experiences become meaningful to others. Dependability means that findings are consistent and could be repeated, whereas, confirmability refers to the extent to which the results of a study are shaped by the respondents only. The researchers ascertained that records of interviews and other data relative to the study were tracked to document the processes supporting the operational steps and for traceability ensuring dependability and confirmability. Lastly, even if the researchers did not personally experience the phenomenon, reflexivity was practiced by intentionally writing pre-conceived thoughts, judgments, or views on the phenomenon of inquiry to avoid biases. Bracketing was also performed with co-researchers through virtual sessions where they openly discussed their thoughts and feelings while uncovering their individual biases.

ETHICAL CONSIDERATIONS

Ethical clearance was sought before the commencement of data gathering. Voluntary participation in the research study was upheld by obtaining informed consent from key informants. All online interviews were conducted in private at a mutually agreed time, date and medium observing confidentiality and privacy. Lastly, audio-video recordings were taken with consent and as verbally expressed during the interview proper. Electronic data are securely stored in a drive with a password known only to the researchers.

FINDINGS

There were twelve participants aged 18 to 56 years old who consented and were interviewed in the study. Out of the twelve, three were college students, while the rest belonged to the working population in varied fields. Throughout the presentation, fictitious names of key informants were used to maintain anonymity. Table 2 summarizes the participants' profile in the study.

TABLE 2. PARTICIPANTS' PROFILE

Participant No.	Pseudonym	Age/Sex	Family Background	Occupation	Result of the RT-PCR Test
1	April	28/F	Living with Husband and Two Children	Virtual Assistant	Negative
2	Bea	27/F	Living with parents	Clinician	Positive
3	Cath	23/F	Living with parents	Customer relation officer	Positive
4	Drei	20/F	Living with parents and siblings	College Student	Negative
5	Ella	31/F	Living with parents and siblings	Virtual Assistant	Positive
6	Finn	28/M	Living with parents	Information Technology Staff	Never received the result
7	Gab	18/M	Living Alone	College Student	Negative
8	Helen	56/F	Living with husband	Home-based baker	Negative
9	Ivan	23/M	Living with parents	Systems Engineer	Negative
10	Josh	23/M	Living with workmates in rented spaces	Service Assistant	Positive
11	Kirk	23/M	Living with workmates in rented spaces	Loans Operation Assistant	Positive
12	Luke	27/M	Living with parents and siblings	College Student	Negative

In the analysis, there were 122 significant statements highlighted from interviews, and 135 formulated meanings were identified. From here, thirteen (13) theme clusters were uncovered, with similar themes grouped into four (4) emergent themes that explained the lived experience of persons tested for SARS-CoV-2 while waiting for their results. Table 3 summarizes the generated themes.

TABLE 3. THEME CLUSTERS AND EMERGENT THEMES OF THE LIVED EXPERIENCE OF PERSONS EXPOSED AND TESTED FOR SARS-COV-2

Emergent Themes	Theme Clusters
Theme 1: Feeling Negative Emotions	Feeling Anxious
	Worrying over the health situation and its consequences
	Anger
	Uncertainty
	Feeling sad and lonely
Theme 2: Interrupted Physiologic Patterns	Disrupted eating patterns
	Altered rest and activity patterns
Theme 3: Strengthening Physical Health	Taking care of physical health
	Practicing minimum health measures
Theme 4: Managing Mental Health	Coping with anxiety
	Staying connected
	Remaining hopeful
	Maintaining a positive attitude
	Acceptance of the current health situation

EMERGENT THEME 1: FEELING NEGATIVE EMOTIONS

The first theme that explains the phenomenon is *feeling negative emotions*. The theme covers an array of emotions that are often considered to be unpleasant and disruptive. The predominant experiences shared by the participants were various negative emotions of worry, anger, uncertainty, anxiety, and sadness. Nine of them expressed anxiety. April shared, *"I had anxiety. I was rattled by the situation since there was no cure - no vaccines yet."* (SS6P1). April, Bea, Kirk, Helen, and Ella added that their source of anxiety is the possibility of infecting others, whether family members or co-workers. Ella recalled, *"The fact that you might have exposed your family members who might not be able to manage it well has got me anxious."* (SS65P5). Others expressed worry and anger over postponed events due to the required isolation. Cath mentioned, *"I was angry with the delayed release of the results. It added to the worry of the many consequences of the delay."* (SS37P3). Disrupted work and school tasks worried Ivan and Drei. Drei added, *"It was quite stressful...I was asking myself what I should focus on first, my schooling or my health."* (SS54P4).

Sadness also kicked in due to forced isolation and lack of physical social connections. April articulated, *"I felt lonely and sad. While isolating, I can hear my family, my children but I could not be anywhere near them (sighs)."* (SS18P1). Further, Ella highlighted uncertainty, *"It's COVID that we are talking about. We really do not know the odds."* (SS67P5).

EMERGENT THEME 2: INTERRUPTED PHYSIOLOGIC PATTERNS

Besides the negative feelings commonly experienced by the participants, a few of them shared about interruptions in their physiologic patterns. This theme elucidates their experience of having altered sleeping and eating patterns while waiting for the result. April and Ivan underscored difficulty in sleeping, *"I was not able to sleep because of the many things that are running on my mind"* (SS1P1). *You can't sleep while worrying over the results"* (SS1P9). The experience also caused some not to eat properly, and Josh recalled his experience, *"After my swab, I cannot control my anxiety. I did not eat or feel hungry at all."* (SS97P10). Cath echoed that her activity patterns changed too, *"I had difficulty sleeping. I found myself wallowing in bed instead of doing my usual exercise routine. Worry filled my mind that my body would not even move."*

(SS49P3). These disruptions in their everyday activities mainly stemmed from the negative emotion they felt while waiting for the results.

EMERGENT THEME 3: STRENGTHENING PHYSICAL HEALTH

Strengthening physical health is another theme elucidating the participants' experience while waiting for their results. This theme pertains to their pursuit of healthful activities such as eating right, having enough rest and sleep, drinking more water, taking vitamins, and practicing minimum health protocols. April, Drei, and Kirk ensured they boosted their immune system by drinking more water and taking supplementary vitamins. Kirk revealed, *"I took my vitamins, ate fruits, and drank more water to boost my immune system."* (SS105P11). Finn and Luke said that they found time to exercise. Luke reminisced, *"For me, it (Yoga) somehow controlled the anxiety. I decided to continue doing it since it releases happy hormones (smiling)"* (SS119P12). Lastly, April, Bea, Drei, and Ella practiced the minimum health protocols to curb the spread of the virus while doing self-isolation. Bea recollected, *"I was using a face mask and occupied a separate room. I had to do it to protect others from possibly getting the disease if the result turned out to be positive."* (SS34P2). April shared the same experience. She explained, *"I did not interact (physically) with anybody so they could be safe too."* (SS12P1). Despite the negative emotions and interruptions in physiologic patterns, the participants remained vigilant of their health and families.

EMERGENT THEME 4: MANAGING MENTAL HEALTH

Managing mental health is the last theme that explains the phenomenon of inquiry. It relates to the various activities that they consciously or unconsciously engage in to keep them going amidst the experience. For instance, a large part of managing the perceived stressful situation is through praying. April, Bea, Ella, and Josh expressed how they communed with God while waiting. Josh recalled, *"I felt that I was less anxious and nervous. It (prayer) helped me ease my worries"* (SS99P10). Helen shared the same, *"All we did was pray to God. We bowed down on our knees. We cried out"* (SS84P8). Others kept themselves occupied with social media (SM) activities and internet contents as avenues for expressing their thoughts, staying connected, and keeping their minds off negativities. April, Cath, Drei, and Finn shared the same thoughts about using SM and internet contents. Finn uttered, *"I did video calls and watched videos on Facebook to keep myself busy."* (SS76P6). Cath resonated the same, *"I did online shopping. I watched Korean dramas which provided entertainment while I was waiting for my result"* (SS42P3). Drei, on the other hand, explained how SM allowed her to stay connected with friends. She said, *"My friends and I were able to connect through social media, I found comfort in our conversations (smiles)"* (SS59P4). Likewise, Gab agreed that he was able to express his thoughts through social media instead of keeping them to himself only.

More importantly, the theme also espouses the positive attitude and mentality of the key informants. They expressed hope and acceptance amidst the uncertainties. Finn, Gab, and Helen shared how they remained hopeful. Helen recalled, *"There was that whisper in my heart to hope."* (SS86P8). Others also exhibited a positive attitude and acceptance of the circumstances. Finn said, *"There is that anxiety while waiting for the results but I still feel positive that it would turn out to be negative"* (SS73P6). Likewise, Luke, Josh, and Ivan said that they just had to continue with their lives since the results were out of their control, but they had command over their body. Ivan mentioned, *"I know myself (and) what I feel. I just have to continue what I have to do"* (SS90P9).

EXHAUSTIVE DESCRIPTION OF THE LIVED EXPERIENCE OF PERSONS EXPOSED AND TESTED FOR SARS-COV-2 WHILE WAITING FOR THE RESULTS

Persons tested and waiting for SARS-CoV-2 test results display an array of negative emotions. Primarily, they are overwhelmed with anxiety and fear as they wait for the result. Worry for their safety and their families envelopes them. And they feel lonely and sad while under forced physical isolation.

Disruptions in eating, sleep, and activity patterns are common experiences. The negative emotions have revealed lesser quantity and quality of sleep, changes in routine activities, and reduced appetite. However, despite these ordeals, they find themselves endeavoring for self-preservation and the welfare of their families. They prioritize strengthening their bodies and immune systems while finding solace in prayers and media use to stay connected and be heard amidst uncertainties.

Amidst the adversities, they remain hopeful and find themselves accepting the reality of the matter. Although they grapple with the negativities, they honed their innate ability to navigate through a temporary setback.

DISCUSSIONS

COVID-19 has triggered unprecedented stress, uncertainty, and anxiety among the affected population [22]. The same tension is evident in the experience of people waiting to know their SARS-CoV-2 test results. Although little is known about the phenomenon, similar studies on waiting for test results revealed perceived uncertainties from various sources [13,23]. These uncertainties predominantly engender negative emotions like fear, worry, sadness, depression, and anxiety from persons anticipating their results and from those who acquired the disease itself [24]. Anger is also expressed by the participants in the study, especially for those who waited for more than a week to receive their results during the earlier part of the disease [25]. Negative emotions can be a reaction to the imminent threat of contracting the deadly disease.

In the context of illnesses, uncertainty is the failure to determine the meaning of illness-related events which results in a person's inability to assign value to events or to predict outcomes precisely [26]. It may be perceived as a threat or opportunity, and individuals can react differently. People who infer uncertainty as such can distinctively mobilize strategies to cope with uncertainty and achieve a state of equilibrium [12].

Besides uncertainty in a relatively novel disease, waiting for COVID-19 test results underscored anxiety as a response to this stressful experience [28,29]. Anxiety is associated with the failure to comprehend the possible future threats of the disease or mitigate its adverse impact [30]. Yet typically, anxiety happens through various neuroendocrine responses producing changes in the body's processes and behavioral patterns, enabling a person's coping ability [31]. Otherwise, the unexpected situation can overwhelm the system leaving a person more vulnerable to stress and escalating anxiety levels.

The coping activities employed during the waiting period were evident in the study. The waiting experience of individuals resulted in the performance of certain strategies to cope with the physical and psychological demands [29]. Health management can consider this experience to highlight the offering of assistance in the development of coping strategies and support once the result is revealed [32]. For instance, a scoping review identified patient-centered strategies that could manage anxiety during waiting periods for COVID-19 testing [33]. This is something that can be further explored for emerging diseases with similar characteristics as COVID-19.

Disruptions in physiologic patterns and behaviors were also emphasized during the waiting period. The anxiety felt while waiting for the results can also lead to changes in physiologic patterns and behaviors. Depending on the degree of the stress response, the body can also manifest physical signs and symptoms [34,35]. For example, high anxiety levels can cause changes in standard dietary patterns and disturbances in sleep and daily activities [22].

In contrast, anxiety is necessary for developing coping behaviors. It is an adaptive function used as a motivation to change or acclimatize to the situation [15] resulting in heightened awareness of both physical and mental health. For instance, while waiting for the test results, individuals amidst uncertainty focus more on controllable factors in a given situation such as compliance with health protocols and being health conscious [26]. Prevention of the transmission of COVID-19 is a family affair with efforts to keep oneself physically healthy while protecting the welfare of family members [27].

In this vein, Staying connected is vital to manage mental health while waiting for test results [39]. An interesting study finding is the use of social media for communicating and coping regardless of age group. A study found that anxiety was linked to more eudaimonic media use or media-based coping strategies among adults. It has become a tool for strategic coping but further studies are needed to iron-out conflicting findings relating to use with positive psychological effects

and detrimental outcomes [40]. Under high stress, individuals will likely turn to media for entertainment and relaxation. Emotion regulation and mood management are a few people's perspectives on media use for coping [41].

The present study further reveals that hope, optimism, and acceptance help moderate negative emotions. Optimism, for example, may influence a person to have a healthy lifestyle and develop cognitive responses and adaptive behaviors leading to increased flexibility and problem-solving ability [42,43]. Hope and optimism are associated with positive coping and subjective well-being [44], and the impact of coping on psychological distress may be mediated by optimism [45]. Lastly, acceptance as expressed in the study should be understood in the light of the context of uncertainty and not of an unchangeable outcome. In this context, it has helped individuals regulate their emotions while waiting for test results but may be different once test results are revealed [46]. Generally, acceptance-based coping during COVID-19 became an alternative pathway to protect oneself from the psychological repercussions of the pandemic [47,48].

LIMITATIONS OF THE STUDY

First, the present study includes 12 participants within the same geographical location, and of varying age groups which may affect the generalizability of the findings. Furthermore, the method through which the study is conducted entails recall of events from participants which can lead to a potential bias in answers. The type of exposure or event that led to the COVID-19 testing may affect their waiting experience. Lastly, the online interview may have limited the researchers from connecting with participants more meaningfully.

CONCLUSION AND RECOMMENDATIONS

The experience of waiting to know the results of SARS-CoV-2 tests arouses negative emotions in individuals due to the tension of the situation. It has highlighted anxiety as a specific reaction to stress and uncertainty. Confronted with uncertain situations, negative emotions, and different levels of anxiety, individuals exhibit changes in physiologic and behavioral patterns, which, in one way or another, have assisted them in maintaining both physical and mental well-being.

The findings of the study call for action to consider this period of disease detection in the overall physical and mental health care strategies employed for emerging diseases including technology-driven approaches. Considering the physical limitations in the context of the disease, healthcare professionals can also focus on providing interactive-educative health interventions during the waiting periods, like multimedia-based home-initiated strategies to manage anxiety. Healthcare management is encouraged to consider strategies to support clients during the waiting periods to ensure physical and mental well-being. Furthermore, research can be done to identify at which waiting point anxiety peaks for timely health interventions.

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- Joana Mariz C. Pananganan, RN, MN - conceptualization, analysis and interpretation, writing and revising of the manuscript, approval of the final manuscript
- Laurence L. Garcia, RN, MSN, DScN - conceptualization, analysis and interpretation, approval of the final manuscript
- Michelle Mae J. Olvido, LPT, PhD - conceptualization, analysis and interpretation, revising of the manuscript, approval of the final manuscript

DATA AVAILABILITY STATEMENT:

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ETHICAL CONSIDERATION:

Prior to the conduct of the study this was reviewed by the Cebu Normal University Research Ethics Committee and was granted approval (Approval Number: 965/2021-08 Castillo)

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DATA LICENSING FOR PUBLIC INTEREST: A RETROSPECTIVE ANALYSIS OF THE COVID-19 OPEN DATASET

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ABSTRACT

The COVID-19 pandemic highlighted the critical need for accessible public health data. However, navigating the complexities of data licensing remains a major challenge, complicating the aggregation, analysis, and sharing of such data. These difficulties are further compounded by diverse legal systems, each with its own copyright and intellectual property rules.

This study examines the licensing terms of 301 datasets within the COVID-19 Open Data metadataset, revealing key barriers to public health data accessibility. To address these challenges, we propose a decision flow diagram to guide users through license compatibility and republishing permissions, enabling ethical and legal aggregation under permissive licenses.

We also present practical guidelines for data producers in public health, aimed at improving the clarity and usability of shared data. These recommendations reflect common licensing issues and the needs of data users, promoting more effective data sharing.

By addressing these barriers, this work offers strategies to enhance the availability and impact of public health data, supporting better responses to current and future global health emergencies.

KEYWORDS

COVID-19, open dataset, data licensing

INTRODUCTION

The COVID-19 pandemic demonstrated the vital importance of data in managing public health crises [1]. In response, the COVID-19 Open Data metadataset [2] was created as a comprehensive repository, consolidating a wide array of COVID-19-related data. This dataset includes information on infection rates, mortality statistics, and various covariates such as mobility trends, weather conditions, non-pharmaceutical interventions, and vaccination progress. The initiative aimed to make this data functional for diverse stakeholders, including researchers, policymakers, and data scientists, fostering a data-driven approach to understanding the pandemic's complexities and informing decisions [3].

Distinguished by its scale and accessibility, the project aggregated data from 301 sources with frequent updates, providing tools like an application programming interface (API) and interactive visualizations to democratize data use. These resources enabled broad applications in research, policymaking, and analytics, supporting advancements in public

health as a science [4]. Data sources were selected based on public availability and minimal usage restrictions, typically requiring only attribution [5,6].

However, assembling such a comprehensive dataset revealed significant challenges, particularly regarding the legal and licensing frameworks governing data use [7]. The diversity of sources, each subject to different licensing agreements, created barriers to integration and dissemination [8]. These issues extend beyond the project itself, highlighting broader challenges in sharing and utilizing public health data during crises [9]. By addressing this often-overlooked issue, this introduction provides a foundation for critically examining the licensing landscape, which holds great potential for advancing pandemic responses yet remains fraught with legal complexities [10].

Data's journey from collection to end-use involves many stakeholders, each playing a pivotal role [11]. Data is initially collected by healthcare professionals or government personnel [12,13] and then curated and shared by health authorities [14,15] or data-sharing entities [16], sometimes through press releases [17]. The value of this data is enhanced when aggregated with other datasets or reformatted for broader accessibility, tasks often handled by intermediaries [18]. Ultimately, researchers, analysts, and policymakers use this data for analysis, visualization, and decision-making [19].

Government and health authority-led 'open data' portals represent a significant step toward democratizing data access. These platforms, ranging from local [20,21] to national authorities [22,23], promote transparency and informed decision-making. Yet, licensing variability—ranging from open licenses to restrictive terms or no license at all—creates challenges for potential users. Licensing ambiguities particularly affect entities like news organizations and researchers intending to republish data, forcing them to navigate the complexities of fair use [24,25], which varies across jurisdictions and depends on the relationship between the source, intermediary, and derived outputs. Recent controversies in artificial intelligence development have brought such issues into sharper focus [26].

The inconsistency in licensing practices hampers data accessibility, complicates compliance for users, and stifles innovation by limiting data integration from diverse sources [27]. Addressing these challenges is essential to fostering an environment where open data fulfills its role in advancing public health, research, and policy [28]. Despite the critical need for accessible public health data underscored by the pandemic, there remains a lack of comprehensive frameworks or best practices for data producers. This gap results in inconsistent access across jurisdictions, limiting usability for both individuals with specialized accessibility needs, such as those relying on screen readers, and automated tools for aggregating datasets [34]. This inconsistency restricts opportunities for large-scale data applications, particularly in machine learning [35].

Selecting appropriate licenses is another challenge for data publishers, given the numerous options [29]. Some publishers opt for custom licenses to address specific needs, adding complexity and necessitating legal expertise [30]. Custom terms can create interpretative challenges, particularly around concepts like derivative works. The classification of a dataset as derivative works, pivotal in copyright law, depends on whether a dataset utilization constitutes significant incorporation of original content [31]. Like fair use, derivative works have faced scrutiny amid advancements in artificial intelligence [32].

Permissive licenses offer a straightforward solution, simplifying compliance by removing the need to evaluate derivative work status. This approach reduces barriers and encourages broader data use [33]. Yet, a unified framework for public health data licensing remains absent, leading to inconsistent access across jurisdictions and challenges for users. This study aims to analyze datasets within the COVID-19 Open Data metadataset, focusing on metrics such as data type, licensing, and publication sources. By examining this comprehensive collection, we propose recommendations for public health data publishers to facilitate broader use of public health data, support automated aggregation, and enhance accessibility.

METHODS

DATA COLLECTION

This section outlines the methodology used to assess the licensure of data sources and determine their eligibility for inclusion in our metadataset. The process began with an exploratory search to identify potential datasets addressing gaps in our objectives, whether related to new data types or specific geographical or temporal coverage. This search utilized general search engines and targeted queries in governmental and public data repositories, yielding several potential datasets.

Datasets were evaluated using both technical and non-technical criteria. Licensing terms and conditions were a primary focus, with preference given to datasets under licenses compatible with our metadataset. These datasets were directly incorporated unless other terms introduced conflicts. Conversely, datasets bound by restrictive share-alike licenses, which impose conditions on the licensing of aggregated outputs, were typically excluded unless successful negotiations with the providers secured more permissive terms.

The feasibility of reliable data aggregation was another critical consideration. Challenges such as network instability and schema volatility sometimes required manual adjustments to the aggregation protocol. Additionally, datasets in machine-readable formats were prioritized for their potential to enable automation, over less accessible formats, such as images or charts.

After this technical evaluation, selected datasets underwent a rigorous legal review, described in detail in the following section, to ensure compliance with licensing requirements for their inclusion in the metadataset. This review involved structured steps to identify potential licensing issues and confirm adherence to relevant legal standards.

For exclusive datasets with incompatible licenses or barriers to automated aggregation, outreach efforts were made to engage with the publishers. These negotiations aimed to either re-license the data under more permissive terms or improve accessibility. While some discussions successfully improved access or licensing conditions, other publishers maintained restrictions to prevent potential misinterpretation of raw data.

LEGAL EVALUATION

Initial Review by Core Team

The legal review began with a preliminary examination by our core team to identify any obvious licensing conflicts or restrictions that could affect a dataset's inclusion in the metadataset. This step served as an initial filter to pinpoint clear legal barriers and streamline the selection process for detailed legal scrutiny.

From a non-technical perspective, datasets were assessed for the presence of personally identifiable information (PII) or data from which PII could be inferred. Aggregated datasets, especially those comprising sufficiently large samples at an administrative region level, were deemed to mitigate PII concerns, adhering to data protection frameworks such as the GDPR [36].

Compilation for Legal Counsel Review

Datasets that passed the initial screening were cataloged into a comprehensive list for further examination by our legal counsel. This documentation included detailed notes on potential legal considerations flagged by the core team, helping to guide the legal review process. The complete list of data sources and their associated licenses was later shared as part of our transparency efforts and for proper attribution.

Consultation with Licensing Experts

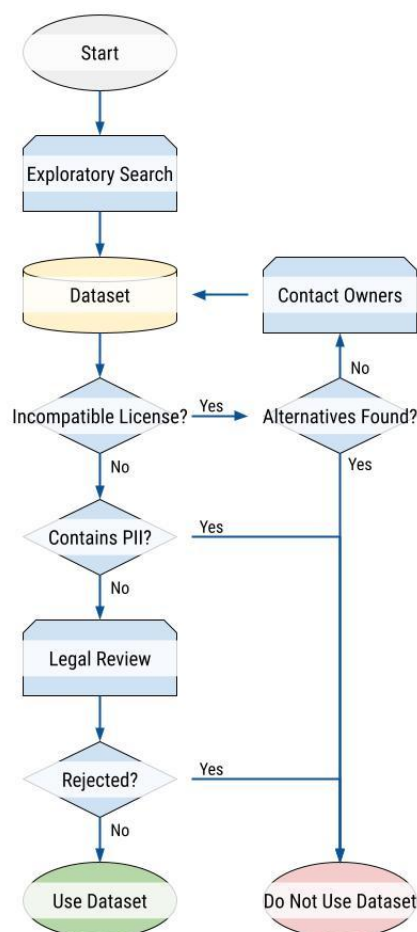
For datasets with ambiguous licensing terms or requiring specialized knowledge, our legal counsel consulted external data licensing experts. These experts, chosen for their expertise in relevant domains, provided insights into resolving complex licensing issues, ensuring compliance with jurisdictional and copyright requirements.

Final Approval and Inclusion

Datasets that underwent this layered review process and received endorsement from our legal counsel were approved for inclusion in the metadataset. This endorsement confirmed that each dataset met the legal standards for use and redistribution, aligning with our commitment to fostering open and accessible public health data.

This structured approach to legal review, depicted in the decision flow diagram in Figure 1, demonstrates our dedication to upholding high standards of legal and ethical data use. By integrating internal assessments with expert consultations, we ensured that the metadataset not only serves as a reliable resource for public health analysis but also complies with the intricate legal landscape surrounding data licensing and usage.

FIGURE 1: FLOWCHART DESCRIBING THE DATASET INGESTION PROCESS.



DATA PUBLICATION

Republishing the aggregated data within the COVID-19 Open Data metadataset required a carefully considered licensing framework. Given the diverse origins of the datasets, each with unique licenses and terms, the chosen strategy needed to respect these individual stipulations while ensuring broad usability. To address this complexity, we selected the Creative Commons Attribution (CC-BY) license for the metadataset. This permissive licensing scheme was chosen for its compatibility with the varied licenses of the included datasets, requiring only that appropriate attribution be provided to the original data sources. This requirement is aligned with the common denominator of terms across the constituent datasets and reflects our commitment to promoting data accessibility and supporting applications in research, policy development, and other fields.

Our approach was guided by the principle that the metadataset's license should neither impose fewer restrictions than the original datasets' licenses nor introduce unnecessary limitations. For example, adopting a license such as Creative Commons Zero (CC0) or placing the metadataset in the public domain would conflict with the attribution requirements mandated by certain source datasets, thereby violating their licensors' terms. Conversely, adopting a more restrictive license, such as one including a ShareAlike condition, was considered but ultimately rejected. While legally permissible, such a choice could hinder the dataset's usability by requiring derivative works to adopt the same licensing terms. This would conflict with our goal of maximizing the metadataset's accessibility and utility for a wide range of users.

RESULTS

The COVID-19 Open Data metadataset aggregates information from 260 distinct sources, comprising a total of 301 datasets, as some sources publish multiple datasets. To enhance the analysis of trends, patterns, and anomalies, we categorize these data sources into various groups. Classification is based on multiple criteria derived from metadata, including data type, publishing source, and license category.

DATA TYPE

Data type refers to the contents of the dataset, including the variables and whether they describe outcomes or covariates. As seen in [Table 1](#), 200 of the data sources contain outcome data, and 60 for related covariates.

Outcome data describes medical outcomes, such as positive test cases and hospitalizations. The datasets with outcome data can be subclassified into core epidemiology (cases, deaths and tests), hospitalizations (general admissions, intensive care, and assisted by ventilator) and vaccinations (single dose, two or more doses and doses by vaccine type). From the datasets classified as outcome data, the epidemiology subclassification had the largest number of data sources, totaling up to 100. This excludes the sources of epidemiological data that provide outcome data stratified by age and sex.

Covariates are variables that relate to outcome data, whether they have a direct relationship (such as non-pharmaceutical interventions) or are considered to be loosely related to behaviors that have a second-order effect on outcome variables (for example, mobility data being an indicator of social behavior). Similarly, the covariates datasets can be subclassified into each of the covered categories. From the datasets classified as covariates, the vaccinations subclassification had the largest number of data sources, totaling up to 35.

TABLE 1: BREAKDOWN OF DATASETS BY CLASSIFICATION (OUTCOME VS COVARIATES), SUBCLASSIFICATION, DESCRIPTION, AND COUNT OF DATA SOURCES (INCLUDING AUTHORITATIVE, JOURNALISTIC AND CROWDSOURCED BREAKDOWNS).

Table Name	Classification	Subclassification	Content	Data Sources
by_age	outcome	By Age	Epidemiology and hospitalizations data stratified by age.	33
by_sex	outcome	By Sex	Epidemiology and hospitalizations data stratified by sex.	28
demographics	covariates	Demographics	Various population statistics.	7
economy	covariates	Economy	Various economic indicators.	3
epidemiology	outcome	Epidemiology	COVID-19 cases, deaths, recoveries and tests.	100

geography	covariates	Geography	Geographical information about the region.	3
google_search_trends	covariates	Search Trends	Trends in symptom search volumes due to COVID-19.	1
health	covariates	Health	Health indicators for the region.	5
hospitalizations	outcome	Hospitalizations	Information related to patients of COVID-19 and hospitals.	39
lawatlas_emergency_declarations	covariates	Emergency Declarations	Government emergency declarations and mitigation policies.	1
mobility	covariates	Mobility	Various metrics related to the movement of people.	1
oxford_government_response	covariates	Government Response	Government interventions and their relative stringency.	1
vaccination_search_insights	covariates	Vaccination Search	Trends in Google searches for COVID-19 vaccination information.	1
vaccinations	covariates	Vaccinations	Trends in persons vaccinated regarding various Covid-19 vaccines.	35
weather	covariates	Weather	Dated meteorological information for each region.	1
worldbank	covariates	WorldBank	Latest record for each indicator from WorldBank.	1

PUBLISHING SOURCE

The publishing source refers to where the information originates from. Although the COVID-19 Open Data project attempted to use information as close to the original source as possible, sometimes data was not available directly from the relevant health authority or it was very challenging to process it. This is the case in developing nations, areas subject to local conflicts unrelated to the COVID-19 pandemic, or with data publishers that preferred to keep a tighter control over how the data could be used. Only the source that published the data used in the COVID-19 Open Data project is considered in this analysis, even if that data originates from yet another data source. The subclassification of publishing sources into authoritative, journalistic, and crowd-sourced can be found in Table 2.

A publishing data source is authoritative when the data is coming directly from a health authority, such as a department of health; or government organization, such as the United Kingdom's National Health Service (NHS) or the United States' Centers for Disease and Control (CDC). Authoritative data sources represent 77.69% of the data.

TABLE 2: BREAKDOWN OF DATASETS BY PUBLISHING SOURCE (AUTHORITATIVE, JOURNALISTIC OR CROWDSOURCED).

Table Name	Authoritative Data Sources	Journalistic Data Sources	Crowdsourced Data Sources
by_age	31	-	2
by_sex	27	-	1
demographics	3	-	4

economy	2	-	1
epidemiology	71	3	26
geography	1	-	-
google_search_trends	1	-	-
health	4	-	1
hospitalizations	34	1	4
lawatlas_emergency_declarati ons	1	-	-
mobility	1	-	-
oxford_government_response	-	1	-
vaccination_search_insights	1	-	-
vaccinations	23	-	12
weather	1	-	-
worldbank	1	-	-

Journalistic data sources are those where the data is aggregated by a reputable third party source, such as a newspaper. In many cases, the main role of the journalistic data source is to aggregate a number of distinct data sources and validate whether they are correct, choosing different sources for different data points depending on some criteria. For example, the New York Times published case counts for USA counties [37] that were significantly simpler to aggregate than those published by the relevant health authority.

Crowd-sourced data sources are those aggregated by a non-journalistic third party source, such as a nonprofit organization. Especially at the beginning of the pandemic, before authoritative data sources established a data publishing pipeline, several groups of individuals collectively gathered data from wherever it was available (including newspaper reports, government press releases, hospital announcements) and made it available for reuse. For instance, the non-profit FinMango republished epidemiological data from multiple health authorities for the countries of Kenya, Sierra Leone and South Africa in an aggregated, machine-readable format. The original data was sometimes scattered across multiple websites or even available exclusively in the legend of a map provided in image format.

LICENSE CATEGORY

The License category is the broad classification of the data license type or, in the case of a lacking, specific license, the applicable conditions to use the data. As seen in Table 3, here are 20 distinct licenses in the various data sources of the COVID-19 Open Data metadataset, which are categorized in the following subgroups.

Permissive data sources include, for example, CC0 [38] (public domain) and CC-BY [6] (attribution required). These are considered permissive because, other than attribution, they impose no restrictions on the users of the data. Crucially, the permissive family of data licenses do not impose any requirements for the license that derivative work (such as data aggregations) need to be published as. The COVID-19 Open Data repository was published under the CC-BY license, in order to allow for unrestricted use of the data by downstream users of the dataset. 85.17% of the data sources used a permissive license.

Some data providers, such as the World Health Organization (WHO), use a custom license that can be considered permissive since none of the terms conflict with other permissive data licenses and aggregation and republication is permitted.

TABLE 3: BREAKDOWN OF DATASETS BY DATA LICENSING (PERMISSIVE VS OTHER).

Table Name	Permissive Licensing Data Sources	Other Licensing Data Sources
by_age	7	26
by_sex	6	22
demographics	6	1
economy	3	-
epidemiology	31	69
geography	3	-
google_search_trends	-	1
health	3	2
hospitalizations	16	23
lawatlas_emergency_declarations	-	1
mobility	-	1
oxford_government_response	1	-
vaccination_search_insights	-	1
vaccinations	25	10
weather	-	1
worldbank	1	-

Share-Alike licenses include CC-BY-SA, although some datasets were evaluated which used a similar but software-specific type of license such as GPL [39]. Share-alike licenses do not simply apply to data aggregations, but to any form of derivative work. This would include, for example, any visualizations made with the data such as charts or interactive tools. The share-alike license terms require any such derivative work to be published under the same license.

Since the data was aggregated by the COVID-19 Open Data project to be used by third parties with unknown requirements as well as interactive visualizations that made use of proprietary technology that could not be made public, the nature of share-alike licenses precluded the use of data sources with that license in the metadataset.

When a data source provided a license that could not be categorized as permissive or share-alike, or lacked a clear license altogether, it was classified as "other." These data sources required careful evaluation by legal experts specializing in data licensing. In most cases, the data did not include an explicit license, necessitating reliance on the custom terms of service of the relevant online portal, which were assessed for legal implications. In some instances, data was considered to fall under the fair use doctrine, even when the licensing terms were unclear or contradictory.

For example, the National Oceanic and Atmospheric Administration (NOAA) publishes the Global Summary of the Day (GSOD) and the Global Historical Climatology Network Daily (GHCN Daily) datasets. However, the licensing terms for these datasets are unclear. At the time of aggregation, the NOAA data search platform displayed a note indicating that the data was subject to the conditions outlined in Resolution 40 by the World Meteorological Organization (WMO) [40]. This resolution refers to an agreement among WMO members but does not specify usage restrictions. Additionally, contradictory information exists regarding usage restrictions, with some sources requiring citation of a specific publication [41]. On platforms such as the Google Cloud Platform Dataset Marketplace, these same datasets are linked to terms that describe them as available "free and without restriction" or even as CC0-licensed [42].

CROSS-ANALYSIS OF DATASET BREAKDOWNS

Cross-analysis of the different breakdowns against data licensing was also performed, with the intent of shedding some light on potential correlation between the different classification categories. As seen in [Table 4](#), data sources with other licensing are the dominant group across all breakdowns, accounting for 60.77% of all data sources; however, they are disproportionately represented in the outcome data type (70%) and authoritative data source (65.84%). In contrast, 30% and 43.10% of the data sources had other licensing for the covariates data type and the non-authoritative data publishers, respectively.

TABLE 4: CROSS-ANALYSIS OF LICENSING BY DATASET CATEGORY, COMPARING DATA TYPE AND PUBLISHER SUBCATEGORIES.

Dataset Breakdown	Permissive Licensing Data Sources	Other Licensing Data Sources
Data Type: Outcome	60 (30%)	140 (70%)
Data Type: Covariates	42 (70%)	18 (30%)
Data Publisher: Authoritative	69 (34.2%)	133 (65.8%)
Data Publisher: Journalistic	3 (60%)	2 (40%)
Data Publisher: Crowdsourced	30 (56.7%)	23 (43.3%)

DISCUSSION

LICENSING CHALLENGES AND IMPLICATIONS

A recurring challenge in data aggregation is determining copyright ownership, particularly when data is repurposed or republished by intermediaries. While facts cannot be copyrighted, the collection or representation of these facts (e.g., under sui generis database rights) introduces complexities in determining the applicable licensing terms—whether those of the original publisher, the aggregator, or both.

Our comprehensive examination of numerous data sources highlights a strong preference among data consumers for clear and compatible licensing, emphasizing the critical need for accessibility and utility in public health data.

In this context, a distinct preference for permissive licensing emerges. This inclination is driven by the simplicity of fulfilling attribution requirements which facilitates broader use of data by enabling diverse users—from non-governmental organizations and private research entities to vaccine manufacturers—to integrate the data into their work with fewer barriers.

Our analysis also revealed that many datasets suffered from licensing ambiguities or relied on bespoke licenses. While such datasets might nominally be protected under the fair use doctrine, the lack of explicit licensing places an undue burden on data aggregators and republishers. These entities are not only required to provide attribution but must also detail the unique licenses or terms of service, complicating compliance and risking misinterpretation by downstream users. Adopting an explicit, widely recognized permissive license could address these challenges by offering data aggregators a consistent framework, eliminating the need for end-users to navigate bespoke licensing agreements. The UK Parliamentary Office of Science and Technology has reinforced this view, noting that international data sharing can be improved through the adoption of common data standards and sharing frameworks [43].

Encouragingly, some data publishers have recognized the limitations of restrictive licensing and transitioned to more open models. For instance, The COVID Tracking Project shifted from a share-alike CC-BY-SA license to a simpler attribution-based CC-BY license [44], demonstrating a commitment to fostering more accessible data practices.

Despite potential selection bias in our dataset compilation—due to the exclusion of sources with incompatible licenses or accessibility barriers—the incidence of datasets for which no suitable alternatives could be identified was minimal.

In conclusion, this analysis underscores the critical need for public health data to be easily aggregable through automated processes and governed by clear, user-friendly licensing. By illuminating the challenges and preferences inherent in the current data licensing landscape, this study aims to inform and influence future practices among data publishers, fostering a more open, accessible, and efficient ecosystem for public health data utilization.

THE ROLE OF AI AND MACHINE LEARNING

Artificial intelligence (AI) and machine learning (ML) have the potential to revolutionize public health by enabling faster and more accurate analysis of complex datasets. These tools can identify patterns, predict disease outbreaks, and evaluate the impact of public health interventions. However, their success depends heavily on having access to high-quality, clearly licensed data.

One major challenge is the fragmented and restrictive licensing of public health data. Unclear ownership and overly restrictive terms make it harder to build and use large, interoperable datasets for AI/ML research [45]. Without these datasets, it is difficult to train models that are reliable and useful across different public health contexts.

The permissive licensing frameworks proposed in this study, such as Creative Commons Attribution (CC-BY), are particularly suited to AI/ML needs. These licenses allow data to be easily shared and combined while minimizing legal complexities. On the other hand, restrictive licenses or unclear terms can limit innovation, as researchers may face barriers when combining or reusing data for AI/ML applications.

Another challenge is understanding how licenses apply to derived datasets. For instance, some licenses may require legal expertise to determine if combining datasets creates a "derivative work." This uncertainty slows down research and discourages collaboration. Clear, simple licensing practices could help overcome these challenges and make it easier to integrate public health data into AI/ML workflows.

Ethical considerations also play an important role. The decline of open data resources risks ignoring critical issues like privacy, consent, and fairness [46]. Public health data publishers need to find a balance between making data widely available and protecting individual privacy while ensuring that AI/ML technologies benefit all communities.

By adopting clear, permissive licensing and user-friendly data formats, public health organizations can support AI/ML innovation. These steps will make it easier to use data for developing new tools and strategies, ultimately helping to improve responses to public health challenges.

GUIDELINES FOR DATA PUBLISHERS

To enhance the accessibility and utility of public health data, we propose a concise set of guidelines tailored for data publishers, including government agencies and health authorities. These guidelines, detailed on the COVID-19 Open Data project page, are designed to address specific challenges identified during the project's development, complementing existing resources like the Open Data Handbook [47,48].

Machine-Readable Formats

Recommendation: Publish data in electronic, machine-readable formats (e.g., CSV) rather than in binary formats (PDF) or as images and charts. This ensures compatibility with accessibility tools like screen readers and diminishes the need for third-party data reformatting.

Example: Utilize CSV for datasets instead of PDFs for reports or summaries, facilitating direct use and analysis.

Stable Access and APIs

Recommendation: Provide stable URLs or APIs for regularly updated data to support automatic downloading. For historical data preservation, maintain versioned datasets accessible through distinct links.

Example: Implement an API for daily case counts that allows users to query current and past data without manual searching.

Aggregated Time-Series Format

Recommendation: For data subject to revisions, publish in an aggregated time-series format to avoid the necessity for users to redownload past versions when updates are made.

Example: Combine daily epidemiological data into a single, continuously updated file rather than separate daily files.

Timeliness and Regularity

Recommendation: Ensure data, especially on topics of general interest like global pandemic epidemiology, is updated in a timely and consistent manner. Establish and adhere to a publishing cadence that balances informational value and feasibility.

Example: Decide on a weekly update schedule for epidemiological data, maintaining this cadence to ensure consistency for users.

Consistency in Data Formatting and Metrics

Recommendation: Maintain consistent data formatting and reporting metrics over time to allow for comparative analysis across different periods.

Example: Use the same data structure and metrics for case counts, ensuring comparability from one update to the next.

Confidentiality and Privacy

Recommendation: Apply techniques to preserve the confidentiality of human subjects, such as redacting identifiable information, aggregating data to obscure individual identities, and implementing differential privacy measures where appropriate.

Example: Aggregate case data to the level of municipalities or districts, applying differential privacy to small counts to prevent identification.

These guidelines are intended to serve as a foundation for data publishers seeking to improve the accessibility, reliability, and ethical use of public health data. By adhering to these principles, publishers can significantly contribute to the global effort of managing public health crises through informed, data-driven strategies.

AVAILABILITY OF DATA AND MATERIALS:

All the data used for this analysis is available in the COVID-19 Open Data repository, hosted on the GitHub platform at the following URL: <https://github.com/GoogleCloudPlatform/covid-19-open-data>.

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The authors did not receive any external funding for this work, and have no competing interests to declare.

AUTHORS' CONTRIBUTIONS:

O.W. performed the original research, analyzed the data, drafted and revised the paper. M.R., drafted and revised the paper.

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A CROSS-SECTIONAL STUDY ON STRESS AND BURNOUT AMONG THE AYUSH DOCTORS IN AN EASTERN INDIAN STATE DURING THE COVID PANDEMIC

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ABSTRACT

BACKGROUND:

Health care workers were at the forefront of the COVID-19 battle. They experienced professional burnout due to long working hours in hospitals, being away from their families, the fear of getting infected and transmitting the infection to family members, and social stigma in society.

OBJECTIVE:

The main objective of this study was to assess the stress and burnout experienced by AYUSH doctors during the COVID-19 pandemic in Odisha.

METHODS:

A concurrent mixed-methods cross-sectional study design was adopted for this study. A Google form was used to gather responses from 56 AYUSH doctors using the Copenhagen Burnout Inventory (CBI), preceded by in-depth interviews with 11 participants. Descriptive statistics and two-way ANOVA analyses were applied to the quantitative data, while thematic analysis was conducted for the qualitative data.

RESULTS:

The in-depth interviews with AYUSH doctors revealed that 63.63% of the participants felt physically and mentally exhausted and susceptible to weakness and illness, including fear of infection; 45.45% felt frustrated; and 18.18% of respondents expressed irritation, stating that they could not endure the situation any longer and felt they were giving much while not receiving what they expected in return. Similarly, the online survey indicated that the mean ($\pm$ SD) scores of personal, work-related, and COVID patient-related burnout were 49.55 ($\pm$ 25.51), 41.45 ($\pm$ 33.15), and 43.22 ($\pm$ 35.72), respectively. Although the average personal burnout was higher than work-related and patient care-related burnout, the difference was not statistically significant at $p=0.5$ when tested using two-way ANOVA.

CONCLUSION:

The AYUSH doctors experienced stress and burnout during the pandemic; however, most felt that this was part of their job and continued to provide services during the pandemic.

KEYWORDS

Burnout, COVID-19, healthcare workers, Indian systems of medicine, psychological wellbeing, stress.

INTRODUCTION

The COVID-19 pandemic created the strongest ripple throughout the globe, where almost all the countries were affected by this [1]. As reported in the COVID-19 dashboard of WHO, the total number of cases and deaths till 1st Jan 2023 were 27.7m and 32.4k, respectively. With this increased number of cases and deaths throughout the globe, the health systems of different countries got overwhelmed and thereby the healthcare workers battling at the front [2]. The pandemic has put tremendous pressure on healthcare workers throughout the globe, with a greater impact on Low- and Middle-income countries (LMICS) with deficient healthcare systems [3].

In India, healthcare workers faced a war like never before, as there is a shortage of the health workforce in the country [4]. Health care workers were at the forefront of this battle. They experienced professional burnout owing to long working hours in the hospital, staying away from families, fear of getting the infection and sharing the same with family members and social stigma in society [5]. Several studies report the prevalence of stress and burnout among doctors in different geographies. In a multicentric Indian Council of Medical Research study among 967 participants across 10 states in India that included doctors, nurses, ambulance drivers, emergency response teams, lab personnel, and others who were directly involved in COVID-19 patient care, 52.9% of the participants reported psychological distress and 9.7% showed the signs of burnout [6]. In a hospital-based short-term follow-up study among 105 resident doctors, 18.1% and 32.4% of them reported stress and burnout [7]. In a meta-review of systematic reviews, which included 40 systematic reviews and 1,828 primary studies among 3,245,768 healthcare professionals, the reported pooled prevalence of stress/post-traumatic stress disorder was 18.6-56.5% [8]. Outbreaks, epidemics, and pandemics have always impacted on the mental health and well-being of the healthcare workers as reported by earlier studies on SARS [9-10] and MERS-Cov outbreak, the A/H1N1 influenza outbreak, Ebola Virus Disease outbreak and A/H7N9 influenza outbreak [11]. Studies during the outbreaks of severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS) revealed that healthcare workers reported higher levels of stress and burnout, resulting in post-traumatic stress disorder (PTSD) [12-13]. Studies reported that healthcare workers considered resignation from jobs, faced stigmatisation resulting in high levels of stress, depression, and anxiety symptoms [14, 15]. During this pandemic, fear of getting infected and spreading the infection to family members was the most common factor of stress among the HCWs owing to a lack of administrative support and personal protective equipment in India and around the globe [16]. During the current pandemic, reports suggest that healthcare professionals are getting infected and even succumbing to the illness [17]. The psychological impact of the pandemic on healthcare workers is increasing, and healthcare workers are also seeking assistance from external sources [18, 19]. Evidence suggests AYUSH doctors actively took part in the COVID-19 response [20]. Given the background, the current study assessed the stress and burnout experienced by the AYUSH doctors while rendering services during the pandemic in the state of Odisha.

OBJECTIVE OF THE STUDY:

The main objective of this study was to assess stress and burnout experienced by the AYUSH doctors during the COVID-19 pandemic in Odisha, India.

MATERIALS AND METHODS

STUDY DESIGN:

The study adopted a concurrent mixed-methods cross-sectional design. This type of design is well-suited for examining different cross-sections by blending both quantitative and qualitative approaches to make inferences about a population of interest at a particular point in time [21].

Study Setting:

The study was conducted in the eastern Indian state of Odisha. The presence of AYUSH doctors in rural parts of the state is substantially higher compared to their allopathic counterparts, and the state has engaged them in rural areas for the management of asymptomatic, mild, and moderate cases.

Study Participants:

AYUSH doctors were selected for this study due to the lack of specific published research. AYUSH doctors are individuals trained in one of the disciplines of Ayurveda, Yoga and Naturopathy, Unani, Siddha, or Homoeopathy. In this study, only AYUSH doctors from the Ayurveda or Homoeopathy streams were included, as practitioners from these fields were the only ones available in the state of Odisha. These doctors were appointed under two different modalities: one through the National Health Mission with a contractual appointment, and the other through the regular Government employee category in the state.

Inclusion Criteria:

(a) AYUSH doctors serving in the state of Odisha recruited either through National Health Mission or through regular category (b) Rendered services during both first and second waves of the COVID pandemic (c) Given consent to participate in the study.

Exclusion Criteria:

(a) Those who were not working in Odisha, (b) Those who did not serve during the COVID-19 pandemic, (c) Those who refused to take part in the study.

Study Instrument:

The Copenhagen Burnout Inventory (CBI) [22] was used in this study, and the data were collected using a Google form. The inventory is an open-access, valid and reliable instrument that measures 19 items under three themes. The inventory consists of three sections: personal burnout, work-related burnout and COVID-19 patient-related burnout and consists of 6, 7, and 6 questions, respectively [22]. In addition, there were questions related to the demographic profile and work profile. The responses to these questions were recorded using five options: Always, Often, Sometimes, Seldom and Never. The average duration to complete the questionnaire by the participants was 12-15 minutes.

In-depth interview:

Before administering the Google form, an in-depth interview was conducted among 11 AYUSH doctors working in different healthcare settings. They were asked questions related to their overall experience during the COVID-19 pandemic and specific questions related to stress and burnout in three areas, such as personal level stress, work-related stress, COVID-19 patient-related stress, administrative support, challenges, and lessons learnt during the pandemic. The interviews lasted between 15-20 minutes and were conducted after obtaining verbal consent. Following this, the CBI was used to collect data from 56 AYUSH doctors in the second phase.

ETHICAL APPROVAL:

The study was conducted as part of the first author's postgraduate dissertation at SP Jain Institute of Management and Research, Mumbai, India, with the research proposal approved by the supervisor on 14th August 2021. The study adhered to the guidelines of the National Ethical Guidelines for Biomedical and Health Research involving Human Participants-2017 set by the Indian Council of Medical Research, Government of India. According to the guidelines, the study was exempt from institutional ethical approval as specified in section 4.8.1, page no. 36. Furthermore, in accordance with the Declaration of Helsinki, the researchers upheld the confidentiality and integrity of the study participants while strictly following survey ethics. Each participant provided informed consent before voluntarily participating in the study, and interviews were recorded using a mobile device with the respondents' permission. Complete confidentiality of the data was ensured during its handling, storage, and analysis.

DATA COLLECTION:

Participants were recruited through the researcher's personal and professional network and were contacted over email. Through snowball sampling, the Google form was shared with 70 eligible participants. Of the 70 participants, all of them have given oral consent to participate; however, 14 did not complete the form, as a result, 56 completed forms were obtained. The responses were automatically received by the author. This data collection was carried out from August to September 2022. Figures. 1 and 2 depict the primary data sources and data collection plan, respectively.

DATA ANALYSIS:

The quantitative data were collected using a Likert Scale through five responses: Always, Often, Sometimes, Seldom and Never. Both descriptive statistics and inferential statistical methods (two-way ANOVA test) were used to analyse the quantitative data. The quantitative data were analysed using R Statistical Software (v4.1.2; R Core Team, 2021). The in-depth interviews with 11 participants were recorded and transcribed verbatim. The transcribed data were read repeatedly to find out thematic areas, and then a thematic analysis was conducted for this qualitative data.

FIGURE 1, PRIMARY DATA SOURCES

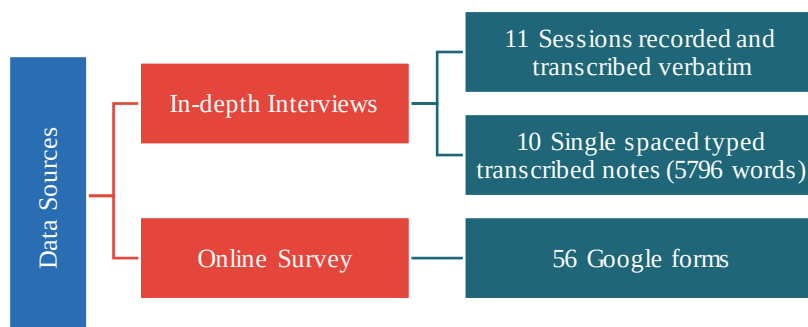


FIGURE 2, DATA COLLECTION PLAN



RESULTS

In the first phase, the in-depth interviews were conducted among 11 participants, followed by an online survey using Google Forms among 56 participants. Table 1 delineates the demographic and professional background of the participants who participated in the in-depth interview. Table 3 delineates the demographic characteristics of the participants who took part in the online survey. Table 4 delineates the professional background of participants who took part in the online survey.

TABLE 1: DEMOGRAPHIC AND PROFESSIONAL BACKGROUND OF PARTICIPANTS FOR THE IN-DEPTH INTERVIEW

Characteristics		Frequency (n=11)	Percentage (%)
Age (In Years)	31-40 yrs	9	81.8%
	41-50 yrs	2	18.2%
Gender	Male	9	81.8%
	Female	2	18.2%
Type of AYUSH System	Ayurveda	9	81.8%
	Homoeopathy	2	18.2%
	Others	0	
Profile of AYUSH doctors	RBSK Medical Officer	1	9%
	NHM-AYUSH Medical Officer	3	27.3%
	Ayurveda Medical Officer	3	27.3%
	MMU Medical Officer	3	27.3%
	Faculty at Ayurveda College	1	9%
Years of service	<10 years	9	81.8%
	>10 years	2	18.2%
Workplace	High risk areas	11	100%
	Low risk areas	0	

*RBSK-Rashtriya Bala Swasthya Karyakram, MMU-Mobile Medical Unit, NHM-National Health Mission

Different sub-themes emerged with the analysis of qualitative in-depth interview data. Table 2 delineates the themes and sub-themes with their definitions and the percentage of participants who reported the sub-themes as a type of stress and burnout while serving during the COVID pandemic.

TABLE 2: MAIN THEMES AND SUBTHEMES AND THEIR DEFINITION

Themes	Sub-themes	Definition	Reported (%) (n=11)
Personal level stress	Physically and mentally exhausted	Individual lacks physical and mental energy, not able to stay awake or alert, not able to sustain in work or complete it, difficulty in concentrating, memorizing, and maintaining emotional stability.	63.63%
	Felt susceptible to weakness and illness including fear of infection	Fear of being self-infected with COVID-19 and becoming ill, being exposed, and becoming ill, or fear of passing virus onto family members.	63.63%
Work related stress	Enough is enough	No more can be tolerated if something is bothering that must stop.	18.18%
	Giving so much	While rendering services one is giving so much but not enough in return.	18.18%
COVID patient related stress	Frustrating	Annoyance and upset.	45.45%
	Irritating	Mild anger and Impatience.	18.18%

PHYSICALLY AND MENTALLY EXHAUSTED:

This theme is related to physical and mental tiredness, where an individual finds it difficult to concentrate and maintain emotional stability. AYUSH doctors expressed their physical and mental exhaustion through the following statements.

"Waiting for the trains at the railway station, to screen the passengers, has been the most exhausting thing that I faced during that period. It could be anytime in the night or any time of the day. I felt like, this is too much." Participant No-5

"Yes, I have felt physically and mentally tired. Being a lady, I was also overburdened." Participant No-11

FELT SUSCEPTIBLE TO WEAKNESS AND ILLNESS, INCLUDING FEAR OF INFECTION:

This sub-theme is related to fear of getting infected and transferring the same to family members and relatives. AYUSH doctors expressed their fear of infection through the following statements:

"I had the fear that I may carry the infection to my family and spread the same to my kids and parents. Initially, taking precautions was also a painful process as everything was new; we used to forget handwashing, sanitizing, etc." Participant No-2

"I felt once that I would get infected when I was handling a case and there was a huge crowd, and incidentally, I developed fever the next day, which persisted for 7-8 days; however, I was found negative. I had the fear that I would transfer the infection to my aged father, who is 78 years old. I never visited any of the family members, relatives during that time and maintained social distance with all." Participant No-3

ENOUGH IS ENOUGH:

This sub-theme is related to a situation where the AYUSH doctors reached a level where they felt tolerating beyond this level is difficult, and hence, enough is enough. One of the AYUSH doctors said.

"In the first phase, I worked for more than 5 months continuously without leave, I felt like how long this COVID situation will continue... Many times, I have also felt that I can't take it anymore." Participant No-3

GIVING SO MUCH:

This sub-theme is related to a state of mind among AYUSH doctors where they felt that they are giving so many services, albeit it's a part of their job, however, they are not getting enough as expected from society at large. One of the AYUSH doctors said that.

"While providing so much of service no nobody recognised the efforts that we put in... no admiration from the administration and inadequate financial incentive are some of the factors that made me think that I am doing so much but getting nothing in return. I am not at all satisfied with the support rendered to me by the administration." Participant No-8

FRUSTRATING:

This sub-theme is related to a state of mind where AYUSH doctors felt annoyed and upset while dealing with COVID-19 patients. Some of the AYUSH doctors said that.

"Yes, in this front, it was frustrating as patients were not cooperative. Some people used to say- "there is nothing like COVID-FOVID, it's false news". Some people used to booze even after being COVID patients. Sometimes they used to throw away food in DCCC. Because of their behaviour, it was very frustrating." Participant No-9

IRRITATING:

This sub-theme is related to a state of mind where AYUSH doctors got angry and impatient while dealing with COVID-19 patients. Some of the AYUSH doctors said that.

"What was more irritating with some patients was that throughout the day, they won't complain about anything; however, the moment we were about to leave the TMC, they would start complaining that I am having breathing difficulty, I am having this, I am having that... That makes us very uncomfortable, as I am the accountable person for the matters related to health. Hence, I always pray to God that nothing should happen to anybody in the night. If something goes wrong, I will be held responsible, and my job might be at stake. I have also observed that mostly at night, patients become more panicked, feeling that if something goes wrong, they may die. The ringtones of my mobile used to give me cold sweats with the fear that something wrong must have happened. I used to get sleepless nights because of this." Participant No-8.

TABLE 3, DEMOGRAPHIC CHARACTERISTICS OF THE ONLINE SURVEY PARTICIPANTS:

Characteristics		Frequency (n=56)	Percentage (%)
Age (In Years)	21-30 yrs	8	14.3%
	31-40 yrs	31	55.4%
	41-50 yrs	16	28.6%
	51-60 yrs	1	1.8%
	>60 yrs	0	0%
Gender	Male	36	64.3%
	Female	20	35.7%

TABLE 4, OCCUPATIONAL BACKGROUND OF THE ONLINE SURVEY PARTICIPANTS:

Characteristics		Frequency (n=56)	Percentage (%)
Type of AYUSH System	Ayurveda	39	69.6%
	Homoeopathy	17	30.4%
	Others	0	0
Type of health facility associated	Community Health Centre (CHC)	24	42.9%
	Primary Health Centre (CHC)		
	Govt. Ayurvedic Dispensary (GAD)	24	42.9%
	Govt. Homoeopathic Dispensary (GHD)	8	14.3%
		0	0%
Years of service	<10 years	24	42.9%
	>10 years	32	57.1%
Workplace	High risk areas	39	69.6%
	Low risk areas	17	30.4%

TABLE 5, RESULTS OF BURNOUT RELATED QUESTIONNAIRE; BASED ON COPENHAGEN BURNOUT INVENTORY (CBI):

Sl N o	Questions	Responses (n=56)					Mean ± SD
		Always	Often	Sometimes	Seldom	Never	
PERSONAL BURNOUT							
1	How often do you feel tired?	10.7% (6)	19.6% (11)	53.6% (30)	8.9% (5)	7.1% (4)	54.46 ± 24.82
2	How often are you physically exhausted?	7.1% (4)	26.8% (15)	50% (28)	12.5% (7)	3.6% (2)	55.36 ± 22.22
3	How often you are emotionally exhausted?	16.1% (9)	30/4% (17)	33.9% (19)	14.3% (8)	5.4% (3)	59.38 ± 27.2
4	How often do you think:" I can't take it anymore"?	8.9% (5)	19.6% (11)	23.2% (13)	25% (14)	23.2% (13)	41.52 ± 32.08
5	How often do you feel worn out?	1.8% (1)	28.6% (16)	30.4% (17)	30.4% (17)	8.9% (5)	45.98 ± 25.13
6	How often do you feel weak and susceptible to illness?	0% (0)	16.1% (9)	39.3% (22)	35.7% (20)	8.9% (5)	40.63 ± 21.62
	Average						49.55 ± 21.49

WORK RELATED BURNOUT							
1	Is your work emotionally exhausting?	10.7% (6)	23.2% (13)	32.1% (18)	12.5% (7)	21.4% (12)	47.32 ± 32.22
2	Do you feel burnt out because of your work?	7.1% (4)	14.3% (8)	26.8% (15)	25% (14)	26.8% (15)	37.5 ± 30.9
3	Does your work frustrate you?	14.3% (8)	12.5% (7)	21.4% (12)	5.4% (3)	46.4% (26)	35.71 ± 38.1
4	Do you feel worn out at the end of the working day?	12.5% (7)	16.1% (9)	26.8% (15)	21.4% (12)	23.2% (13)	43.3 ± 33.2
5	Are you exhausted in the morning at the thought of another day at work?	8.9% (5)	19.6% (11)	16.1% (9)	16.1% (9)	39.3% (22)	35.71 ± 35.31
6	Do you feel that every working hour is tiring for you?	1.8% (1)	17.9% (10)	7.1% (4)	19.6% (11)	53.6% (30)	23.66 ± 30.68
7	Do you have enough energy for family and friends during leisure time?	35.7% (20)	21.4% (12)	25% (14)	10.7% (6)	7.1% (4)	66.96 ± 31.66
	Average						41.45 ± 23.04
COVID PATIENT RELATED BURNOUT							
1	Do you find it hard to work with COVID cases/suspects?	14.3% (8)	19.6% (11)	19.6% (11)	12.5% (7)	13.9% (19)	41.96 ± 36.96
2	Do you find it frustrating to work with COVID cases/suspects?	7.1% (4)	10.7% (6)	12.5% (7)	12.5% (7)	57.1% (32)	24.55 ± 33.54
3	Does it drain your energy to work with COVID cases/suspects?	10.7% (6)	12.5% (7)	17.9% (10)	12.5% (7)	46.4% (26)	32.14 ± 35.9
4	Do you feel that you give more than you get back when you work with COVID cases/suspects?	35.7% (20)	23.2% (13)	17.9% (10)	5.4% (3)	17.9% (10)	63.39 ± 36.92
5	Are you tired of working with COVID cases/suspects?	8.9% (5)	12.5% (7)	25% (14)	8.9% (5)	44.6% (25)	33.04 ± 34.74
6	Do you sometimes wonder how long you will be able to continue working with COVID cases/suspects?	37.5% (21)	21.4% (12)	16.1% (9)	10.7% (6)	14.3% (8)	64.29 ± 36.26
	Average						43.22 ± 26.95

TABLE 6, TWO-WAY ANOVA TEST RESULT AS OBTAINED FROM (R.4.1.2)

	Df	Sum sq	Mean Sq	F value	P Value
Variable	2	2030	1015	1.771	0.173
Residual	165	94557	573.1		

A total of 56 AYUSH doctors participated in the online survey. Of the total participants, 64% of the participants were male and 36% of the participants were female. Of the five age groups 55% of the participants were in the age group of 31-40

years of age, 28% were in the age range of 41-50, 14% were in the age range of 21-30 and there was only one participant from the age group of 51-60 and nobody was found beyond 60 years of age [Table No-3]. In the occupational background it was found that 70% of the doctors were from the stream of Ayurveda and the rest were from the stream of Homoeopathy, 43% of them work in CHCs including equal number of doctors working in PHCs under NHM and remaining 14% of the participants work in GAD under the department of AYUSH [Table No-4]. The mean ($\pm$ SD) scores of the personal, work-related, and COVID-19 patient-related burnout were 49.55 ($\pm$ 25.51), 41.45 ($\pm$ 33.15), and 43.22 ($\pm$ 35.72), respectively [Table No-5]. Though the average perceived personal burnout is higher than work-related and patient care-related burnout, the difference is not statistically significant at $p=0.5$ when tested using two-way ANOVA [Table No-6].

It was further found that 16.1% of the participants always felt emotionally exhausted, 35.7% of the participants always felt that they were not having enough energy to spend time with family and friends, 35.7% of the participants always felt that they gave more while serving the COVID-19 patients than getting back and 37.5% of the participants always wondered that how long were they going to work with COVID-19 patients. Similarly, 28.6% of the respondents often felt that they were worn out, 23.2% often felt emotionally exhausted, and 19.6% of the respondents often felt that it was hard to work for COVID patients [Table No-5].

DISCUSSION

Most of the AYUSH doctors primarily worked with patients in the outpatient departments with less involvement in emergency care and mostly have less patient load compared to their allopathic counterparts [23]. However, with their mainstreaming under NHM, they are now involved with similar kinds of activities at least at the level of a PHC, akin to their allopathic counterparts [24]. Moreover, with this pandemic and with the scarcity of HRH, AYUSH doctors rendered the services as frontline healthcare providers in different parts of the country, including in the state of Odisha.

With the pandemic, the health systems of many countries were overwhelmed and incapacitated owing to several factors such as infrastructure, HRH, medical supplies, surveillance system and information. Of all these factors, HRH plays a very pivotal role in the delivery of health services. This was realised during this pandemic, and all the available HRH were utilised to mitigate the menace of this pandemic. In a country like India, where a pluralistic healthcare system is being followed, the role of the AYUSH system becomes immensely important in mitigating the pandemic [25]. AYUSH doctors serving under the NHM at peripheral health institutions, especially at the level of PHC and CHC, contributed immensely toward care and control during this pandemic. With the joint efforts of the Ministry of AYUSH and the Ministry of Health and Family Welfare, 33,000 AYUSH doctors have been trained to offer COVID-19 care. Furthermore, through the cascade model 66,000 more AYUSH doctors got trained through government platforms [26]. However, all cadres/types of healthcare providers, including AYUSH doctors, witnessed several grades of stress and burnout because of long working hours in the hospital, staying away from families, fear of getting the infection and sharing the same with family members and social stigma in society.

This study found that AYUSH doctors were instrumental in providing care at the Temporary Medical Centers (TMC), contact tracing, primary care of the mild and asymptomatic cases, timely referral, capacity building of ASHA and AWWs, IEC activities at the community level, mobilising the PRI members and the community to follow COVID-19 appropriate behaviour and vaccination. The study identified six sub-themes under three broad themes of personal, work-related and COVID patient-related stress among the 11 AYUSH doctors through the in-depth interview. Some of these sub-themes have been reported by other studies and media reports in India and elsewhere, among different cadres of healthcare providers [27-29]. It is noteworthy to mention that the subtheme of fear was linked to both fear of infection and the fear that emerged from the death of patients and colleagues. In addition to the fear of getting the infection, AYUSH doctors also felt stress owing to the restrictions imposed due to the pandemic and unavailability of leave for a protracted period. AYUSH doctors felt additional stress after prolonged duty hours in dedicated COVID-19 care centres (DCCC) and witnessing the death of patients, and keeping themselves isolated from their loved ones and family members. A US-based study reports similar findings among nurses during the pandemic [29]. AYUSH doctors reported that they were further

stressed because of the closure of eateries, travel restrictions in the town where they served during the pandemic. A similar study among Australian nurses revealed that lockdowns acted as an extra-stressor to work-related stress as they were deprived of the much-needed sources of social support [30].

A study in a tertiary hospital in India reported about insomnia, stress-related anxiety, stress-related irritability, and stress-related hopelessness among different cadres of healthcare workers and found that doctors faced the highest level of anxiety. The doctors and nurses perceived a greater level of irritability. However, the nurses and other cadres of healthcare workers experienced a greater level of insomnia. The study also revealed that being a part of a family, being female and having comorbidity contributed to perceived hopelessness [31]. Another study in several continents including India, Asia, North America, Central/South America, Europe, and other parts among 733 dermatologists revealed that 73.9% of the respondents experienced stress, 33.7% irritation, 30% insomnia, 27.6% depression and 78.6% of the participants were overwhelmed with the information they received on COVID pandemic [32]. Another study among 1253 Dentists of Chhattisgarh revealed that no family time owing to long working hours (90%), concerns of getting infected (83.3%), and financial implications were the factors of stress and burnout [33]. A multi-national study covering China, India, Israel, Italy, and the UK among 1302 dentists reported that fear of being infected by patients, fear of infecting the family and lack of enough information about COVID-19 were the factors of stress and burnout [34]. A cross-sectional study in Eastern India among 384 frontline doctors revealed higher levels of stress among females and unmarried individuals of both groups. Risk of infecting self, colleagues and family members and lack of protective gear in healthcare settings were the main factors of stress [35].

Stress and burnout among healthcare workers, especially among doctors, have led to increased clinical errors [36-38]. Furthermore, stress and burnout among doctors can lead to decreased patient satisfaction, resulting in litigation in healthcare settings. Stress and burnout can affect badly in personal life, sometimes leading to substance abuse and deterioration in interpersonal relationships. Many times, it happens that medical professionals retire early owing to stress and burnout in healthcare settings, adding to the already scarce HRH problem. Stress and burnout in healthcare settings are multifactorial, and previous pandemics have been shown to cause detrimental effects on healthcare workers [39]. Some of the studies used CBI during the pre-COVID-19 times and found significantly less burnout owing to client/patient-related burnout as compared to studies during COVID-19 times [40]. A study among paediatricians during the pre-COVID times showed only a 22% overall incidence, of which 8% had client/patient related burnout, 22% and 14% personal and work-related burnout, respectively [41]. A similar study in a public hospital in Mumbai among 300 residents during the pre-COVID-19 times using CBI found that there was the highest level of stress in personal (66.67%) and work-related (57.14%) domains compared to client/patient related domains (16.67%) [42]. One of the recent systematic reviews that assessed stress and burnout among healthcare workers during the pre-COVID-19 period, where three studies used CBI as a means of assessment, found that the client/patient-related burnout is lower compared to personal and work-related burnout [43]. This clearly shows that the dynamics have changed concerning client/patient-related burnout, where the COVID-19 pandemic has a direct impact on increased patient-related burnout compared to pre-pandemic times; hence, utmost care should be exercised by all the concerned stakeholders to maintain the equilibrium.

The study was conducted among the AYUSH doctors who have certain limitations in rendering the clinical services compared to their allopathic counterparts hence, the findings cannot be generalised across the healthcare workers. Secondly, while conducting the study, it was not ruled out whether any of the participants had any history of mental health problems. Lastly, self-reporting bias, based on the interest and mindset of the respondents, cannot be ruled out. Follow-up studies with a large sample size are needed to assess any long-term impact of the pandemic on their stress and burnout levels.

CONCLUSION

Stress and burnout for any employee negatively affects their performance. In healthcare settings, healthcare professionals must remain free from all forms of stress and burnout to effectively deliver patient care services. Stress and burnout among

AYUSH doctors can lead to poor treatment outcomes and diminished patient satisfaction. Hence, the study recommends the following for better stress management in healthcare environments.

Building confidence and morale among AYUSH doctors: The administration should work to create environments that boost AYUSH doctors' confidence and morale, helping to alleviate existing mental health issues.

Enhanced communication and training: The administration should lead in providing adequate information, instructions, training, and technical updates on COVID-19 through regular communication.

Administrative and financial support: AYUSH doctors should receive adequate comfort, compensation, incentives, and necessary administrative support to enable them to provide effective healthcare services to those in need.

Personal readiness and help-seeking: AYUSH doctors, on a personal level, should prioritise self-care by developing resilience plans, seeking counselling support, and participating in workshop-based self-care training. They must strive to maintain their mental fitness by utilising various computer-assisted training packages for psychological well-being. In times of distress, they should engage with colleagues and seniors to seek expert advice. Pandemics are always unprecedented; therefore, all stakeholders must play their roles appropriately to maintain a healthy life.

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Definition of intellectual content, concepts, design, literature search, manuscript preparation, data analysis: JS
Manuscript editing and review: AH

Conflicts of interest:

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THE FOUR FRAMES FOR CHANGE MANAGEMENT IN HEALTH SERVICES

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ABSTRACT

The delivery of health services is complex, and this complexity is exacerbated by embedded wicked problems requiring solving through change management initiatives. To create sustainable solutions and improvement healthcare leaders and managers are required to have a well-developed understanding of their complex organisation from several perspectives. The Bolman and Deal framework postulates that organisations can be viewed through four frames: structural, human resource, political and symbolic.

This paper presents a collection of four real life published case studies to show the four frames from the perspective of assessment and intervention, demonstrating ways in which the Frames can be applied to healthcare organisations. A retrospective analysis of the case studies demonstrates that the application of the Frames can lead to identifying areas for improvement and innovation and that they can play a role in creating strategies for evaluating health service improvement initiatives. The full potential of the Frames is only realised when a comprehensive approach is taken by utilising all four frames. Only then a better understanding of complex organisations takes place, helping healthcare organisations to improve and innovate.

KEYWORDS

Four Frame Model, Case Studies, Innovation, Leadership, Change management

INTRODUCTION

A positive organisational culture is a key ingredient of well-performing organisations. Many organisational development specialists and senior leaders use frameworks to create strategies to enhance organisational culture. Good theories and frameworks are at the core of effective organisational development and change [1]. One of these frameworks is the Four Frames of organisations: *structure*, *human resources*, *politics* and *symbolism*. The Bolman and Deal [2] Four Frame Model was developed to assist in the comprehension and approach issues about organisational diagnosis, development, and change. The Model assists leaders to gain greater insights into organisational behaviour, via a reflective approach in which participants consider the predominant frames that they are strongest in and strengthen those where weaknesses are identified. From this approach an individual can develop improved capability to lead or manage in a complex environment by reframing or learning to view the organisation from multiple perspectives.

The model aims to develop outward awareness, that is, the strengths and weaknesses of colleagues in the context of each Frame. Previous studies have utilised this model to undertake change in higher education [3], data governance [4] and pharmacy leadership [5] creating sustainable organisational improvements. Each frame is a cognitive concept and is envisioned in this model as a set of ideas and assumptions that assist in organising complex situations within an organisation. This creates the possibility for identifying and interpreting how organisations and their employees' function, by gaining a better understanding of human interactions and processes, and therefore how to change them. A frame can therefore work in varying ways, as a guide, device, lens, filter, prism, or simply a perspective [2]. A key limitation of the four frames relates to it being a framework, and not a full theory. Therefore, while the four frames draw attention to important phenomena, they do not make causal predictions on the interrelations between them, and this could be seen as a limitation of this framework.

For people working within and across health organisations, concerns and challenges are often present around issues such as complexity, ambiguity, disbelief and even deception. The Four Frames Model can be utilised as a tool to gain a more comprehensive understanding of health services, looking inward and from an external perspective. The Frames can contribute to the identification of areas for improvement and innovation. Healthcare professionals are at the fore front of innovation, as many of them are passionate about improving care outcomes, through evidence-based practice [6] and therefore the Frames align well with many health professions. Furthermore, the Frames can also play a role in the development of strategies for evaluating health service improvement initiatives. In this way leaders and managers can better understand healthcare organisations and services [2].

THE FOUR FRAMES

The *structural frame* is about the structure of an organisation and governance, including accountability, work allocation, rules, guidelines, systems, and chain of command. Inclusive in this frame are goals, infrastructure, the characters (employees) and relationships they have with each other, and the way in which they are coordinated. Essentially it encompasses all that contributes to the organisational functioning as an integrated approach. Within this frame, leaders, and managers design, maintain, and align their structure with what is currently needed and what might be needed in the future, the conditions, jobs, know-how, as well as the situation of the organisation, and its objectives. When the structure does not fit with the need, then challenges are likely to occur. Re-organisation or redesign may bring the structure back into alignment.

The *human resource frame* is about understanding people and the way they relate to each other. The needs of individuals are varied and can include fulfilment, anxieties, prejudices, skills to offer, and developmental needs. This frame enables the focus to be upon the fit between the individual and the organisation, allowing a better understanding of the match or mismatch. By caring for its people through the application of this frame, the organisation can understand better how to meet individuals' needs as well as being able to train and educate the individual to meet the needs of the organisation.

The *political frame* places emphasis upon power, rivalry, and competing for limited resources. People in an organisation are the context of this frame, with a range of values and beliefs, differing behaviours and skills all competing for power and resources. It is also the people in the organisation who set the agenda, initiate bargaining, and negotiations, and in their relationship with others, build alliances, compromise, and coerce, as well as manage conflict. Common themes in this frame include competing interests and the struggle for power thus creating either a toxic or creative and innovative environment. From a healthcare perspective the Pathway to Excellence Program, a recognition program for healthcare organisations accredited by the American Nurses Credentialing Centre is a prime example whereby leaders use the political frame to create an innovative environment of evidence-based improvements [6]. The Program entails 12 practice standards enabling organisations to provide a positive work environment [7].

The *symbolism frame* is about the meaning attached to the activity, and the faith people have in that activity. This context focuses on the cognitive as well as the emotional reaction of members of the organisation to an activity, by focusing on the meaning of that they ascribe to the activity, whether as ritual or ceremony. Within the symbolism frame, it is the meaning of an action that matters more than the results; shared confidence and meaning within a group will instill energy, innovation, and depth into a project or activity. By contrast, procedures (formal and informal), guidelines, and managerialism matter less in this frame. Rather, team spirit, values, and the meaning that the group attaches to the project or activity, are the route to organisational effectiveness. The nature of this frame is to challenge leaders to create an environment in which faith, integrity, and meaning of a project or activity allows the support of its members. This notion becomes visible when patients and health professionals collaborate to improve an organisation's effectiveness and efficiency through a meaningful way to improve the delivery of healthcare, a core component of safe and high-quality healthcare [8].

For managers and health leaders, whether dealing with challenges of four-hour waiting times in emergency departments, community care needs, failures of safety processes, or underperformance of elective surgery, the Four Frame Model is a different way to try to understand and interpret health services, which are complicated and complex [9], and offer new ways to reframe health services. The frames are therefore a potentially powerful way to gain clearer understanding and perspective, leading to innovation to improve health services. The Four Frame Model can provide a new approach to effective change management. However, some limitations of the model need to be taken into consideration. The Four Frame Model allows leaders to be versatile and use appropriate frames of reference, adjusting their behavior to each challenge. However, this can introduce room for error, and if the wrong frame is chosen, it could damage or even destroy an initiative that once had potential. Similarly, the model provides almost no guidance in environments that have the kind of leadership that is more distributed. In that case, there are many agents simultaneously causing change, to the strategy becomes less clear because there is a variety of avenues to consider. The model simplifies the different management styles into a single approach when the truth is that sometimes several approaches are required to cause change. However, the four frames do have merit, and this demonstrated through four case studies proving the ways in which the Four Frame Model can be applied in management practice to successfully achieve change in a variety of health services.

METHODOLOGY

The four published case studies chosen share a commonality in that they all entail an improvement initiative. The case studies are underpinned by The Juran Trilogy [10] involving managerial processes including quality planning, quality control and quality improvement as a foundation for organisational quality management. These three interrelated processes are based upon Juran's seminal work that quality does not happen by accident, it must be planned, and that managers and leaders need to provide stability to prevent adverse change and performance variations, develop quality plans to meet new goals, and continually improve organisational processes and systems to create high quality services [11]. The focus of this paper is on how the four frames relate to the case studies and the outcomes of the case studies play a lesser role. The authors of this paper played a lead role in the case studies below, by implementing a planned organizational change.

CASE STUDIES

Case Study 1: "Patient Journey": Patient and family co-led redesign

The challenge with change in health services is being able to achieve evidence-based, meaningful solutions in a timely manner to effect sustainable improvement of patient outcomes, improved patient and staff experience and improved organisational impact. Campbell et al. [12] carried out 18 clinical health service redesign projects in the United Kingdom (UK) over a period of five years from 2003 and a further project in Tasmania in 2018 [12]. These projects were well sponsored by organisational leads and involved patients and families as partners (codesign) as a key part of the process for change. Project outcomes included broad health service improvements based on the needs and expectations of the stakeholders involved in these services [12, 13] and the development of a matrix sampling approach for health services, co-design research.

These redesign projects most obviously highlight how *Political and Symbolic Frames* can influence outcomes in health service improvement. Where Chief Executives make clear statements about the symbolic importance of projects by not sponsoring any other projects, the political implications are considerable amounts of power to deliver on one project, by one group of people. However, in the case of these projects, this standalone sponsorship also affected normal structural approaches (line management) through the undermining of local managers' power and influence. This created the potential for individual and collective resentment of those who were sponsored and protected to achieve their goals.

The *Human Resource Frame* becomes evident throughout these projects in the co-design components, that is working with consumers of the clinical services to better understand how to improve them. This also includes the utilisation of appropriate stakeholder engagement strategies and identifying the right people to fulfil the needs of consumers and the organisation. Healthcare staff are an important group of stakeholders in these projects as they can influence, and are influenced by, any systems and process change. This engagement also shows alignment with the *Structural Frame*, whereby ensuring all levels of staff in healthcare have a voice in redesign is part of the hierarchical nature of health service delivery. The development of various project parties, such as steering committees, working groups and sponsors play a major structural role in the success of redesign of health services.

Case Study 2: Integrating a reablement model in Community Care

In 2018, the University of Tasmania and local community care organisation, Family Based care (FBC), collaborated to develop, and implement a strategy for ensuring a reablement-based model of care was integrated into the service delivery model and that reablement was recognised as a stand-alone organisational value [14]. The project team consisted of FBC staff and University Nursing, Health Science and Medicine academics who worked together to develop training materials centred around how reablement could be utilised specifically as a tool within this organisation. These tools were utilised on an organisation wide level to provide a deeper understanding of the concept of reablement and how it applies to community care through the experiences of direct care workers and care coordinators.

There is clear alignment between the four frames and the way in which the reablement project was undertaken but also some inconsistencies that may have influenced the outcomes of this work. The project team started by utilising staff experiences and building upon existing behaviours to develop a needs-based training program in conjunction with staff, thus empowering them to grow professionally and personally. The *Human Resources* component of the project was strong and well supported by the organisation through shared vision and a focus on staff and client wellbeing. Opportunities were provided for staff to tell their stories in relation to reablement from the beginning of the project, in the education development phase, right through to the final stages of evaluation. Similarly, the *Structure* of the project focussed on how change could be made successfully and sustainably while meeting the needs of the staff in the organisation, their clients and more broadly the families of clients. Emphasis was placed on defining the goals, understanding what reablement was and how best to integrate this into a systems-based process. The care coordination staff worked closely with the project team to clarify the tasks involved in a reablement framework, to develop roles and responsibilities within the organisation and a sustainability model for ongoing success. *Symbolically*, this provided a sense of purpose and meaning for all staff working with clients, particularly when they were able to physically see the change in client wellbeing or when positive feedback was shared. The organisation also recognised the work of staff through rewards based on sharing their own examples of how they incorporate reablement into their daily support activities with clients and some of the benefits that their clients are experiencing.

The Chief Executive Officer (CEO) of FBC was one of the main drivers for this project, a clear *Symbolic* statement about the value of this work and potentially inspiring and motivating staff to get on board. *Politically*, this statement highlights the organisation's vision and how this vision affects the distribution of power. In our project, staff were equal, they were each provided opportunities to be involved in the development of solutions and processes and identifying what was and wasn't working. However, from an organisational perspective, staff were told that they must participate in the training component of the reablement project as part of their role, suggesting that a power hierarchy was still in play. Other political factors to be considered in this project include the organisational funding scheme – clients are funded federally as individual care packages and therefore the organisation wants to provide the best care that they can for the money

they receive. Ensuring that reablement is a part of their care model potentially reduces the pressure on residential aged care facilities and hospitals, thereby reducing health costs more broadly. As a motivating factor, the economic outcomes for this project support the initiatives of the organisation and more specifically the CEO and management team.

Some limitations were evident through the Four Frame model for this project. An inclusive model was utilized where all staff participated in training and evaluation, however this did not always align with addressing staff sense of purpose or inspiring staff on a care level. Feedback from some staff was received indicating that they already understood and implemented reablement daily and that their time was essentially wasted being told to attend training. Similarly, some staff felt reablement was not something that was appropriate for their clients, or themselves, and they found it difficult to understand why a new direction was necessary. *Politically* this conflict had implications for relationships within the organisation from a hierarchical, power perspective and implications for clients and families who may have benefitted from a reablement type care plan. Overall, the organisation has adopted a reablement model as a core value and staff adhere to this model as demonstrated a qualitative evaluation.

Case Study 3: Establishment of a professional doctorate as a joint university and health service initiative

The importance of research conducted by nurse clinicians has been well recognised through the improvements seen in organisational efficiency, improved patient satisfaction and decreased mortality rates [15]. In the Tasmanian Health Service (THS) a major issue had come to the fore in that a limited amount of research was initiated by nurse clinicians. Partly, this issue was caused by nurse clinicians being ill prepared to undertake a research project. The THS and the University of Tasmania (UTAS) have a strong partnership arrangement in place and through this partnership the opportunity was presented to develop a professional doctorate to enhance current limited research capacity of the workforce with and to establish an academic health precinct for nursing and midwifery. Part of this initiative was to build a cohort of doctorally prepared clinical leaders in nursing and midwifery with research projects focused on improving clinical outcomes for patients. At the time of the creation of the professional doctorate, a debate took place for doctoral studies to become more industry focussed and to develop and to maintain closer collaboration between universities and industry [16]. This debate informed the way the professional doctorate was created.

Examining the initiative from the *structural frame*, it is evident that THS leaders and managers saw the need for a professional doctorate to increase organisational and patient outcomes. Central to this insight was the necessity to ensure managerial support for research initiatives undertaken by employees within their workplace. This support did not exist in some parts of the organisation, contributing to employees struggling with completing their studies. As leaders there is a central role in developing the social architecture and balancing this with the task at hand, such as overarching support for research. Similarly, the *Human Resource* frame enhances the initiative by working towards student empowerment and supportive relationships. Undertaking a doctorate is a long process and strong relationships are necessary to sustain the employees and to keep the links between the organisations strong. In this way the basic leadership challenge of balancing organisational and human needs could be worked through.

From a political frame perspective, the THS and UTAS operate in different political environments, created by both organisations having different operational priorities. The THS from an operational point of view needs to ensure that patients receive treatment and are cared for. The health service regards this as the main role of the clinician, while the University regards research and the provision of education as their main tasks. Therefore, these different political environments and priorities can lead competition for limited resources. This became obvious when at times employees were denied research time when clinical priorities escalated. Managing the politics of both organisations is necessary to ensure that research is moving forward, and employees are not caught in a power struggle. In the partnership there must be advocacy for each other's positions, to find a middle way between research and clinical demands.

Lastly, the *Symbolic* frame assists us to see that our shared basic leadership challenge is to develop faith in the initiative and its aims. Opportunities for ritual, meaning and storytelling are important. Such as making opportunities for students and senior staff from both organisations to get together to tell their stories. Students enrolled in the program have been

willing to come to tell of their journeys and symbolically say to their peers "you can do this too and you can make a difference". Opportunities for celebration are important.

Case Study 4: An organisational research capacity building intervention

Limited research capacity in Allied Health professions was identified as an issue existing within the Tasmanian Health Service (THS). In response, in 2018 a group of University of Tasmania (UTAS) academics and THS Allied Health Professionals established the Tasmanian Allied Health Research Group Intervention Trial (TARGIT). This program was designed to have an outcome focussed approach including improved health research capacity and culture, centred on the design, data collection, analysis, implementation, and dissemination of practice-based research.

From a *structural* perspective as part of the task orientated frame the efforts of the combined UTAS and THS leadership teams stressed the creation of an achievable strategy with measurable goals and clear responsibility lines. The major goal concentrated on building research partnerships, developing research experience, and raising THS managers' awareness and appreciation of the importance and value of research in practice. A workshop was conducted that focused on researcher awareness and expectations, developing research questions, building rapport and academic collaboration.

As the *human resource* frame places more emphasis on employees' needs by giving employees the opportunity to perform their jobs well by focusing on personal growth, and job satisfaction. THS managers were involved in participants' progress through encouragement and a report became a mechanism for progress updates and promoted a sense of accountability amongst participants. Mentor meetings between academics and participants were held and the frequency of these meetings were decided by the participants. This unstructured approach was designed to ensure collaboration was natural and real, reflecting attributes of good research collaboration relationships. Meetings of the TARGIT cohort were conducted at 6 months and 18 months into the delivery of the program to regroup, energise, monitor progress, and support the TARGIT cohort. Throughout the delivery of the Program participants expressed that manager support was critical to their success. Participants had varied experiences with the support they obtained from their manager. Some described it as an enabler, others described it as a barrier to finding the time to carry out research in their practice.

In terms of the *political* frame, the relatively resource poor environment for research for Allied Health Professionals in the Southern Region of the THS was the start point. Limited collaboration opportunities with academics and relatively low visibility and prioritisation of research amongst health service management. As part of the *political frame* coalition-building was central to building support for TARGIT. Strategies used to build research capacity within available resources included the utilisation of opinion leaders and these leaders advocated and negotiated between different interest groups for use of limited resources. It became clear that managerial support, opinion leaders and a shared commitment to develop research capacity in a resource poor context is of vital importance. In addition, group work, training, mentoring, supervision, partnership development and protected time helped in creating strong partnerships between the University of Tasmania and the Tasmanian Health Service.

The *symbolic Frame* addresses people's needs for a sense of purpose and meaning in their work. Outstanding performance through celebrations was a key approach and these celebrations were part of a conference organised for participants to present their research. The sense of purpose and meaning increased and this led to organisational support for research and awareness of managers' roles as research enablers. The outcomes of participants' projects clearly demonstrated the benefits of practice-based research embedded as core health business. Many reported outcomes included increased organisational efficiency, staff satisfaction, reduced staff turnover, improved patient satisfaction and decreased patient mortality rate [16]. The program seems to have advanced the development of research culture amongst participants, managers and the academics involved in the process. This is reflected in enhanced awareness, sustained interest, and ongoing collaboration between UTAS academics and health professionals in the THS. Using all frames has shown to significantly contribute to an enhanced research culture in the local Tasmanian health workforce.

DISCUSSION

Four case studies have been presented highlighting the ways in which the Four Frames can be applied in various health service and academic settings to achieve meaningful and sustainable change. Utilising elements of each frame at points during change creates a robust method for meeting the needs of people and organisations in the healthcare context. Consistent with previous studies [17], it was found that the structural frame is best utilised to focus on the rational aspects of engagement and leadership, such as setting policies and goals evident particularly in the Family Based Care model for implementing reablement into existing organisational values. Having the opportunity to be involved in change, regardless of hierarchy is a motivating factor for participation and having an equal voice. The human resources frame focuses on the interpersonal connections among all workers and managers, something clearly demonstrated in capacity building through managerial support evidenced in the TARGIT case. The *political frame* focuses on the conflict that arises from inevitable competition among different organisational groups, such as various departments which is clearly demonstrated within the establishment of a professional doctorate engaging two politically distinct organisations. Consistent with previous research [18] change in higher education should be based on scale and sustain with a focus on culture, which connects the four frames as interrelated components. Power can be the key to successful change, and appropriate power holders can influence motivation through signs of progress [18]. The symbolic frame focuses on social realities, such as the need for inspiration and passion, which can be developed through defining and maintaining value systems that foster an effective corporate culture, evident in patient-centered healthcare models.

Adopting a multi-frame, evidence-based leadership approach to change within a team environment is key to a positive, meaningful outcomes. A clear understanding of the context and each situation should guide the weighting of each frame to be considered at a particular point in time. Scouller [19] suggests that where a leader ascertains that the principal issue within a team is lack of motivation and commitment, the leader may adopt a *symbolic* and/or *human resource* (Frame) approach. If there is confusion around priorities and responsibilities, more success may come from adopting *structural* and *political* Frames. If a group is experiencing uncertainty and anxiety about direction and progression, then *symbolic* and *political* Frames leadership behaviours are more likely to produce effective results. Organisations typically lean toward a *structural* Frame through a hierarchy system which has a specific chain of command, policies, and processes, set roles and technological structure for change [20]. Less attention is then given to the three remaining Frames which may result in unsuccessful change projects due to an imbalance in organisational thought. The reablement case study demonstrated a shift in balance across the four frames at different time points consistent with a previous pharmacy reform study [21].

An authentic leader will learn to recognise workforce needs, adopting the frame that best meets those needs, thus inspiring relevant and necessary change. The Professional Doctorate case study suggests that highly rated staff in the health service might not be supported to undertake doctoral studies. Which could be *symbolic*. However, this could also be of great political significance, impacting the relationship between the two organisations. Bolman and Deal propose [2] that leaders should see the challenges of their organisation through these four frame lenses, so they have a complete picture. This method then allows leaders to decide which frames are most appropriate for meeting goals, aligning with values and visions of an organisation. This is a huge benefit for leaders because it provides an evidence-based, direct model of problem-solving and change within an organisation. The Frames are meant to be used as needed, which means leaders are supposed to use one frame for a while and then change to another. And so, for redesign work in the health service, for example, translational research of all kinds, as well as practice development, four frames is an interesting set of lenses through which to envision the challenges of change.

The fundamental focus of each frame is an important part of the functioning of the organisation. The organisation's whole functions are essentially based on the four frames. To understand the whole organisation, each of the four frames needs to be utilised. And as such the four frames are indicative of areas for focus, consideration, and adaptation. The design of the Four Frames Model requires multi-frame thinking and its application in the same manner. Limiting the thinking and application to fewer than the four Frames is a constrained approach. When a comprehensive approach is adopted from

all four frames, better understanding of complex organisations occurs, and the specific focus of the organisation can develop, improve, and expand.

LIMITATIONS OF THE STUDY

The limitations of this paper include the relatively small number, and broad overview, of health services case studies chosen to represent the advantages and disadvantages of the Four Frame Model. A further in-depth exploration of larger case studies where local and organisational change are being undertaken would provide a more robust analysis and allow for greater generalisability. However, this paper has demonstrated the value of using the Four Frame Model in a small number of case studies.

CONCLUSION

This paper has examined several ways in which the Four Frame Model can be applied to complex healthcare contexts through four case studies. The structural frame clearly identified that people from all levels of an organization need to be involved in change, as it stimulates participation. The human resources frame can be used to enhance the interpersonal connections among all workers and managers through mentorship and a shared vision. The political frame can be used to handle conflict that arises from competition among different organisational groups and finally the symbolic framework can be employed to create sense of purpose and meaning through storytelling. Proposed change should focus on sustainability and culture connecting the Frames as interrelated components. From a practical point of view, the Frames would be useful for healthcare leaders, as a vehicle to initiate, implement and evaluate innovative practices. Furthermore, healthcare organisations who are planning to embark on large changes or are examining ways to enhance their organisational culture might find the Four Frame Model a useful framework for implementing improvement initiatives, to apply multi frame thinking.

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EXPLORING LEADERSHIP IN HEALTH SECTOR NONPROFITS IN NON-WESTERN CONTEXT

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ABSTRACT

OBJECTIVE AND IMPORTANCE OF STUDY:

This scoping review examines leadership within healthcare nonprofit organizations (NPOs) in non-Western contexts, addressing a key research gap in healthcare leadership literature. In resource-limited regions, NPOs support public health, compensating for limited government infrastructure and resources.

STUDY TYPE AND METHOD:

Following PRISMA-ScR guidelines, the review synthesizes peer-reviewed literature on healthcare leadership in NPOs from the past decade.

RESULTS AND ANALYSIS:

Three primary themes emerge - leadership styles, community health leadership, and leadership challenges. Transformational, servant, collective, and shared leadership styles are highlighted for their contribution to fostering collaboration, decentralizing decision-making, and enhancing organizational performance in achieving health outcomes. The review also underscores the importance of leadership in empowering communities through participatory processes, with Community Health Workers (CHWs) playing a pivotal role in driving health initiatives. However, the analysis identifies systemic challenges such as gender inequality, resource constraints, and power imbalances, which undermine effective leadership and the sustainability of healthcare programs in low-resource settings. The review also highlights a Western bias in the literature and calls for more empirical leadership research focused on non-Western regions and their sub-regional differences.

CONCLUSION:

The review emphasizes the critical role of leadership in healthcare NPOs in non-Western contexts, advocating for further exploration of context-specific leadership strategies to improve health outcomes and system performance.

KEYWORDS

Leadership, nonprofit, nongovernmental, healthcare, public health, global health

INTRODUCTION

Health is essential for social welfare [1] and a key focus of the third Sustainable Development Goal, which promotes health and well-being for all [2,3]. The World Health Organization defines the health sector as encompassing public and private services, including health ministries, nongovernmental organisations (NGOs), community groups, and health professionals involved in health promotion, disease prevention, diagnosis, treatment, and care [4]. Health sector leaders in different public, for-profit, and nonprofit organisations must adapt and respond to evolving needs in shifting political, technological, societal, and economic contexts. [2,5]

While research on healthcare leadership has gained recognition, particularly in Western countries [5,6], there remains a significant gap in understanding nonprofit leadership in the health sector in non-Western countries, including Asia, the Middle East, Africa, and Turkey [7]. These regions face more challenges, such as inadequate healthcare infrastructure, workforce shortages, limited access to advanced medical technologies, restricted universal health coverage, and experience more significant development challenges related to poverty, education, and access to clean water and sanitation, affecting health outcomes. Furthermore, many low- and upper-middle-income countries in these regions face a dual disease burden with high rates of communicable diseases like Malaria and Tuberculosis alongside increasing non-communicable diseases such as Diabetes and Stroke due to lifestyle changes. [8]

Nonprofit organisations (NPOs) play a crucial role in shaping public health outcomes, mainly where government resources may be limited [9]. In supporting the country's health systems, NPOs or NGOs partner with foundations, the private sector, and foreign donors through development assistance for health (DAH). Development funding sources include bilateral donors that are represented by single-country government agencies (e.g., USAID, JICA) and/or multilateral donors where more than two bilateral donors pool their aid flow through an international organisation that aggregate preferences from member countries (e.g., UNICEF, World Bank) [9–11]. However, the increasing reliance on external funding has led NPOs to adopt business administration and New Public Management (NPM), raising concerns about whether these organisations are serving donor interests over community needs [9,12].

Despite the critical role of leadership in healthcare, research on nonprofit organisations (NPO) leadership remains disproportionately focused on countries in Western contexts, limiting its relevance to regions with distinct health systems and leadership challenges [5]. Furthermore, existing literature on healthcare leadership often does not differentiate between public, for-profit, and nonprofit organisations, each of which operates under different institutional logic [12] and behaviours [9]. Understanding the leadership of NPOs in diverse settings is essential to examine how values shape organisational behaviour, management approaches, and decision-making processes [9,13].

Addressing this research gap requires a comprehensive review of existing literature on nonprofit leadership in the health sector in more diverse settings. No such review exists currently, making it essential to map the available evidence before formulating hypotheses. Given that most leadership theories stem from Western countries [9], expanding global leadership scholarship necessitates the incorporation of literature in global health and more diverse health system contexts.

This scoping review explores the leadership literature related to NPOs in the health sector by mapping the variety and characteristics of existing peer-reviewed literature and identifying key leadership topics. NPO is defined as meso-level infrastructure within civil society, driving social capital and individual actions. We follow Salamon and Anheier's definition, identifying NPOs by five characteristics: organised, private, self-governing, non-profit distributing, and voluntary. Additionally, we reference the International Classification of Nonprofit Organizations (ICNPO) for health-related NPOs, including hospitals, nursing homes, mental health services, and community-based organisations. [9]

THEORY

Traditionally, leadership theories emphasise individual traits, behaviour, and styles generally applicable or dependent on varying situations. More recently, leadership has been characterised as an interaction between leaders and their followers. Leadership is a dynamic process in which the leader guides and motivates people to work together towards a common goal within a structured environment with mutual influence and shared values [13].

Effective leadership is crucial not only for shaping organisational culture but also for ensuring patient safety and the overall performance of healthcare systems [5,14,15]. Leadership in the health sector has been conceptualised through theories (e.g., servant, lean, transformational leadership), frameworks (e.g., CanMEDS, Russel and Stone's Leadership Framework), and models (e.g., NHS UK Healthcare Leadership Model) [2,5,14,16,17]. A recent systematic review by Wu et al. on leadership styles in the healthcare sector revealed a marked increase in scholarly interest on this topic during the COVID-19 pandemic. The review identified transformational leadership as the most extensively researched style, demonstrating significant positive effects on patient care, employee satisfaction, and team performance. The authentic and ethical leadership styles were also prominently discussed, and the majority of the research in this area originated from Canada, the United States, and China [6].

In addition, servant leadership, centred on the leader's commitment to serving others, has been widely studied across different cultures and contexts, and its value orientation makes it particularly relevant in the health sector [14,15,18]. Although its definition and measurement continue to evolve, research highlights servant leadership's positive impact on individual and organisational outcomes. A review by Demeke et al. across 16 countries, including Pakistan and Indonesia, found that servant leadership improves care quality, job satisfaction, and organisational performance by fostering a patient-centred and supportive environment, often grounded in social exchange theory [15].

Leadership during public health emergencies such as COVID-19 has been examined through key traits like communication, emotional intelligence, and evidence-based decision-making, which are crucial for selecting competent leaders [19]. Additionally, Spanos et al. identified critical competencies needed to address modern healthcare challenges based on the scoping of literature in OECD countries, including innovation, collaboration, and self-awareness. Their findings emphasise the importance of leadership in fostering teamwork, driving innovation, and addressing issues such as workforce burnout and disruptive technologies in increasingly complex healthcare systems [5]. Alternative leadership approaches, such as shared leadership and collective leadership in the health sector, can be challenging due to a more hierarchical structure with extensive policies and procedures [20]. Nonetheless, shared leadership can improve NPOs' resilience and adaptability to navigate uncertainty and positively impact succession management and leadership continuity in NPOs including health organisations [20,21]. Collective leadership among leaders within a hospital network for a geographic region can emerge to enhance integrated healthcare in the Irish healthcare system but requires honest collaboration, openness, and certainty in communication including in the interpersonal relationships of the leaders [22].

METHOD

SEARCH STRATEGY

This review used a Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guideline [5,22]. The search strategy was developed from January 2014 to December 2024 using Google Scholar, PubMed, and Scopus using Harzing's Publish or Perish software. Two keywords used are "Nonprofit Leadership Healthcare" and "Nongovernmental Organization Leadership Healthcare", which intended to limit search results to articles about NPOs and NGOs in healthcare. This review focuses on peer-reviewed literature from the last 10 years to capture recent and relevant perspectives to inform subsequent research direction.

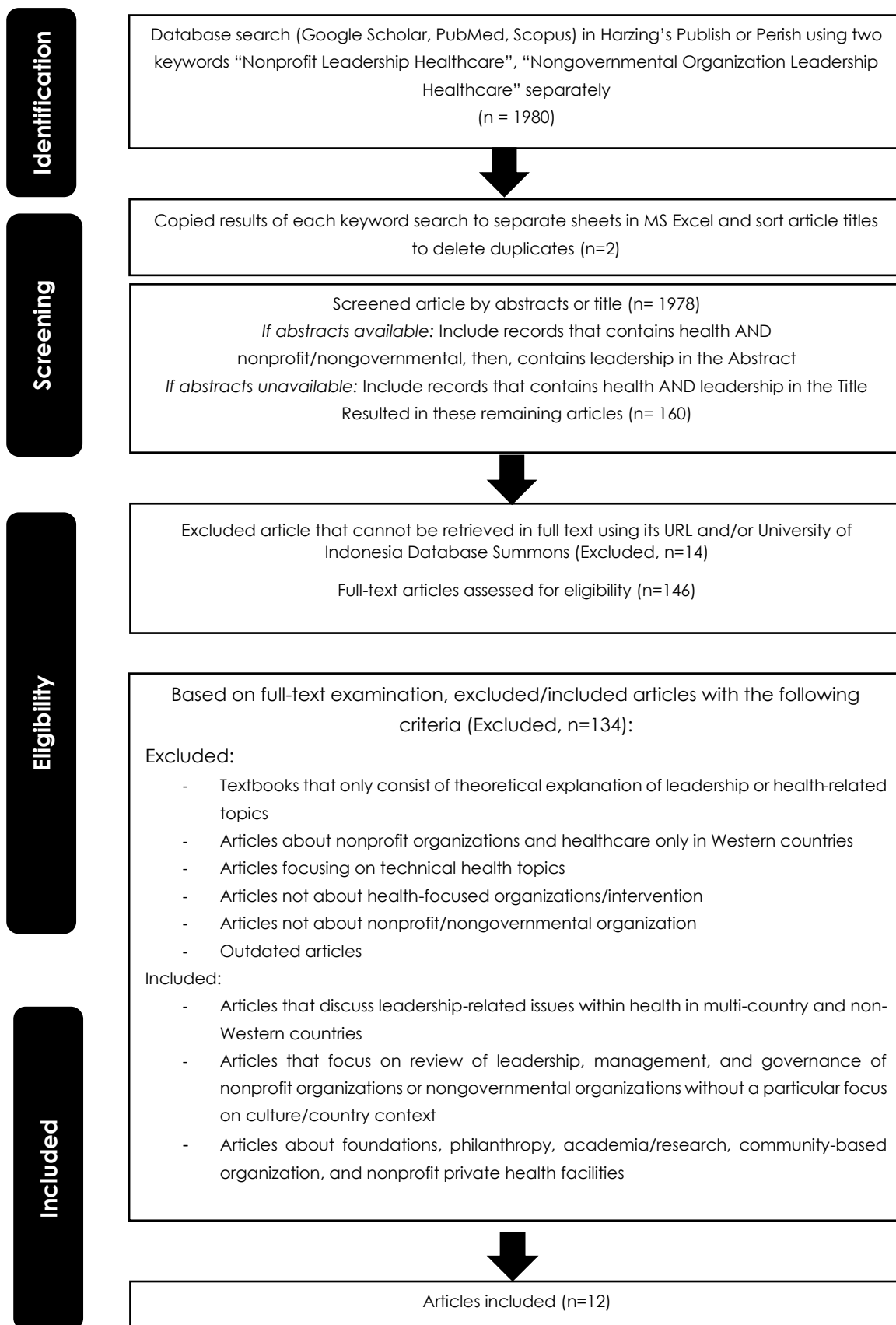
DATA EXTRACTION PROCESS

References found from each database search were saved to Microsoft Excel, and duplication was identified and removed using the filter and sort feature. Subsequently, the article title and abstracts were screened according to the inclusion and exclusion criteria and then included for data extraction and thematic content analysis. These extracted data include record details such as author, publisher, journal, year, authors' country, the country context in the article, article type, aim, concept/theory discussed, health topic discussed, design, and method.

RESULT SYNTHESIS FOR ANALYSIS

First, the authors familiarised themselves by reading the included articles to obtain an overall view of the context of how leadership is discussed across the files as conducted by Spanos et al. [5]. Second, the authors made a summary note for each article on their insight into how leadership is discussed, particularly in the work of NPOs or NGOs and in non-Western contexts. Subsequently, a qualitative inductive approach was employed to identify common concepts coded and grouped to form themes interpreted from those summary notes. All extracted data records and content themes were analysed using descriptive statistics.

FIGURE 1. PRISMA-SCR FLOW ON THE ARTICLE AND RECORDS IDENTIFICATION AND SELECTION CRITERIA FOR REVIEW



RESULT

This section describes the literature review process undertaken, not the content of selected articles.

SELECTION OF INCLUDED ARTICLES

The overall flow of the selection of articles is described in Figure 1. A database search using the keywords "Nonprofit Leadership Healthcare" (NPO-LH) and "Nongovernmental Organization Leadership Healthcare" (NGO-LH) across Google Scholar, PubMed, and Scopus yielded 1,980 records (NPO-LH $n=948$; NGO-LH $n=1,032$) and were copied to Microsoft Excel, with two duplicate entries removed after data were sorted alphabetically. The remaining 1978 articles were subsequently screened through the obtained abstract text and, if unavailable, through title text. Abstracts were then filtered for texts containing the words 'health' and 'nonprofit' for NPO-LH results or 'nongovernmental' for NGO-LH results, then copied into a new sheet filtered for texts containing 'leadership'. The search results from Scopus did not include abstracts, and the authors filtered for the words 'health' and 'leadership' in the title. Therefore, 160 articles remained for eligibility assessment, and after a full-text search, 14 articles were removed because they were unretrievable, yielding 146 full-text records. The authors excluded 134 articles and records based on the exclusion and inclusion criteria, resulting in only 12 articles or 0.6% (NPO-LH $n=7$; NGO-LH $n=5$) from the yielded results were included and synthesised for review.

CHARACTERISTICS OF INCLUDED ARTICLES

The twelve included articles are published by Taylor and Francis ($n=3$), BioMed Central ($n=2$), Sage Journals ($n=2$), Association of American Medical Colleges ($n=1$), Wiley Online Library ($n=1$), DePaul University ($n=1$), Sagamore-Venture Publishing ($n=1$), and Elsevier ($n=1$) by authors or co-authors mainly from United States ($n=10$) and one author or co-authors from Australia, Canada, Switzerland, Tanzania, Turkey. The types of articles included are review ($n=4$), empirical ($n=3$), conceptual ($n=3$), editorial ($n=1$), and perspective ($n=1$).

TABLE 1. CHARACTERISTICS OF ARTICLES INCLUDED IN THE SCOPING REVIEW

No	Author	Publisher	Journal (article type)	Year	Authors country	Country context	Aim	Topic
1	Farnsworth, S. K., Böse, K., Fajobi, O., Souza, P. P., Peniston, A., Davidson, L. L., Griffiths, M., & Hodgins, S.	Taylor and Francis	Journal of Health Communication (Review)	2014	United States	18 Low-and Middle- Income Countries (LMICs); Multi- country	To assess how community participation (i.e., shared leadership is its highest level) contributes to improved infant and child health outcomes at the population level, through enhanced household practices or better healthcare-seeking behaviours.	Leadership style; Leadership in communities
2	Downs, J. A., Reif, L. K., Hokororo, A., & Fitzgerald, D. W.	Association of American Medical Colleges	American Medicine Journal (Perspective)	2014	Tanzania, United States	Multi- country	To examine the gender gap in global health and offer recommendations to encourage female leadership.	Leadership challenges

3	Saxon, A., & Ford, J. V.	Sage Journals	International Quarterly of Community Health Education (Empirical)	2020	United States	Sri Lanka, Bangladesh	To understand how community organising operates to effectively drive change and improve health in underserved populations through three programs in Sri Lanka and Bangladesh.	Leadership in communities
4	Perry, H. B., Chowdhury, M., Were, M., LeBan, K., Crigler, L., Lewin, S., Musoke, D., Kok, M., Scott, K., Ballard, M., & Hodgins, S.	BioMed Central	Health Research Policy and Systems (Review)	2021	United States	Multi-country	To identify the most critical challenges facing Community Health Worker (CHW) programs and propose strategies to strengthen them.	Leadership challenges; Leadership in communities
5	LeBan, K., Kok, M., & Perry, H. B.	BioMed Central	Health Research Policy and Systems (Review)	2021	United States	Multi-country	To examine the quality of relationships between CHWs and key stakeholders at the local level of the national health system and with community members	Leadership in communities
6	Ospina, S. M., Foldly, E. G., Fairhurst, G. T., Jackson, B.	Sage Journals	Human Relations (Conceptual)	2020	United States, Australia	N/A	To deepen academic understanding of the social and relational aspects of leadership in modern institutions by exploring the theoretical and methodological challenges involved in empirical research on collective leadership	Leadership style
7	Hopkins, K., Meyer, M., Shera, W., & Peters, S. C.	Taylor and Francis	Human Service Organizations: Management, Leadership & Governance (Editorial)	2014	United States, Canada	N/A	To describe the challenges faced by leadership in nonprofit organisations in the post-recession period and offer potential solutions	Leadership style; Leadership challenges
8	Ward, C. L., Shaw, D., Anane-Sarpong, E., Sankoh, O., Tanner, M., & Elger, B.	Wiley Online Library	Bioethics (Empirical)	2017	Switzerland	Ghana, Tanzania	To explore the views of stakeholders involved in an international health research partnership in Ghana and Tanzania	Leadership challenges

9	Shirin, Andrey V.	DePaul University	Journal of Religion and Business Ethics (Conceptual)	2014	United States	N/A	To examine whether servant leadership is inherently Christian by analysing the writings of St. Augustine	Leadership style
10	Sullivan, W. P.	Taylor and Francis	Journal of Social Work Education (Review)	2016	United States	N/A	To provide an overview of the current state of leadership in social work, focusing on the distinct functions and challenges leaders encounter in the field	Leadership style Leadership challenges
11	Routhieaux, R. L.	Sagamore-Venture Publishing	Journal of Nonprofit Education and Leadership (Conceptual)	2015	United States	N/A	To discuss the advantages of shared leadership for nonprofits in addressing current trends, such as funding strains, collaboration, talent succession, demographic shifts, and accountability and transparency	Leadership style; Leadership challenges
12	Baysak, B., & Yener, M. I.	Elsevier	Procedia - Social and Behavioral Sciences (Empirical)	2015	Turkey	Turkey	To determine which leadership style is most effective in reducing the negative effects of stress on nonprofit hospital employees	Leadership style

FINDINGS

Based on the content of the twelve articles (Table 1), there are three significant findings about nonprofit leadership in the health sector:

LEADERSHIP STYLES

Seven reviewed articles examined various leadership styles: shared, collective, transformational, and servant. Shared leadership is explored in both a review [20] and a conceptual paper [24], demonstrating its positive impact in diverse contexts, such as child health initiatives in low- and middle-income countries, and its contribution to organisational resilience and patient care in healthcare organisations. This leadership style decentralises decision-making, empowering communities and healthcare workers to foster collective action in sustaining health outcomes [20]. Collective leadership was discussed in a conceptual paper [25] and an editorial [26], highlights the significance of distributing leadership across teams in nonprofit healthcare settings to address increasingly complex challenges. As an illustration, the interaction between co-leaders might reframe issues and bridge different institutional logics, such as between physicians and managers, to drive social change [25]. A review highlighted the importance of transformational leadership in healthcare in aligning individual and organisational goals to improve performance and prioritise patient-centred care [27]. Similarly, transformational leadership in nonprofit hospitals reduces employee stress, enhances organisational performance, and improves patient outcomes by fostering a supportive and motivating work environment [28]. A conceptual paper on servant leadership, grounded in both Christian values and secular thought founded by Robert Greenleaf, emphasises how it contributes to a people-centred approach in healthcare by prioritising the well-being and empowerment of staff and patients [18].

LEADERSHIP IN COMMUNITY HEALTH

Four of the twelve reviewed articles touch on leadership in community health. A review article [20] emphasizes how shared leadership is the highest form of community engagement achieved through participatory processes like the Community Action Cycle to promote long-term behavioural change and social cohesion in low- and middle-income countries. An empirical study about an evaluation of an NGO's intervention in Sri Lanka and Bangladesh frames leadership as an essential tool to address health inequities by fostering critical consciousness as capacity building, collaboration, and community ownership [29]. The search result also yielded two texts as part of 11 articles from a special publication on community health workers (CHW). These local leaders are the intermediaries between the health system and the community through health education, promoting behaviour change, and leading community health initiatives [30]. In addition, CHWs need to develop their leadership skills to as trusted figures who navigate dual roles in the health system and communities; furthermore, their selection, supervision, and evaluation may involve communities to foster a sense of ownership and enhance program sustainability [31].

CHALLENGES IN LEADERSHIP

Six of the twelve reviewed articles reveal systemic and social leadership challenges across global health, nonprofit organisations, social work, and CHW programs. A perspective paper highlights in global health, gender inequality restricts women's advancement into leadership roles, despite their ability to drive policies that improve outcomes for women and children [32]. The authors noted barriers to women's leadership in health include gender bias, discrimination, challenges in balancing career and family responsibilities, and health and safety concerns, especially in resource-poor settings. Two reviews noted that limited political support, inconsistent funding, and resource shortages hamper the impact of CHW leadership on improving health outcomes [30,31]. Nonprofits and social work sectors contend with increasing demand, tight budgets, and a growing need for leadership succession while also facing pressure to prioritise efficiency over client-centred care [27,33]. Empirical qualitative research on partnerships in international health research at Ghana and Tanzania highlighted collaborative leadership is key to fostering equitable partnerships, yet requires overcoming power imbalances between international researchers and local communities [33]. Across these fields, the shift towards more collaborative and decentralised leadership through collective and shared leadership styles is essential to driving sustainable, community-driven change but requires overcoming deep-rooted structural and cultural barriers within the organisation [24,27,32].

DISCUSSION

This scoping review examined leadership literature on health sector nonprofits by mapping the evidence variety and characteristics and identifying key leadership topics from twelve key articles identified from academic literature (Table 1). The three major leadership topics—leadership styles, leadership about community health, and challenges in leadership—are interconnected and collectively shape the leadership landscape in health sector NPOs.

First, leadership styles serve as a foundation for how leaders bring positive health impacts to their organisations and communities. The leadership styles identified—shared, collective, transformational, and servant leadership—orient toward others beyond the individual leader and about the interactive process with professional workers and communities [20,22,23,27–30]. Each leadership style offers distinct advantages. Shared leadership [18] and transformational leadership [28] enabled better well-being of healthcare workers and patients' care. Collective leadership of teams within the facility [25] and between a network of facilities [22] can maximise impact to address interdependent challenges faced by patients. Furthermore, shared leadership can sustain local ownership and capacities to drive improvements in child health [20] indicating community engagement enables succession of healthcare leadership in nonprofits beyond the public health intervention [21].

Second, the leadership styles discussed are closely tied to promoting community health. Shared leadership and collective leadership, for example, are directly applied in community health initiatives, where they empower communities to engage in decision-making processes and foster collective action [21]. The role of community health workers (CHWs) as leaders within their communities also reflects servant leadership principles, where CHWs focus on the well-being and

empowerment of the people they serve [30,31]. Thus, leadership styles are critical in fostering community ownership and collaboration, which are key to addressing health inequities and improving health outcomes in marginalised populations. These leadership styles address the challenges and complexities within healthcare systems, especially in low- and middle-income countries.

Lastly, structural and social challenges must be addressed to successfully apply leadership styles to ensure equitable and sustainable health services and outcomes. Systemic and social challenges, such as gender inequality, inadequate resources, and power imbalances, create barriers to effective leadership [32]. For example, limited political support and inconsistent funding hinder the ability of shared or collective leadership to achieve sustainable health outcomes [30-33]. Similarly, gender inequality in leadership roles undermines the potential of transformational or servant leadership to create more inclusive and effective healthcare systems [32].

CONCLUSION

This scoping review provides insights into nonprofit leadership in the health sector, an underexplored area of healthcare leadership. The findings emphasise the prominence of leadership styles such as transformational, servant, collective, and shared leadership in addressing healthcare challenges and improving outcomes in diverse settings. Understanding and implementing these traditional and alternative leadership styles is crucial to delivering better health outcomes in low—and middle-income countries and improving global health. Nonetheless, this effort requires strong political support, reliable funding, and gender equity.

The authors followed the rigorous PRISMA-ScR methodology to ensure the review process was transparent. This review also maintains relevance to current health challenges by focusing on literature searches in the past decade. However, the review is limited by its small sample size (12 articles) or 0.6% of its yield and can be improved with more variety in single keywords instead of phrases. The review did not yield articles discussing nonprofit leadership in the health sector from non-Western contexts, limiting its broader applicability. To address these two limitations, future reviews should add region names in the search strategy and include non-English language articles. Lastly, the yield from this review is mainly non-empirical (conceptual, editorial, perspective, and reviews), hindering the generalizability of its findings. Future studies can improve this by adding grey literature, such as case studies and reports from non-academic platforms, to provide practical and real-world insights into leadership. Further research on nonprofit leadership in the health sector in diverse settings can improve understanding of context-specific leadership strategies to improve health systems and outcomes more effectively and sustainably.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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STUDENT-DRIVEN RESEARCH ACUMEN IN HEALTHCARE MANAGEMENT EDUCATION FROM CLASSROOM TO CONTRIBUTION: NARRATIVE REVIEW OF CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND

Research holds paramount importance in healthcare management within academic settings, playing a pivotal role in enhancing patient outcomes, innovating treatments and technologies, as well as advancing medical understanding.

OBJECTIVE

The objective of the study includes an overall understanding of research acumen among healthcare management students and the importance of research knowledge translation for practical applications.

METHODOLOGY

The study employed a cross-sectional design, comprising a comprehensive review of the literature, data extraction, and synthesis of 17 published papers on research literacy, healthcare management, and the integration of research in academic settings. Additionally, Primary Data was collected from 120 postgraduate students on their research acumen, interest, barriers, and facilitators of conducting research in the academic.

RESULTS

During postgraduate studies, 70.2% did not receive any formal training or coursework related to research methods and techniques. Skill development training was viewed as a preferred facilitator, while the lack of knowledge on how to get started was identified as the primary obstacle, among all other barriers.

CONCLUSION

This study contributes to the discourse surrounding the critical role of research in shaping the future of healthcare management.

KEYWORDS

research, healthcare management, research literacy, academic settings, evidence-based practices, postgraduate students.

INTRODUCTION

Health research holds significant value for society. It furnishes crucial insights into disease trends, risk factors, treatment outcomes, public health interventions, functional capacities, care patterns, and the utilization and costs of healthcare. Research has been instrumental in yielding substantial discoveries, the creation of novel therapies, and a remarkable enhancement in healthcare and public health standards [1]. Researchers and academia bear a critical responsibility in advancing and advocating for the utmost quality of healthcare. Research outcomes across various domains notably contribute to pinpointing and implementing vital solutions pivotal in attaining future goals. Numerous healthcare service providers struggle with substantial challenges that can be effectively addressed through research and innovation. Researchers are in the prime position to present authentic and pioneering solutions that actively play a part in resolving both national and global issues [2].

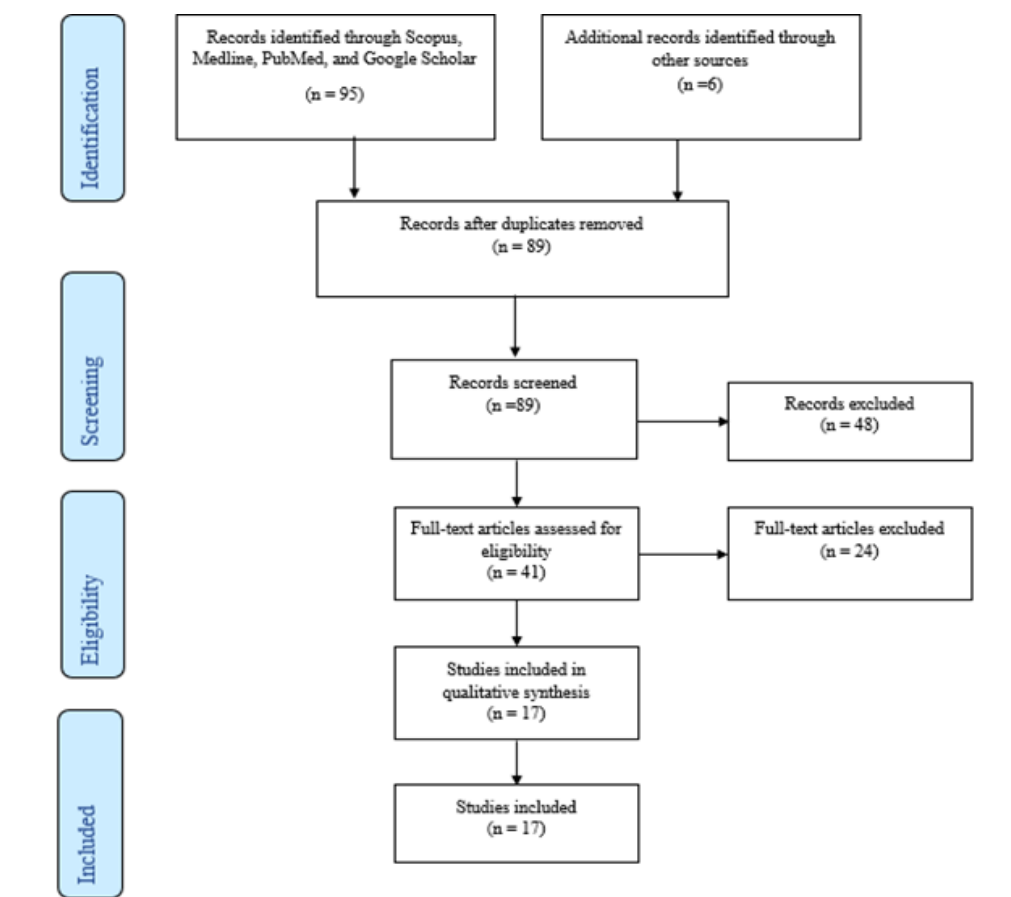
A critical challenge lies in the shift from researcher-driven methodologies, primarily focused on summarizing research outcomes, towards co-production processes. These processes entail the active engagement of managers, policymakers, and researchers in the collective interpretation of implications for the healthcare system [3]. Insufficient familiarity with research can impede the effective application of recommended healthcare services for prevention, treatment, and management. Obstacles to knowledge utilization encompass challenges in accessing resources, indifference towards research-derived knowledge, and potential misidentification of hindrances [4]. A persistent discovery in clinical and health services research is the recurring challenge of translating research findings into practical applications and policies. This shortfall can be attributed to a deficiency in research understanding, ultimately leading to suboptimal patient benefits from healthcare advancements and unnecessary expenditures for healthcare systems [5]. This study gives an overall understanding of research acumen among healthcare management students and the importance of research knowledge translation for practical applications.

METHODOLOGY

SYSTEMATIC REVIEW DETAILS

The primary methodology included a thorough evaluation of healthcare management, a review of literature based on research acumen, and an integration of research into academics. A comprehensive electronic search yielded a total of 101 articles, with the PRISMA flowchart delineating the systematic procedure for article selection shown in Figure 1. The search was conducted for publications from 2013 to 2023 over databases including PubMed, Web of Science, Google Scholar, Scopus, and relevant healthcare management publications. The search words used were Research, Healthcare Management, Academic Settings, and Postgraduate Students. Inclusion criteria were applied to select studies directly addressing research knowledge in healthcare management education, while those outside this scope were excluded. Initial screening involved the examination of 89 records, leading to the exclusion of 48 articles. However, 24 articles were subsequently disqualified due to errors, duplications, and other irregularities. Ultimately, the study incorporated a total of 17 qualifying articles. The extracted data was synthesized and analysed to identify prevalent themes, challenges, and effective strategies pertaining to research literacy in healthcare management education.

FIGURE 1. PRISMA FLOWCHART SHOWING THE DATA SELECTION PROCESS



SURVEY DETAILS

Study Population - A descriptive cross-sectional study was carried out in the university campus for a period of three months. A total of 120 students were interviewed who were selected using convenience sampling and met the inclusion criteria of students enrolled in healthcare and related fields while those from non-healthcare disciplines were excluded from the study. Data analysis was performed using the IBM SPSS (Version 27) statistical software. The questionnaire used in the study consisted of 25 structured questions. These questions were developed by the authors, drawing on a review of relevant literature and consultation with subject matter experts in healthcare research and education. To ensure validity, the questionnaire underwent a rigorous review process. Initially, it was shared with a panel of three academic researchers and two postgraduate students for feedback on clarity, relevance, and comprehensiveness. Based on their suggestions, revisions were made to improve the content and wording of questions. Following this, a pilot test was conducted with 15 postgraduate students from healthcare disciplines, who were not part of the final sample. The pilot responses were analysed to assess the reliability and internal consistency of the questionnaire.

The questionnaire was divided into sections, including demographics, prior research experience, research acumen and interests, perceived facilitators and barriers to conducting research, and opinions on research training in academic programs. Demographics comprising of six questions. We used six questions to assess their research acumen and interest. This section assessed participants' familiarity with research methodologies, formal training, confidence in literature reviews, and engagement in activities like publishing and presenting research. It also gathered their views on the importance of research, evaluating their skills, experiences, and attitudes. In the study, we used five questions to find out perceived facilitators and barriers for conducting research in the university.

Data Collection and Analysis - A Google Form was circulated among 300 students, containing questions about their research acumen, interests, as well as the barriers and facilitators they encounter in conducting academic research. Out

of which 120 students responded and filled the questionnaire and participated in the survey. The categorical variables were summarized using frequency and percentage. The response to open-ended questions were coded (in vivo coding), categorized, and represented in the form of themes, and presented as frequency and percentages.

This study was conducted in accordance with the ethical standards of the responsible committee on human experimentation and adhered to the principles outlined in the Declaration of Helsinki (1964) and its subsequent revisions in 1975, 2000, and 2008. Informed consent was secured from all participants before data collection, ensuring voluntary participation, confidentiality, and the right to withdraw at any stage. The study maintained strict anonymity of participants, and all data were handled with the highest standards of confidentiality and integrity.

RESULTS

After conducting the systematic review, the results revealed four specific areas that both academics and students should prioritize to enhance their research acumen.

1. Learning from Peers, Teachers, and Mentors:

A student's research abilities can be improved by gaining new knowledge from peers and professors. In addition, getting advice from mentors, looking through relevant publications, and reading papers are crucial for improvement. Ultimately, seeking superior guidance and assistance is essential to improving research abilities.

2. Engaging in Collaboration and Networking:

Collaborating with others who have past research experience is an excellent way to learn. Students can participate in the process by attempting to get their articles published. Attending conferences and research programs promotes the development of interest.

3. Reading and Absorbing Knowledge:

A student can read more publications, journals, and acquire knowledge from studies, and it also helps a student understand various study approaches. Also doing in-depth reviews of the literature and having discussions with colleagues will add to the benefit.

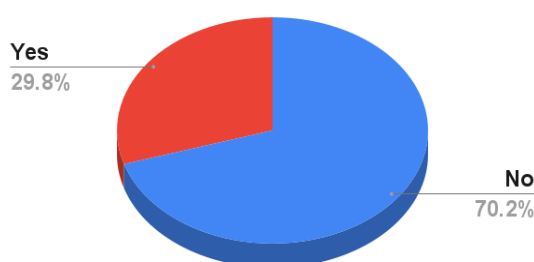
4. Utilizing Advanced Technologies and Tools:

Improving research abilities necessitates the use of new technology and research tools. There are a lot of instruments and technological advancements that make conducting research easier. Academics must take several courses to improve their research skills.

SURVEY RESULT

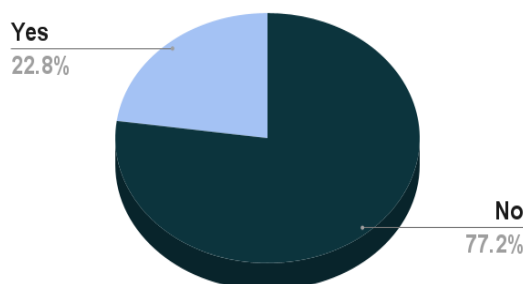
The survey focused on individuals aged 20 to 30 pursuing postgraduate studies. Notably, 70.2% of postgraduate students did not receive any formal training in research methods during their studies. Figure 2 shows the distribution of formal training received during studies.

FIGURE 2 – DISTRIBUTION OF PARTICIPANTS WITH FORMAL RESEARCH TRAINING



Out of 120 individuals, approximately 22.8% have either authored or co-authored a research publication. However, a significant proportion of individuals have not been engaged in the publication of any research papers. Figure 3 shows the research publication engagement of the participants.

FIGURE 3 - RESEARCH PUBLICATION ENGAGEMENT DURING POSTGRADUATE STUDIES



The survey results indicate that, when enquired about the primary facilitators for research training, respondents identified "Training and Skill Development" as the foremost factor. This was closely followed by recognition of the importance of a "Supportive Research Environment" and ample "Collaboration Opportunities." Additionally, respondents acknowledged the significance of "Government and Institutional Support" as well as the availability of "Publication Opportunities" as facilitators in fostering a conducive research environment. On the contrary, when participants were asked about the primary barriers hindering research, the predominant obstacle was identified as the "Lack of knowledge on how to start." Subsequently, respondents highlighted challenges associated with the "Lack of information on scientific work" and the "Lack of funding/grants for research" as significant barriers. Other noted obstacles included "Lack of time" and the absence of a defined "research idea or team." The study findings revealed a consensus among respondents regarding the importance of research in healthcare management. A significant majority agreed with the statement that "Every student should take part in scientific research during their studies." Furthermore, respondents were aligned in their opinion that "The methodology of conducting scientific research should be taught at university." This indicates a collective recognition of the significance of formal instruction in research methodologies as a crucial aspect of academic training. The potential biases in the study include response bias, observer's bias, recall bias, and selection bias, which may affect the validity of the results.

ACADEMIC SIGNIFICANCE OF RESEARCH IN HEALTHCARE MANAGEMENT

The observation, comparison and evaluation of individuals in different settings is how healthcare research attempts to solve social problems as well as medical issues. This domain involves intellectual and scientific endeavours, encompassing the examination of samples and patient records, the analysis of data gathered from health and lifestyle surveys, and the exploration of the merits, drawbacks, acceptability, and broader impacts of different treatments. It may also involve the use of new types of tools or technology [6]. While research is important in healthcare management, students may vary greatly with regard to their ability for research. That poses a big problem indeed. Addressing this problem, healthcare management courses have integrated research training into their curricula. The training consists of knowledge in research methodology, data analysis and the evaluation of results [7].

Internships and other such opportunities give students taking healthcare management programs a window into the world of research, as do roles in capstone projects. In addition, such programs encourage students to participate in research conferences and workshops. Additionally, these programs can motivate students to participate in research conferences and workshops, offering valuable exposure to the latest developments in their field and facilitating networking with professionals and peers. Participating in real-life activities allows students to put their research capabilities into actual practice, which helps them come at a fuller understanding concerning the field of healthcare management. Besides keeping students in touch with the latest research, it also gives them a chance to develop contacts with researchers and practitioners. [8,9]. In the field of academic healthcare management, however, research is crucial to the development of new therapies and equipment that can improve patient outcomes while also expanding medical knowledge for future

generations. Utilizing research findings can enhance the accessibility and affordability of treatments, but it can also improve the quality and efficiency of care. As a student, one should acknowledge the importance of research and actively participate in research. This is an important step that can make significant contributions to health care management and lay an excellent foundation for the future [4,8].

ENHANCING HEALTHCARE MANAGEMENT THROUGH RESEARCH

Research is vital to developing a better way of healthcare management, in that it allows the identification of problems and the assessment of possible solutions to them. The method of diagnosing problems and evaluating solutions can help healthcare management to enhance the quality as well as efficiency of care, which in turn causes cost-effective treatment and accessibility [10]. To improve health outcomes, healthcare professionals must accept new strategies warranted by solid evidence. The incorporation of research findings into health system management and policymaking, however, remains a notable challenge. The key to using the research in this way is effective knowledge translation and exchange between relevant stakeholders. However, a large proportion of research evidence is often not adequately presented or communicated. Furthermore, many health managers and policymakers may not have the required ability or capacity to identify applicable research findings [3,5]. Creating an organized framework within the healthcare system is considered essential for easy and pragmatic access to research findings, as well as insights from colleagues and pertinent information. Additionally, it is critical to provide managers whether they are insiders or outsiders in the healthcare system with the training they need to carry out their responsibilities as organizational facilitators [4].

Managers of healthcare can learn about the most advanced developments in medical education research and innovations through electronic tools such as Twitter, recommendations from various managers, automatic database/journal alerts and medical education listservs/blogs. These are the ones that filter information, and ensure that managers receive news which is both timely and relevant to their needs [11]. Research furnishes healthcare managers with reliable insights drawn from the latest evidence and best practices. These insights empower healthcare managers to make well-informed decisions, ensuring the delivery of top-tier care to their patients. The careful focus on the education and training of healthcare managers provides a significant competitive advantage for hospitals and healthcare systems, and this training should be consistently updated with the most recent data and resources. The observable positive impact of training initiatives on the expertise, knowledge, and capabilities of health managers underscores the necessity for ongoing investment in the research field. Training requirements should undergo continuous updates, tailored to evolving contexts and identified gaps, and be subject to evaluation to assess effectiveness for optimal outcomes [10–12].

REFINING RESEARCH SKILLS FOR HEALTHCARE MANAGEMENT STUDENTS

Research positions within healthcare settings give students an opportunity to hone their research skills and get hands-on experience. In playing these roles, they are able to apply their research talents in actual settings and understand the practical side of healthcare research [13]. By undertaking studies in healthcare facilities, students may hone their research skills and gain hands-on experience. By assuming such roles, students may learn the nature and practice of healthcare research. They can put their own research skills into action [14]. It requires the use of suitable keywords and a good search strategy to enable students to learn how to find locate relevant research articles. This approach is invaluable for getting at the latest and most applicable research findings. In addition, students are able to learn how to prepare grants and cash flow projections so as better ensure that they have funding available for their research work. Not only does this give them experience of how the research process works, it helps develop their own capabilities as researchers [15]. Besides taking their interests into account, students could choose a research topic according to the specialization or focus of study they have chosen. It is an intentional decision which keeps interest alive and encourages active involvement on the part of learners in studying, such that a better understanding emerges. Also, students themselves can actively practice honing their critical assessment skills so that they are more capable of judging the value and applicability of research resources. This skill helps them judge the merits and achievements of research projects, which makes it easy to turn their conclusions into practical applications in daily life [16]. In the field of healthcare management, it can be a great boon to participate in collaboration with veteran researchers or academics who provide guidance and encouragement throughout research. An open mind and a continuous motivation for learning new aspects of healthcare management is also very beneficial [17].

The study tried to address the felt need of the research acumen among the students and areas to increase the technical competencies in research. The study also appreciates the significance of research during the academic journey of the student. It also fosters embedding of research in the academic curriculum to stimulate academic growth and professional growth.

This study had a few limitations. The sample size utilized was not enough to generalize the findings. The cross-sectional nature of the survey which is used may also hinder the cause-and-effect relationship. This restricted scope may not fully capture the diversity of experiences and perspectives from students in other regions or disciplines, potentially limiting the applicability of the results to a broader population. Future studies using a very large sample size are recommended for generalizing the findings.

CONCLUSION

Research is an essential tool for improving healthcare management; it is not only an academic pursuit. This research asserts the necessity of cultivating research acumen within postgraduate students specializing in healthcare management. The study addressed the felt need for enhancing research acumen among students and identified areas to increase their technical competencies in research. Furthermore, it highlighted the significance of research, adequate mentorship and institutional culture during students' academic journeys, emphasizing its role in fostering both academic and professional growth. The key strength of this research lies in its advocacy for embedding research into the academic curriculum, which could stimulate greater academic development and prepare students for evidence-based professional practices. Integrating research assignments across subjects is advised to build foundational research skills among university students.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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A CRITICAL AND PROGRESSIVE REVIEW ON MATERNAL AND CHILD HEALTH POLICIES IN INDIA

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ABSTRACT

BACKGROUND:

Mothers' survival and well-being are crucial for addressing major economic, societal, and child development issues. They are also significant in and of themselves. The current mother and child health situation in India is a complex topic with both hurdles and improvement. The Government of India has the foresight to reduce maternal mortality with the help of different programmes and healthcare facilities being introduced and cautiously implemented.

OBJECTIVE:

The author summarised the literature on maternal and child health programmes, investment in their impact, especially those initiated through national health missions and analysed the programmes.

RESULT:

This paper discussed the programmes and their current scenario with their benefits and problems. Some programmes are near to achieving their objectives such as Jannani Suraksha Yojana (JSY), and Janani Shishu Suraksha Karyakaram (JSSK) but not at their full potential. There is still some lacuna in these programmes. In this direction reviewed research papers highlighted the problems in the implementation and utilisation of the programmes and suggested further steps that should be taken to fully utilise these programmes and improve maternal and child health.

CONCLUSION:

Maternal deaths can be reduced if proper healthcare treatments are used to prevent or break the chains of problems. Although India outperformed the global average in terms of maternal mortality reduction between 1990 and 2016, we still have a long way to go to catch up with large economies such as Brazil, China and Japan where the maternal mortality ratios are 44, 27, and 5 respectively.

KEYWORDS

government programmes, institutional delivery, maternal and child health, maternal mortality ratio, national health mission.

INTRODUCTION

Maternal and Child Health is a crucial component of any nation's growth in increasing equity and combatting poverty. Mothers' survival and well-being are crucial for addressing major economic, societal, and child development issues. [1] The term "maternal health" describes the condition of women before, during, and after childbirth by the World Health Organization (W.H.O). Even though there has been significant progress over the past 20 years, in 2020 there were over 287,000 deaths of pregnant and postpartum women. Unacceptably high is this number. In addition to botched abortion, high blood pressure, excessive blood loss, obstructed labour, and indirect factors such as anaemia, malaria, and heart disease, these are the most frequent primary causes of maternal injury and death. [2]

By 2030, reduce the global maternal mortality ratio (MMR) to less than 70 per 100,000 live births, reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births and ensure universal access to sexual and reproductive health-care services, including family planning, information and education, and integration of reproductive health into national strategies and programs and end preventable deaths of new-born and children under 5 years of age are some important target of Sustainable Development Goals 3(SDGs). [3] Maternal mortality and Adolescent fertility rates are used as indicators in the health dimension of the Gender Inequality Index (GII). Child mortality rate and Nutrition are used as an indicator in the health dimension of the Multidimensional Poverty Index published by the Human Development Report (HDR). [4]

India holds approximately 18% of the world's population of which 48.4% is female (World Bank, 2022). [5] Increasing sex ratio of females per thousand males is 1,020 (NFHS-5) than 991 (NFHS-4). The percentage of the female population aged 6 years and above who ever attended school is 78.1. [6] whereas according to the Indian Census 2011, only 65.46% of females are literate. According to the Registrar General of India's (RGI), Special Bulletin on MMR, India's MMR has further improved by a stunning 6 points and currently stands at 97/ lakh live births. [7] Through different policies and activities, India is at the forefront of guaranteeing maternal and child health services to all mothers and children. Despite various socioeconomic and cultural challenges, the country has achieved commendable progress in providing healthcare services and lowering mother and child mortality. [8]

India is responsible for 20% and 25% of the world's baby and maternal deaths, respectively. Nearly one-fifth of all maternal deaths globally occurred in India in 2015. [9] Despite various policies and programmes the cost of maternal healthcare drove 46.6% of women into poverty, with the illiterate being particularly at risk. As many as 63% of households nationwide had a catastrophic maternal health cost of 40%, according to the study, which looked at data from the National Sample Survey Office. [10] Public facilities have a low rate of institutional births (61.9%), notwithstanding improvements in institutional delivery (88.6%). NFHS5 [6] Based on clinical symptoms and examinations, more than 0.55 million pregnant women were diagnosed with high-risk pregnancies and sent to a higher health facility or expert for proper care. [11] Therefore, there is a need for analysis of the various programmes and policies for the improvement of the status of maternal and child health.

DATABASE AND METHODOLOGY

Numerous internet databases, including The Press Information Bureau (PIB), the Annual Report of NITI Aayog, the National Family Health Survey (NFHS), report, PubMed, Google Scholar, relevant journals, different government sites and reports published such as NFHS, district-level household and facility survey (DLHS), PIB and also report published by World Health Organization (WHO) were searched for data related to indicators of maternal and child health since independence of India until now to analyse the impact of various public health programmes connected to maternal and child health in India.

OBSERVATION ON MCH PROGRAMMES AFTER INDEPENDENCE

The study discussed the steps taken by the government after the independence for the improvement of maternal and child health. The steps taken are discussed below:

FAMILY PLANNING AND MATERNAL AND CHILD HEALTH

A National Programme for Family Planning was first introduced in 1952 in India, making it the first in the world. By assisting women in having the number of children they want and preventing unplanned and untimely births, increased investments in family planning serve to lessen the effects of high population growth. These efforts also cut maternal death by 35%, infant mortality, and abortion rates dramatically. The Indian government committed to lowering the rates of maternal mortality (MMR) to 100/100,000, infant mortality (IMR) to 30/1000 live births, and total fertility (TFR) to 2.1 (MoHFW) by 2017 [12]. Some major objectives for improving maternal and child health include lowering infant mortality rates to below 30 per 1,000 live births, maternal mortality rates to below 100 per 100,000 live births, ensuring that 80 per cent of deliveries take place in institutions and 100 per cent of deliveries are performed by trained personnel, and encouraging the use of contraception targeted in National Population Policy 2000. [13] The PM 20 Point Programmes, which were to be implemented in the fifth five-year planning cycle and would be monitored monthly, featured provisions including institutional delivery and child immunisation. A target for a birth rate of 25 per 1,000 people and a population growth rate of 1.4% by the conclusion of the sixth plan period had also been outlined in the fifth plan, and those targets were anticipated to be attained. [14]

In April 1976, the Ministry of Health and Family Planning unveiled a national population policy. That policy envisages a series of fundamental measures, such as raising the marriage age, and female education, spreading population values and the small family norm, strengthening research in reproductive biology and contraception, incentives for individuals, groups, and communities, and allowing state legislatures to enact legislation for compulsory sterilisation. [15] The 10th five-year plan referred to several vertical programmes for family planning, maternal and child health, integrated health care for women and children, centrally defined targets for community need assessment, and decentralised area-specific micro-planning and implementation of the programme for women's and children's health care. Monitorable targets for the 10th Five-year Plan included lowering the IMR to 28 per 1,000 by 2012, as well as lowering the maternal death ratio to 1 per 1,000 live births by 2012. [15] One of the goals of the Eleventh Five Year Plan was to lower the infant mortality rate to 28 and the maternal mortality rate to 0 to 1 per 1,000 live births. Other goals included lowering the level of malnutrition in children aged 0 to 3 to half what it was previously, as well as lowering anaemia in women and girls by 50% by the end of the plan. For a 950-child sex ratio, lower the MMR to 1 and raise the IMR to 25. The Twelfth Five-Year Plan had several objectives, including reducing child malnutrition in the 0–3 age group to half of the NFHS-3 level by bringing the total fertility rate (TFR) to 2.1. [15]

MATERNAL & CHILD HEALTH AND NITI AAYOG

In 2017, the National Institution for Transforming India (NITI Aayog) launched an annual Health Index in collaboration with the Ministry of Health and Family Welfare (MoHFW) and the World Bank to track overall and incremental performance across all states and Union Territories (UTs). Maternal Mortality Ratio (MMR), the proportion of pregnant women who received four or more antenatal care check-ups (ANC), and the level of death registration are included as new indicators. The major action carried out by the WCD division during the reporting year (2022-23) was the 'Publication of the National Nutrition Strategy' which the WCD Division published the strategy in preparation for the stage of incorporating the Nutrition Centre into the development agenda and other actions Pradhan Mantri Matru Vandana Yojna (PMMVY) in which the Maternity Benefit Programme must be implemented in all areas of the country in compliance with the provisions of the National Food Security Act of 2013. According to the PMO mandate, NITI Aayog is in charge of monitoring and evaluating the Maternity Benefit Programme. [16]

NATIONAL HEALTH MISSION

India has undertaken enormous efforts under the National Health Mission (NHM) to enhance access to high-quality maternal and newborn health services and decrease the statistically significant number of preventable maternal, neonatal, and infant deaths. According to the Registrar General of India's Special Bulletin on MMR, India's MMR has decreased by 10 points, which is an important achievement. The ratio decreased by 8.8% from 113 in 2016–18 to 103 in 2017–19. With this ongoing drop, India is on track to meet the SDG target of 70 lakh live births by 2030 and the National Health Policy (NHP) objective of 100 lakh live births by 2020.[17] To end all avoidable maternal and newborn deaths and morbidities and to promote a positive birthing experience, the Ministry of Health & Family Welfare (MoHFW), Government of India (GoI), has launched a new initiative called SUMAN-Surakshit Matritva Aashwasan. The expected outcome of this new initiative is "Zero Preventable Maternal and Newborn Deaths and high quality of maternity care delivered with dignity and respect". In keeping with this plan, the Maternal Health Division works to deliver high-quality services to expectant mothers and their babies through a variety of projects and programmes, improving routine health system strengthening operations and the capacity of health workers. Under the NHM, the Indian government has launched the following significant initiatives to lower maternal deaths [17]

JANANI SURAKSHA YOJNA

The National Health Mission's Janani Suraksha Yojana (JSY) promotes safe motherhood. The system was introduced on April 12, 2005, by the Hon. Prime Minister, and is currently being implemented in all states and UTs, with a concentration on Low Performing States (LPS). Encouraging institutional delivery among low-income pregnant women aims to lower maternal and newborn mortality. The scheme focuses on poor pregnant women with a special dispensation for states that have low institutional delivery rates, namely, the states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, Assam, Chhattisgarh, Rajasthan, Orissa, and Jammu and Kashmir. While these states have been named Low Performing States (LPS), the remaining states have been named High Performing States (HPS).[17]

Current scenario of this programme: Achievement and Issues

Coverage of critical maternal health services has more than doubled since 2005, while the proportion of institutional deliveries in public facilities has nearly tripled, from 18% in 2005 to 52% in 2016 (including private facilities, institutional deliveries now account for 79%). Although institutional delivery has improved (88.6%), institutional birth in public facilities is low (61.9%) {NFHS5}[6]. However, the JSY scheme in practice is almost completely focused on the promotion of institutional delivery- to the exclusion of other related objectives. The payments on account of home delivery are low and not encouraged. Informally they could be actively discouraged. The exclusion of women below the age of 19 and women with more than two children is another issue. Undoubtedly, this would not help in terms of mortality reduction. Most women who die would be in these two categories. The quality of clinical care also needs to improve. After all, this is the single biggest reason for institutional delivery.[18] However, expenses were incurred by the beneficiaries on drugs, diagnostics, transport etc. which was a barrier to accessing quality services.

JANANI-SHISHU SURAKSHA KARYAKARAM (JSSK)

After the Janani Suraksha Yojana (JSY) was introduced, institutional deliveries significantly increased in India. However, 25% of women still fear delivering in a hospital because they have to pay for their medications, food, diagnoses, blood workups, etc. while they are there. The Janani Shishu Suraksha Karyakaram (JSSK) programme, which aims to eliminate out-of-pocket expenditure (OOPE) for both pregnant women and unwell babies, was introduced in June 2011 as a follow-up to the safe motherhood program's success. Within 48 hours, the mother and newborn need critical care. Identification and treatment of difficulties following delivery depend on this postnatal phase. All pregnant women giving birth in public health facilities are entitled to completely free and expense-free deliveries, including caesarean sections. [17]

Current scenario of this programme: Achievement and Issues

With the launch of JSSY, a considerable increase in institutional deliveries was reported from different parts of the country. Despite the provision of free services, the families often meet with OOPE during institutional deliveries.[19] It has largely closed the urban-rural divide traditionally seen in institutional births. Overall, 87% of rural births are now supervised, as

compared to 94% of urban deliveries (NFHS-5)[6]. Various studies reported that the utilization pattern of the JSSK program is variable for different components. A study from Himachal Pradesh showed that the utilization is highest for tests and diagnostics, user fees and blood transfusion; one out of seven families pay for drugs, while two-thirds pay for consumables.[19] On the contrary, a higher utilization pattern (94%–97%) for different components of JSSK was reported by Chaudhary et al.[20]

Although average out-of-pocket expenditure per delivery in a public health facility decreased from 3197 to 2916 (NFHS-5), still 25% of pregnant women hesitate to access these services. [21] According to the study done by researchers from Jawaharlal Nehru University and Indian Institute of Technology, Roorkee in December 2016 study Maternal healthcare expenses pushed 46.6% of mothers in India into poverty – with the illiterate being especially susceptible. Childbirth, antenatal care, and postnatal care are all included in the costs. According to the study, which examined data from the National Sample Survey Office, as many as 63% of households nationally had a catastrophic maternal health cost of 40%.[10] There are some possible barriers to the system such as delayed fund flow, low food quality and quantity, door-to-door drug delivery, lab logistics issues, a lack of understanding of transportation facilities, a lack of blood banks, and informal behaviour by health staff. By focusing on removing such barriers we can achieve the objectives of this programme.[21]

VILLAGE HEALTH, SANITATION AND NUTRITION DAYS (VHSND)

Since 2007, Village Health Sanitation and Nutrition Day (VHSND) has been conceptualised as part of the National Health Mission (NHM) across the country. The VHSND strategy is designed to reach all geographical areas under the jurisdiction of health and wellness centres, including hilly, tribal, underserved, and difficult-to-reach locations. Some actions taken by VHSND for antenatal services that are all pregnant women are to be registered and registered pregnant women to be given ANC and all eligible children are to be given vaccines as per the immunization schedule, all dropout children who do not receive vaccines as per the scheduled doses are to be vaccinated, vitamin A solution is to be administered to under five children for immunisation service.[22]

Current scenario of this programme: Achievement and Issues

According to Sharma et al., who showed in their studies, that basic amenities such as electricity, bathrooms, and drinking water are required to provide comfortable and excellent service delivery. At the end of the pilot period, the proportion of model locations with drinking water increased from 76% to 86%, while the proportion of model sites with toilets increased from 48% to 66%. The availability of all three types of equipment, namely equipment for providing ANC services, immunisation, and growth monitoring, has significantly improved. However, there was no statistically significant change in drug supply at these locations.[23] Studies in different states have shown that contrary to the guidelines, only a limited range of services was being provided at the VHSND. Registration of pregnant women and immunization of children were prime tasks undertaken at VHSND.[24–26] Several studies have identified deficiencies in VHSND planning, operation, infrastructure, and service delivery. A few scholars have also shown that 3 months of concentrated effort can result in significant changes in VHSND.[25,27] Timely detection of risk factors during pregnancy and childbirth can prevent deaths due to preventable causes. This can only be possible if the complete range of the required services is accessed by pregnant women.[28]

PRADHAN MANTRI SURAKSHIT MATRITVA ABHIYAN (PMSMA)

PMSMA was created in 2016 to provide universal fixed-day assured, comprehensive, and quality prenatal care to all pregnant women (in the second and third trimesters) on the 9th of every month. One of the critical components of the Abhiyan is the identification and follow-up of high-risk pregnancies and red stickers are added to the Mother and Child Protection cards of women with high-risk pregnancies.[17]

Current scenario of this programme: Achievement and Issues

PMSMA completed 13 million antenatal check-ups in just 13 months, resulting in the diagnosis of 0.65 million high-risk pregnancies. [21] According to the Union Minister of State for Health and Family Welfare, 3,090,270 pregnant women received ANC in the first year of its implementation. Over one billion prenatal check-ups have been performed. Maharashtra has reported the highest number of check-ups among Non-Empowered Action Group (EAG) States, and

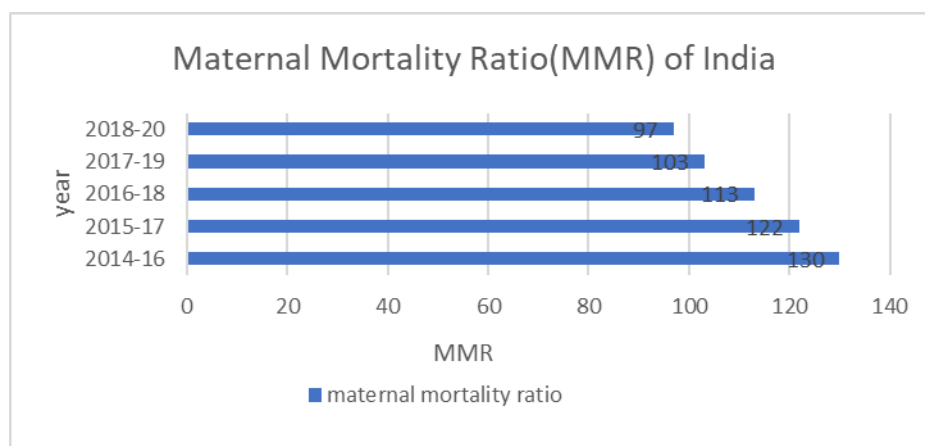
Rajasthan has recorded the highest number of check-ups among Empowered Action Group States. The scheme has resulted in 84 lakh haemoglobin tests, 5.5 million HIV tests, 4.1 million gestational diabetes tests, 3.3 million syphilis tests, and more than 15 lakh ultrasounds, allowing for the early discovery of high-risk pregnancies. Over 0.55 million pregnant women were recognised as having high-risk pregnancies based on clinical symptoms and investigations and were referred to a specialist or a higher health facility for appropriate care.[29]

DISCUSSION

ACHIEVEMENTS OF THE PROGRAMMES:

The World Health Organisation applauds India for making historic gains in recent years in lowering the maternal mortality ratio (MMR) by 77%, from 556 per 100,000 live births in 1990 to 130 per 100,000 live births in 2016. The National Health Policy (NHP) 2017 established the goal of lowering India's MMR to less than 100 per lakh live births by 2020. 'Beti Bachao Beti Padaho' programmes supported India in dealing with the social determinants of maternal health. Women in India are more literate than ever before, with 68% reading and writing now. They are also getting married later in life, with only 27% getting married before the age of 18. For these reasons alone, Indian women now have more control over their reproductive lives, allowing them to make decisions that reflect their interests and wishes.[30] The government has made significant efforts to promote beneficial collaboration between public and private healthcare providers. Campaigns such as the 'Pradhan Mantri Surakshit Matritva Abhiyan' have had a significant impact, providing women with access to antenatal check-ups, obstetric gynaecologists, and tracking high-risk pregnancies - exactly what is required to make further progress and meet the SDG targets[30] Mothers who underwent a prenatal check-up in the first trimester increased from 58% to 70% (NFHS-5). 58.1% of mothers had at least four prenatal care visits, compared to 51.2% in NFHS-4.[6] It seeks to improve the quality and coverage of diagnostics and counselling services and provide assured comprehensive and quality antenatal care free of cost. Providing a positive birthing experience to pregnant women such as Registered pregnancies for which the mother received a Mother and Child Protection (MCP) card and Mothers whose last birth was protected against neonatal tetanus are 92% (NFHS-5) has been made an imperative through programmes like 'Surakshit Matritva Anushasan (SUMAN)', and Labour Room & Quality Improvement Initiative '(LaQshya)'. In addition, the Union Ministry of Health and Family Welfare established the Anaemia Mukta Bharat initiative in 2018 to reduce anaemia prevalence due to both nutritional and non-nutritional reasons across the lifespan. The initiative is expected to benefit 450 million people, including 30 million pregnant women. These initiatives by the Government of India have played a pivotal role in increasing the number of institutional deliveries in the country.[31] Institutional deliveries in India have increased substantially from 79 per cent in 2015-16 to 89 per cent in 2019-20. Around 87% of births in rural areas and 94% of births in urban areas are institutional deliveries.[6] Over the last eight years, the Government of India's concerted interventions aimed at addressing all elements of maternal care have resulted in a continuous drop in MMR. The country's MMR fell from 130 per lakh live births in 2014-16 to 103 in 2017-19 see Figure 5.1.[31,32]

FIGURE 5.1 THE MATERNAL MORTALITY RATIO IN INDIA (2014 TO 2020)



source: Trends in maternal mortality in India. [32]

Target 3.1 of the SDGs adopted in 2015 is to reduce the worldwide MMR to less than 70/100,000 live births by 2030. With its programmes for women's health and well-being, India is steadily advancing towards this target ahead of schedule. The Central Government's actions have permitted excellent development by several states, eight of which have already met the SDG objective. Kerala (19), Maharashtra (33), Telangana (43), Andhra Pradesh (45), Tamil Nadu (54), Jharkhand (56), Gujarat (57), and Karnataka (69) are among them. [33]

ISSUES RELATED TO MATERNAL HEALTH PROGRAMMES IN INDIA

The current mother and child health situation in India is a complex topic with both hurdles and improvement. The high maternal and newborn mortality rates are one of the most significant concerns. India accounts for 20% and 25% of global maternal and infant mortality, respectively. While 15% of moms face potentially life-threatening difficulties during pregnancy and childbirth, about 40% of mothers experience general issues. [source-UNFPA 2011, NFHS-3]. [32] According to the World Health Organisation (WHO), 63,000 maternal deaths occur in India each year, accounting for nearly 18% of all maternal deaths. Worldwide maternal mortality has declined internationally, but it is still high in several low and middle-income countries (LMICs), including India, where maternal health is still a major public health problem (WHO). In 2015, India was responsible for nearly one-fifth of all maternal deaths worldwide. [9], and there are large inter-state and intra-state disparities. When compared to southern states like Kerala (66) and Tamil Nadu (90), the maternal mortality ratio (MMR) in northern states like Assam, Uttar Pradesh (including Uttarakhand), and Rajasthan is relatively high (328, 292, and 255 maternal deaths per 100,000 live births, respectively). [34] Between states and different demographic groups within states, especially among populations formed by socioeconomic divisions, significant disparities in the use of maternal health services (antenatal and maternity care) are also documented. [35,36]. The budgeted health spending for the federal, state, and local governments reached 2.1% of the GDP in 2022–2023, according to the Economic Survey 2023. [37] India's relatively stagnant performance with reference to maternal and child health indicators is linked with low levels of government investment in health. Other neighbours have higher health spending in per cent of their GDP. Pakistan and Sri Lanka's public expenditure on healthcare was 3.4 per cent and 4.1 per cent of their GDP respectively. [38]

Some other indirect causes of maternal health are lack of maternal education, lack of sound healthcare facilities, lack of pregnancy care, lack of cleanliness concerning maternal health, and inadequate postpartum checkups. In India, a large portion of the female population remains unaware of maternal health issues. Even they are not aware of the facts of birth control, reproduction, fertility, and sex education. Most women in India's rural and semi-urban areas fail to reach the hospital on time owing to the worst traffic congestion and lose their lives on the way. Hospitals have deteriorated due to a lack of equipment and efficient workers. Healthy food consumption and getting enough sleep are essential for pregnant women. One of the biggest indirect causes is a lack of prenatal care. In India, a lack of cleanliness and hygiene can hurt maternal health. [39]

KEY POLICY SOLUTION

Maternal deaths can be reduced if proper healthcare treatments are used to prevent or break the chains of problems. During pregnancy and after childbirth, all women must have access to high-quality healthcare. [39] By implementing tactics like encouraging prenatal care, tackling malnutrition with focused interventions, and utilising community-based health professionals, such as ASHAs, to provide home-based care can improve maternal and child health status. [40] Prioritise tracking weight growth during pregnancy, guaranteeing iron-folic acid pill availability, and integrating maternal nutrition into ANC services through home visits and platforms like VHSND. [41] With its distinct geopolitical and sociological realities, India does not need to adopt ideas that have proven successful in other nations. Instead, she must develop solutions centred on women, culturally acceptable, cost-effective, and easily accessible. Such a strategy has the potential to be implemented at multiple levels. We can start by combining existing traditional/community service providers (dais) or people's health traditions or formal Indigenous health care systems like Ayurveda, Unani, yoga, and so on with existing health care infrastructure. [42] Improving maternal health necessitates intersectoral work from a stronger gender and human rights perspective in order to promote women's empowerment, eliminate poverty, and reduce gender-based inequalities. Gender-sensitive interventions are required to address established inequities and achieve gender justice in health. [8] In order to reduce maternal mortality, it is critical to increase the availability of knowledge on these topics. It is also essential that parents educate their children on topics such as maternal health and sex education. Healthy food consumption is essential for pregnant women. Including prenatal vitamins in the everyday food-routine

would help moms and their babies acquire enough important nutrients. Women's lives can be saved by obtaining life-saving antibiotics in an emergency. All hospitals should consider prioritising postpartum checkups.[39] health facilities must be LaQshya certified and consistent efforts to meet SDG targets and goals for maternal and neonatal health. These will help maintain and accelerate extraordinary progress towards eliminating all preventable maternal, neonatal, and child deaths.[17]

CONCLUSION

India's success in lowering MMR strengthens the Government's commitment to achieving 'Surakshit Matritva Aashwasan' (programmes started by government of India and it means to provide assured, dignified, respectful and quality healthcare, at no cost and zero tolerance for denial of services, for every woman and newborn) for women by establishing a responsive healthcare system that strives for zero preventable maternal and newborn deaths. As India celebrates 'Amrit Kaal,' (the time period of 25 years until 2047 'The Era of Elixir' to the entire nation of India introduced on its 75th Independence Day). the goal is to keep MMR below the target of 70/lakh live births and to maintain a steady drop in the future. To attain this goal, India is focused on improving the quality of in-facility maternity care and boosting awareness about the importance of reproductive health.[7]. Matching global standards is critical in every aspect to preserve women's lives. Although India outperformed the global average in terms of maternal mortality reduction between 1990 and 2016, we still have a long way to go to catch up with large economies such as Brazil (44), China (27) and Japan (5). However, even one maternal death is too many, and all stakeholders must work together to guarantee that no woman dies from a preventable cause. [43]. The Government of India sees a future in which maternal mortality is no longer a problem; with the different programmes and healthcare facilities being introduced and cautiously implemented, this vision is well on its way to becoming a real.

ABBREVIATIONS:

MMR- Maternal Mortality Rate

SDG -Sustainable Development Goals

NHM - National Health Mission

IMR - Infant Mortality Ratio

NFHS- National Family Health Survey

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TRENDS OF RESEARCH IN HOSPITAL FINANCING AND HEALTH INDUSTRY 4.0/5.0: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

INTRODUCTION:

The convergence of Industry 4.0 (technologies) and 5.0 (human-centric) within the health sector heralds a transformative era, leveraging advanced technologies and human intelligence to redefine healthcare delivery. This evolution not only revolutionizes patient care and outcomes but also revolutionizes hospital financing, enabling cost reduction, improved efficiency, and enhanced revenue streams through the strategic integration of artificial intelligence (AI), Internet of Things (IoT), and blockchain technologies.

AIM:

Through a bibliometric analysis, this paper seeks to unravel the evolving trends in research within hospital financial and Health Industry 4.0/5.0.

MATERIALS & METHODS:

Bibliometric analysis was performed using the search results from Scopus database, Bibliometrix package in R Studio, and Vosviewer.

RESULT & DISCUSSION:

178 studies were eligible for analysis from the search on Scopus database. Cooccurrence analysis revealed 5 clusters of keywords in the topic of hospital financing and Health Industry 4.0/5.0. The overlay cooccurrence map showed a shift of the main research topic from focusing on cost analysis and reduction to applying more advanced technologies and addressing privacy concerns.

CONCLUSIONS:

The increasing impact of Industry 4.0 and 5.0 on hospital financing is indicated by an increasing scholarly focus towards applying more sophisticated technology in hospital financing.

KEYWORDS

Industry 4.0, Industry 5.0, Healthcare 4.0, Healthcare 5.0, Hospital financing

INTRODUCTION

The health industry is evolving along with the 4th and 5th industrial revolutions, otherwise known as Industry 4.0 and Industry 5.0. Industry 4.0 aims to increase automation and technology for efficiency improvement, while Industry 5.0 focuses on

creating a sustainable collaboration between humans and technologies. Both are transformative for the health industry.^{1,2} Health Industry 4.0 and 5.0 refer to the integration of advanced technologies and human intelligence in the healthcare sector to revolutionize healthcare delivery, improve patient outcomes, and enhance the overall healthcare experience.^{2,3}

Industry 4.0 focuses on technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics, and robotics to enable personalized medicine, sophisticated diagnostics, telemedicine, and more patient-centric care. However, it also faces challenges related to data security and privacy, ethical and legal issues, appropriate skills and training for healthcare professionals, and cost-effectiveness.^{3,4} Moreover, Industry 5.0 builds upon Industry 4.0 by adding human, environmental, and social aspects back into the equation. It aims to create higher value jobs that afford greater personalization for customers and improved design freedom for workers, as well as to enhance resilience and sustainability in healthcare.² In this context, Health Industry 5.0 is a human-centric solution that leverages IoT and AI in healthcare, focusing on mass personalization and the interaction between people and machines to improve work efficiency and effectiveness. This revolution enables healthcare professionals to provide better, more efficient care and facilitates faster recovery for patients.

Health Industry 4.0/5.0 revolutionizes hospital financing through various means. It facilitates cost reduction by integrating advanced technologies such as AI, IoT, and cloud computing, optimizing resource utilization and efficiency across patient care, supply chain management, and administrative tasks.^{3,4} Improved efficiency is achieved through telemedicine, remote monitoring, and AI-assisted diagnostics, which enhance diagnostic accuracy and reduce hospital visits, potentially cutting costs for patients and insurers. With a focus on mass personalization, Health Industry 5.0 offers tailored treatments, improving patient outcomes while curbing overall care expenses. Moreover, hospitals benefit from increased revenue by employing AI diagnostics to attract more patients and extending services via telemedicine to remote and underserved areas. Efficient resource allocation through blockchain and big data analytics further streamlines operations, resulting in cost savings and enhanced patient outcomes. Successful adoption hinges on meticulous planning, investment, and a strong prioritization of patient-centered care.²

This paper aims to investigate the trends of research in hospital financial and health industry 4.0/5.0 through a bibliometric analysis.

METHODS

BIBLIOMETRIC ANALYSIS

Bibliometric analysis is a research approach that employs statistical methods to examine data from published scientific literature, offering valuable insights into the progression of scientific research domains such as hospital financing and Health Industries 4.0 and 5.0. This method involves selecting a database and using keywords to retrieve relevant publications. In this paper, published articles listed on Scopus are used for the analysis.

Data from Scopus were analysed using VosViewer⁵, a software for bibliometric analysis, and Bibliometrix package⁶ on R Studio using R version 4.3.1. Basic information, such as the number of documents, trends, countries of origin, and relevant authors, was gathered from Scopus during the search. The results from the search were then exported into a CSV file for further analysis using VOSviewer and Bibliometrix. Network analysis was conducted using VOSviewer, including keywords occurring five or more times in the search. Bibliometrix was used to create visuals for country production on these topics and the most cited documents.

SEARCH STRATEGY

Search was done in Scopus using several keywords and Boolean operators. The search was limited to publication years after 1999, published as articles, and in English. The keywords used are (TITLE-ABS-KEY ("smart hospital" OR "digital health*" OR "Digital*" OR "4.0" OR "5.0" OR "Health* Industr*") AND TITLE-ABS-KEY ("Hospital financ*" OR "Hospital Profit*" OR

"Hospital Cash*" OR "Hospital Income" OR "Health* financ*" OR "Health* Profit*" OR "Health* Cash*" OR "Health* Income") AND PUBYEAR > 1999 AND PUBYEAR < 2025 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")).

RESULTS

Based on the search, 178 studies were included in the analysis. The studies were reported between the years 2000 and 2024. The number of studies published on these keywords experienced a significant increase, from only 6 in 2018 to 12 published studies in 2019 (Figure 1). The number of published studies increased in the following years, reaching 46 studies in 2023.

Data for the 10 most contributing countries are shown in Figure 2 and visualized in Figure 3. The United States contributed the most to these topics, with over 45 publications. India followed as the second most prolific country, with over 35 publications. The United Kingdom and Germany ranked fourth and fifth in terms of contributions, followed by China, Australia, Canada, France, Switzerland, and The Netherlands. The distribution of the 73 contributing countries is shown in Figure 3. Europe, Asia, North and South America, and Australia all made significant contributions to these topics, with sparse contributions from Africa.

FIGURE 1. NUMBER OF DOCUMENTS ON HOSPITAL FINANCING AND HOSPITAL INDUSTRY 4.0/5.0 PUBLISHED OVER THE YEARS.

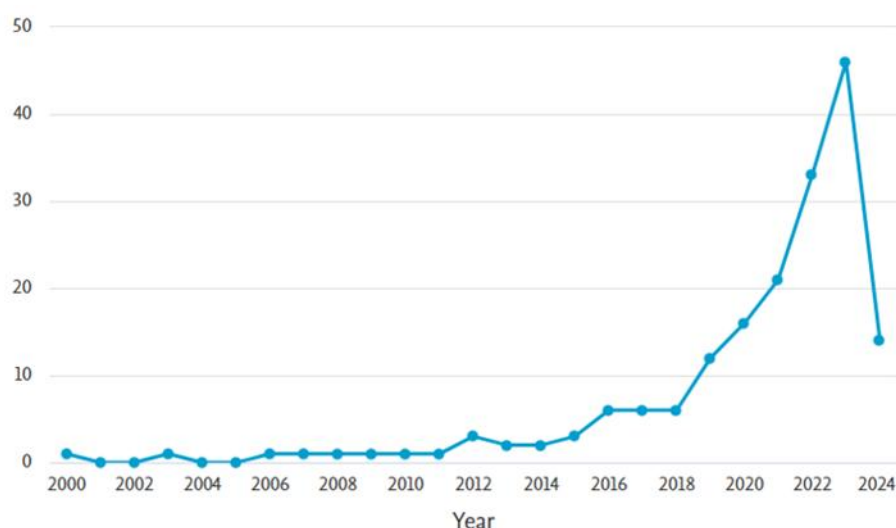


FIGURE 2. 10 COUNTRIES WITH MOST PUBLICATIONS ON HOSPITAL FINANCING AND HOSPITAL INDUSTRY 4.0/5.0.

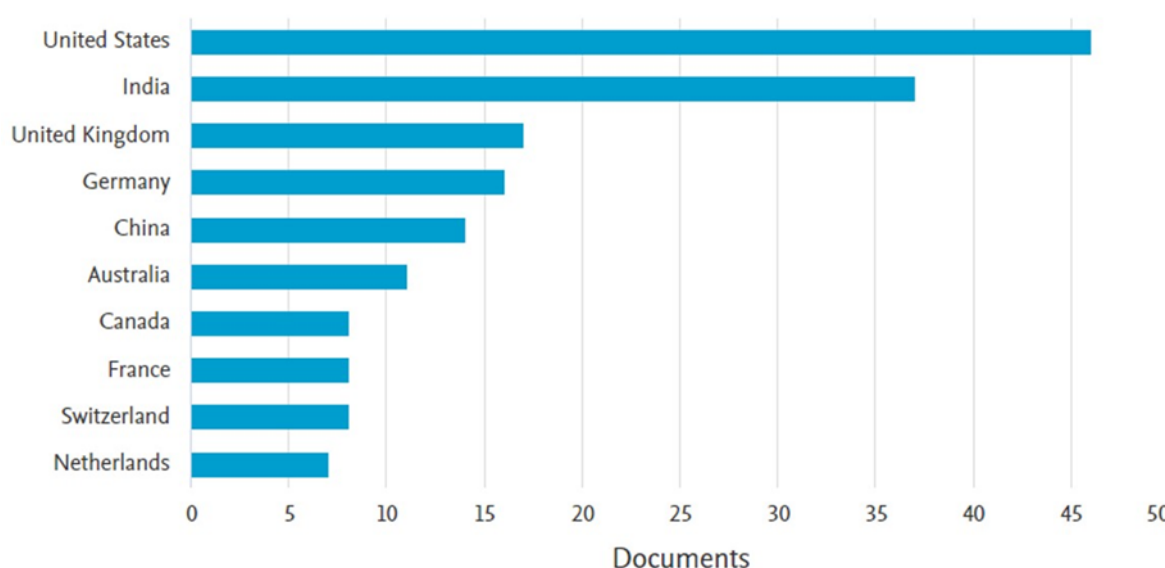


FIGURE 3. COUNTRIES WITH PUBLICATIONS ON HOSPITAL FINANCING AND HOSPITAL INDUSTRY 4.0/5.0.

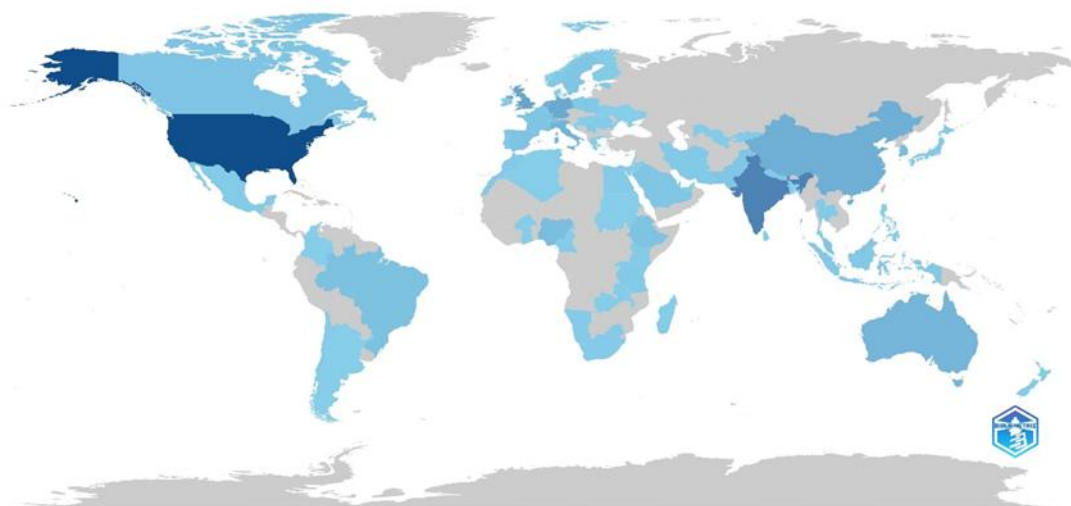


FIGURE 4. 10 MOST CONTRIBUTING AUTHORS ON HOSPITAL FINANCING AND INDUSTRY 4.0/5.0.

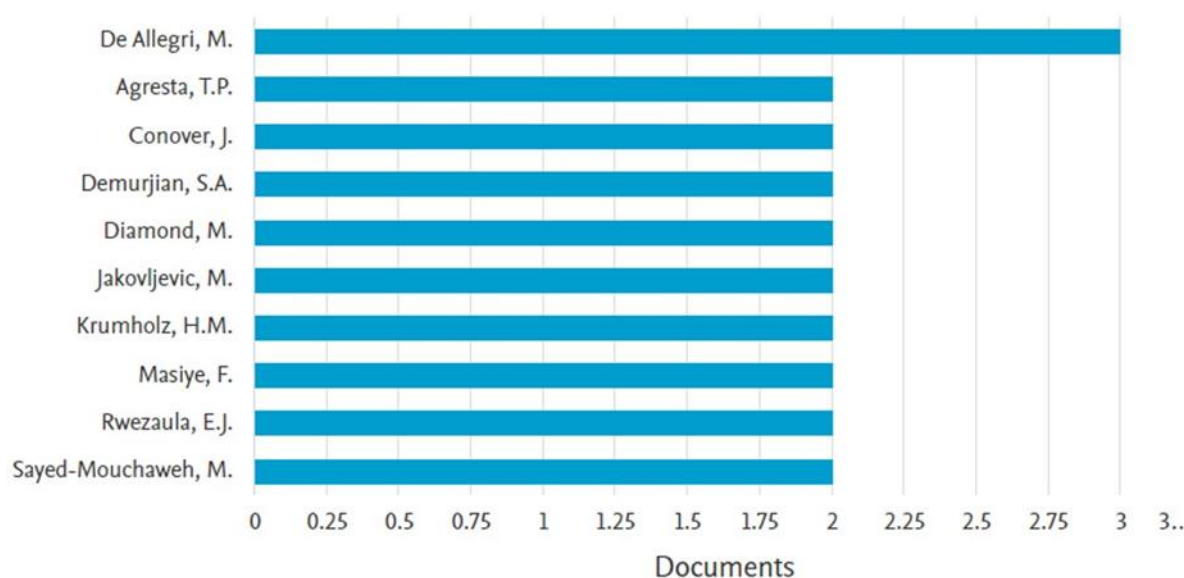


Figure 4 shows the 10 most contributing authors on these topics. The author with the highest number of published papers on this topic is De Allegri, M., with 3 published papers recorded. Agresta, T.P., Conover, J., Demurjian, S.A., Diamond, M., Jakovljevic, M., Krumholz, H.M., Masiye, F., Rwezaula, E.J., and Sayed-Mouchaweh, M., respectively published two papers on these topics.

VosViewer was used to visualize links and occurrences of keywords in the included studies and classify those keywords into clusters. The 113 identified keywords were classified into 5 clusters, each containing different keywords (Figure 5). Each of the clusters has a different number of items, with Cluster 1 containing the most item (35 items), followed by Cluster 2 (30 items), Cluster 3 (21 items), Cluster 4 (15 items), and Cluster 5 (12 items).

Cluster 1 (red): digital storage, blockchain, artificial intelligence, machine learning, block-chain, health care, security, finance, machine-learning; Cluster 2 (green): health care cost, hospital financing, health care quality, health expenditures, economics; Cluster 3 (blue): health insurance, financial management, health financing, health service, health care access, digital technology, global health, e-health, middle income country; Cluster 4 (yellow): health care delivery, healthcare financing, health care financing, delivery of health care, patient care, developing countries, health

services accessibility; Cluster 5 (purple): public health, health care policy, covid-19, pandemic, epidemiology, health policy, electronic health record, pandemics.

Figure 6 shows the overlay visualization of the co-occurrence network map. The map utilizes a colour gradient to represent the average publication year of documents, ranging from blue for older publications, through green for those evenly distributed across time, to yellow indicating more recent publications. The map highlighted the shift of main topics from the economic perspective and treatment outcomes to the impact of IoT, machine learning, artificial intelligence, and blockchain towards hospital financing.

Figure 7 shows the density map visualization. The map showed the dominance of research in health care cost, hospital financing, healthcare delivery, healthcare financing, and digital storage among other topics. The utilization of social media, information management, and data privacy still remain understudied.

FIGURE 5. CO-OCCURRENCE NETWORK MAP.

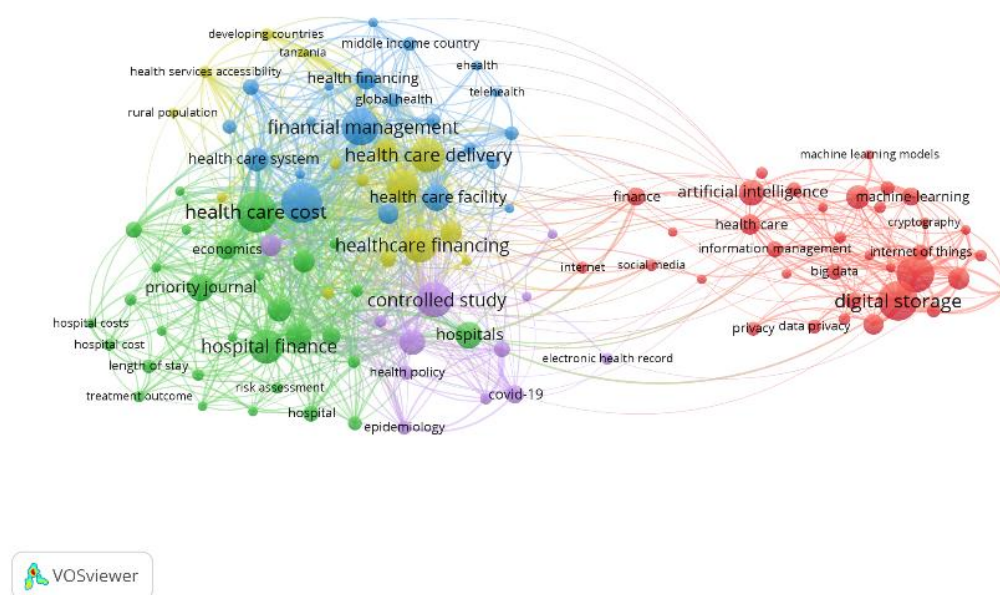


FIGURE 6. OVERLAY CO-OCCURRENCE NETWORK MAP.

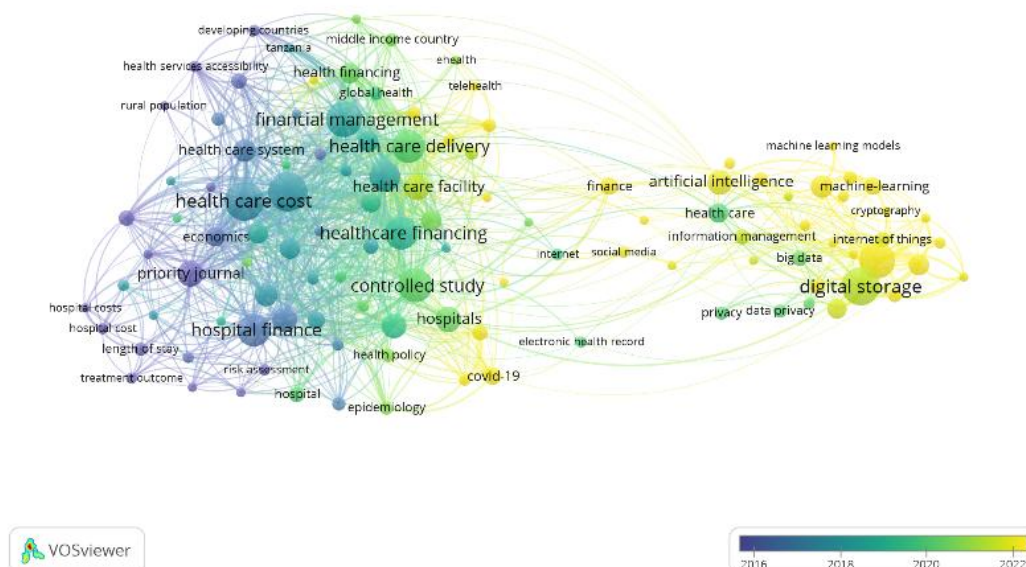


FIGURE 7. DENSITY CO-OCCURRENCE NETWORK MAP.

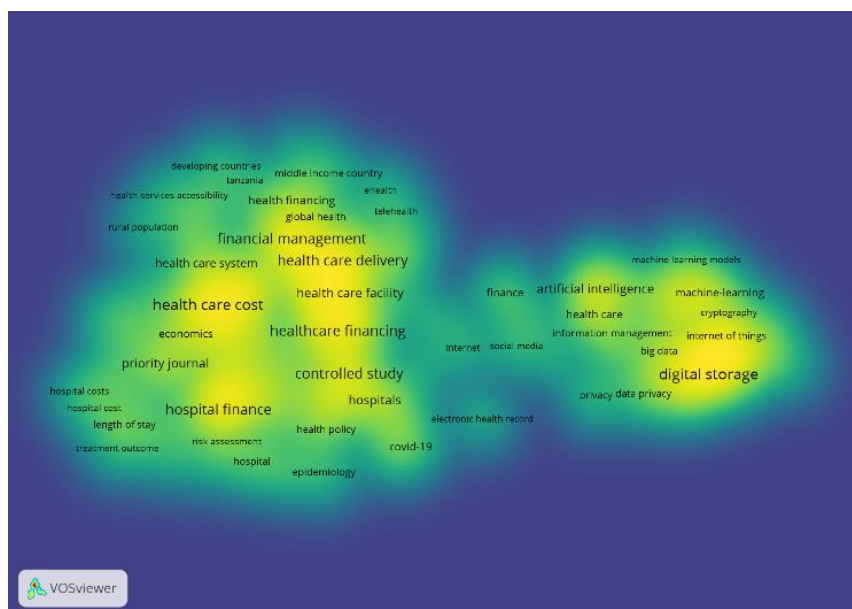


Table 1 shows relevant articles to the Hospital financing and Health Industry 4.0/5.0 along with their citation number and sources. Table 2 demonstrates the total link strength and occurrence of keywords in the searched literature. Health care cost, health insurance, and financial management are among the most discussed financial topics. Digital storage and blockchain occur respectively 20 times and 29 times (blockchain and block-chain) in the searched literature, being the leading topic in digitalization and health industry 4.0/5.0.

TABLE 1. RELEVANT ARTICLES.

Authors	Title	Source title	Cited by
Meessen B. (2018) ⁷	The role of digital strategies in financing health care for universal health coverage in low- and middle-income countries	Global Health Science and Practice	21
Seddon J.J.J.M. and Currie W.L. (2017) ⁸	Healthcare financialization and the digital divide in the European Union: Narrative and numbers	Information and Management	15
Nasution F., et al. (2020) ⁹	Automation Financial Processing in Account Receivable for Integrated Hospital System using ERP and Quickstart Approach	ACM International Conference Proceeding Series	4
Yuan X., et al. (2022) ¹⁰	The Optimization of Hospital Financial Management Based on Cloud Technology and Wireless Network Technology in the Context of Artificial Intelligence	Wireless Communications and Mobile Computing	3
Schuetze L., et al. (2023) ¹¹	What Factors Explain Low Adoption of Digital Technologies for Health Financing in an Insurance Setting? Novel Evidence From a Quantitative Panel Study on IMIS in Tanzania	International Journal of Health Policy and Management	2

Authors	Title	Source title	Cited by
Okuzu O., et al. (2022) ¹²	Role of digital health insurance management systems in scaling health insurance coverage in low- and Middle-Income Countries: A case study from Nigeria	Frontiers in Digital Health	2
Suess T.M., et al. (2019) ¹³	Smart Pump–Electronic Health Record (EHR) Interoperability with Auto-Documentation is Associated with Increased Submission of Infusion-Therapy Billing Claims at a Community Hospital	PharmacoEconomics - Open	2
Schuetze L., et al. (2023) ¹⁴	Factors Affecting the Successful Implementation of a Digital Intervention for Health Financing in a Low-Resource Setting at Scale: Semistructured Interview Study with Health Care Workers and Management Staff	Journal of Medical Internet Research	1
Malhan A., et al. (2022) ¹⁵	Role of Electronic Healthcare Record Adoption in Enhancing the Relationship between Quality Measures and Hospital Financial Performance	American Business Review	1
Vogel J., et al. (2024) ¹⁶	The association of hospital profitability and digital maturity – An explorative study using data from the German DigitalRadar project	Health Policy	0

TABLE 2. MOST OCCURRING KEYWORDS IN HOSPITAL FINANCING AND HEALTH INDUSTRY 4.0/5.0

Keyword	Total link strength	Occurrences	Keyword	Total link strength	Occurrences
Health care cost	223	21	Health care facility	114	13
Health insurance	207	21	Hospitals	70	13
Digital storage	82	20	Artificial intelligence	33	12
Blockchain	79	19	Health care quality	121	12
Financial management	194	19	Public health	113	12
Health care delivery	183	17	Health care system	117	11
Healthcare financing	173	17	Machine learning	50	11
Hospital financing	136	17	Block-chain	58	10
Health care financing	177	16			

DISCUSSION

The concept of Industry 4.0 emerged in 2011, describing a phenomenon facilitating the integration of internet technologies for enhanced interaction among factories and businesses spanning various industries.^{1,3} Entering a new era characterized by Industry 5.0, we observe a fusion of human capabilities with technological innovations.¹⁷ Industry 5.0 combines the progress of Industry 4.0 with human expertise to amplify communication, collaboration, and workforce capabilities, rather than substituting them. While this paradigm revolutionizes numerous industries, the pace of change within the healthcare sector is comparatively slower when contrasted with other sectors.¹⁸ Therefore, this bibliometric analysis aims to investigate the trends of research in these topics, especially about how Industry 4.0 and 5.0 affect the financial aspect of hospitals.

This paper uses analysis directly from Scopus, VOSviewer, and the Bibliometrix package in R Studio. Scopus was used to identify relevant research, as it is one of the most comprehensive research databases. Our findings showed that the United States and India are two of the most contributing countries to these topics. This finding is similar to the market share both regions hold in the healthcare digitalization sector. North America, with the US accounting for 88.2% of the revenue share, and India are among the countries with the highest compound annual growth rate (CAGR) in the digital health sector.⁴ This paper identified five main growing clusters in our findings, showing growing evidence of the impact of Industry 4.0 and 5.0 on hospital financing. The overlay co-occurrence network in our study indicated a shift in the main research topics, from focusing on improving treatment outcomes and reducing costs, to further elaborating on advanced technologies to improve hospital financing. A systematic review published in 2022 notably showed that digital interventions have a higher cost-effectiveness compared to conventional ones.¹⁹ The quality of care was also shown not to be compromised in the digital intervention group compared to the control groups. Another study analyzed the association between hospital profitability, digital maturity, and the adoption of electronic health records (EHR), showing that a one-percentage-point increase in earnings before interest, taxes, depreciation, and amortization (EBITDA) is associated with a 0.359-point increase in digitalization. Another study also found that the full implementation of EHR enhances the relationship between benchmark quality and a hospital's operating margins, where benchmark quality is positively correlated with hospital operating margins.¹⁵ These findings support the development of research to further integrate Industry 4.0 and 5.0 in healthcare.

The largest and most recently growing cluster of keywords consists of digital storage, blockchain, artificial intelligence, machine learning, block-chain, health care, security, finance, and machine-learning. This signifies the direction of development towards collaboration with digital technology in healthcare while addressing the privacy and security concerns of users.²⁰ Digital storage, in the form of EHR, is the fastest-growing application of digital technology in healthcare. However, the risks related to privacy and security in this context are considered to be higher compared to conventional methods.^{21,22} This is where blockchain, a decentralized network of nodes, serves as an effective technology for safeguarding confidential data within the system. Employing blockchain technology involves utilizing technically derived and impressive features such as protecting healthcare data, managing genomic information, electronic data management, medical record keeping, promoting interoperability, digitally tracking issues, and managing outbreaks.²³ Despite the large number of growing studies on the application of more advanced technologies in healthcare, the impact of these advanced technologies on hospital financing is rarely studied. However, at the current growth rate, it is feasible to expect further advancements in the near future and identify where they can contribute to hospital financing.

Qualitatively, this study reveals significant insights into the transformative trends of hospital financing within the paradigm of Industry 4.0 and 5.0, highlighting both challenges and opportunities. The bibliometric study elucidates a shift in focus from traditional cost reduction measures to advanced technological applications, such as artificial intelligence, blockchain, and IoT, which are central to enhancing financial processes like billing, insurance claims management, and budget monitoring. These advancements necessitate substantial initial investments, yet they offer efficiencies through automation and centralized data processing. Moreover, the integration of telemedicine and predictive health services – healthcare services that focus on predicting future outcomes or diseases rather than diagnosing when the diseases have

occurred – underscores a redefinition of hospital business models, enabling competitive and sustainable strategies. However, the digital transformation is not without concerns. Ethical issues, particularly data privacy and security in blockchain systems, are paramount to maintaining patient trust. Additionally, societal impacts, including disparities in technology adoption and potential discomfort for less tech-savvy populations, require targeted communication and education strategies.

CONCLUSIONS

Industry 4.0 and 5.0 have revolutionized many aspects of people's lives, including healthcare finances. Although growing at a relatively slower pace than other sectors, this paper shows an increased research interest in this topic. The growing number of papers and the shift towards more advanced technological keywords are the main characteristics of research in healthcare financing 4.0 and 5.0.

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A REVIEW OF THE NIGERIAN NATIONAL HEALTH POLICY ON INJECTION SAFETY AND HEALTHCARE WASTE MANAGEMENT

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ABSTRACT

BACKGROUND:

Exposure to healthcare wastes increases the risk of transmission of blood-borne infections. Nigeria previously lacked an enabling environment for healthcare waste management, as it did not have a national healthcare waste management policy. Thus, the National policy on injection safety and healthcare waste management in Nigeria was developed to ensure infectious diseases being transmitted through unsterile injections, and improper healthcare waste are eradicated or minimized to the lowest minimum.

AIM:

This study is aimed at reviewing the level of implementation and challenges of the Nigerian National Policy on injection safety and healthcare waste management.

METHODOLOGY:

This review focused on the policy document, its implementation, successes and challenges.

RESULTS:

The areas of focus of the policy are communication and behavioral change, healthcare waste management, logistics, management (human resource development) as well as monitoring and evaluation. Implementation of this policy cut across the tiers of government, public institutions in addition to private stakeholders. The policy has been able to achieve training of healthcare workers on safe injection and behavioural change, better waste management practice, advocacy programs, development of guidelines for injection and healthcare waste management practices, construction and installation of waste facilities and mobilization of resources.

CONCLUSION:

In spite of the achievements of the policy, inadequate training, ineffective legislature and absence of data were challenges facing this policy implementation despite the resources allocated to its implementation. Moreover, stated guidelines were not strictly followed and adhered to in all healthcare facilities. For the efficient and productive

implementation of the policy, there should be continuous training of health workers, enforcement of guidelines and procedures, proper data collection and provision of necessary consumables.

KEYWORDS

injection safety, healthcare waste, waste management, safety and policy, Nigeria.

INTRODUCTION

The Federal Ministry of Health, as well as the Federal Ministry of Environment of Nigeria and other stakeholders, have decided to prioritize the issue of safe practice of healthcare waste management and injection safety in health institutions across the country. Even though a few international treaties like the Basel Convention were signed by the Nigerian Government, there was no specific legal framework or regulations for injection safety and healthcare waste management practices in Nigeria before 2013 [3]. This made safe healthcare waste management accomplishment difficult.

The aim of formulating the National Policy on Injection Safety and Healthcare Waste Management was to ensure that patients, healthcare workers, communities and the environment are protected from risks associated with unnecessary and unsafe injections, as well as improper treatment and disposal of injection materials and other healthcare waste [1]. Exposure to used injection devices, contaminated sharp objects and other healthcare wastes increase the risk of transmission of blood-borne infections such as Human Immunodeficiency Virus (HIV), Hepatitis B and Hepatitis C viruses among others.

The World Health Organization (WHO) describes healthcare waste as all by product of healthcare produced from healthcare activities. The management of waste involves waste segregation, collection, storage, treatment, transportation, safe disposal and monitoring of these activities. The standard for injection safety as described by the WHO states that safe injections do not harm their recipients, do not expose the healthcare workers to any avoidable risk and do not result in waste that is dangerous to the community [2]. The 1999 Revised National Policy on Environment and the 2007 National Policy on Injection Safety and Healthcare Waste Management provide the basis for the development of a National Healthcare Waste Management Policy in Nigeria [1,3]. This article, therefore, reviewed this Policy highlighting the level of implementation, achievements, challenges to implementation and made necessary recommendations.

BRIEF HISTORY

Prior to the development of the policy in 2007, Nigeria as a country did not have a policy that is particular to injection safety and healthcare waste management, although policies are on ground for immunization with a chapter on injection safety with respect to immunization. Moreover, there was also a National Policy on Environment and Solid Waste Management Master Plan which briefly touched on medical waste management. Subsequently, the Federal Ministry of Health through the National Injection Safety Forum conducted an assessment of injection practices and healthcare waste management practices in Nigeria [4].

The United States Agency for International Development's (USAID)/President's Emergency Plan for AIDS Relief (PEPFAR) in 2004 implemented the Making Medical Injection Safer (MMIS) project in Nigeria over five years from 2004 to 2009. The project distributed over seven million safe injection commodities such as color-coded containers and sharp containers worth over 104 million Naira (\$USD 700,000) for proper disposal of healthcare waste and trained over 10,000 healthcare workers in Nigeria on injection safety [5]. However, proper management of healthcare waste only occurred in states that had healthcare waste management projects and remained unsatisfactory in other states in Nigeria [6]. The report of this project shows low implementation because there was not much support from the relevant government agencies as there was no law or policy on national healthcare waste management [5].

As a result, in 2007, the Federal Ministry of Health and Federal Ministry of Environment collaborated with the MMIS project and other partners to develop the National Injection Safety Policy and the draft National Healthcare Waste Management

Policy. Although the National Injection Safety Policy was developed in 2007, the National Healthcare Waste Management Policy remained in draft form due to long bureaucratic delays in approval and was finally approved in September 2013 [5]. Following approval, the national healthcare waste management policy 2013 became available for implementation.

DESCRIPTION OF THE POLICY

The National Policy on Injection Safety and Healthcare Waste Management in Nigeria was developed to ensure infectious diseases being transmitted through unsterile injections and improper healthcare waste are eradicated or minimized to the lowest minimum [6]. In time past, concerns have been raised on the transmission of blood-borne pathogens which are life threatening, such as HIV, Hepatitis B and Hepatitis C viruses to healthcare workers, patients and communities due to the use of unsterilized medical equipment including injections, and the incorrect disposal of healthcare wastes [4]. Lassa virus, with high morbidity and mortality in Nigeria, poses a threat to healthcare workers and the general public if waste generated from infected persons is handled improperly [7].

The safety of injections and proper disposal of waste in this policy is a primary concern in ensuring the well-being of people receiving therapeutic injections, immunization injections and injections for other purposes, and equally a concern for both the public and private healthcare institutions [8]. The policy was developed to ensure that injections given in both public and private health institutions for any purpose are safe and that every injection must be given using a sterile needle and syringe (Auto-Disable syringe) combination and that both are safely disposed of after every use according to laid down regulations. The policy document was made to provide guiding principles for safe injection practices and proper management of all healthcare wastes [9].

AREAS OF FOCUS

The National Policy on Injection Safety and Healthcare Waste Management focuses on providing an enabling environment to ensure injection safety practices and appropriate management of waste [10]. The aim is to protect and minimize the risks due to unsafe injection and healthcare waste management practices to the healthcare workers, patients, community and the environment from hazardous healthcare waste disposal practices, which were expected to be achieved through appropriate procurement, distribution, monitoring of equipment/supplies, improved injection and healthcare waste management practices and increased awareness. Strategic thrust was placed on the following areas including communication and behavioral change, healthcare waste management, logistics, management, human resource development, as well as monitoring and evaluation.

LEVEL OF IMPLEMENTATION

Implementation of this policy requires the coordination of the efforts of all stakeholders in its implementation [11], and as stated in the policy document this cut across the three tiers of government, public as well as private institutions. Implementation from top-down encompasses the Federal Ministry of Health in collaboration with other line ministries, the State Ministry of Health, Local Government Areas (LGAs), Healthcare Facilities, Civil Society Organizations (Non-Governmental Organizations and Community Based Organizations), Organized Private Sectors, Professional Regulatory Bodies and the Academia. The 2013 National Healthcare Waste Management policy also outlined how the government aimed to manage waste generated in health facilities to protect the public and the environment.

Moreover, resources have been allocated for the implementation of this policy. USAID/PEPFAR spent over US\$2 million in eight states through the AIDS Free Project in Nigeria from 2015 - 2016 to address weaknesses in healthcare waste management. The project trained 112 master trainers in healthcare waste management who in turn trained a total of 13,673 health workers and waste handlers [6]. They also assisted health facility staff in developing healthcare waste management plans as well as provided healthcare waste management supplies such as bins and liners, protective equipment for waste handlers, and sharps safety boxes to help health facilities initiate appropriate healthcare waste management activities.

Also, in 2015, the Institute of Human Virology Nigeria (IHVN) trained around 40 doctors and nurses from different health facilities in ten states on healthcare waste management and distributed incinerators in 19 tertiary health facilities in the country [10]. The Federal Government of Nigeria also provided high-temperature incinerators at tertiary health facilities. The World Bank second HIV/AIDS Program Development Project (HPDP2) 2013–2015 conducted routine visits to World Bank-supported health facilities in all the 36 states in Nigeria to monitor and supervise waste management processes [8].

Given the level of investment in injection safety and healthcare waste management, an environmental safeguard audit was done in 2015 by the National Agency for the Control of AIDS, Nigeria (NACA) through the World Bank second HIV/AIDS Program Development Project to assess the level of implementation of the national healthcare waste policies and guidelines in the 36 states and Federal Capital Territory [8].

ACHIEVEMENTS OF THE POLICY SO FAR

Due to the enactment of legislation by the Federal Government in developing the policy, reviewing, support from the State, enforcement from the LGAs and collaboration from other bodies both public and private, internationally and locally, the following were achieved:

- 1) The development of the policy on injection safety and healthcare waste management was followed by a series of training on safe injections and behavioral change.
- 2) Better waste management practices in tertiary, secondary and primary health facilities although with the greatest impact on tertiary facilities
- 3) Advocacy programs for communities to seek treatment only from qualified personnel
- 4) Development of guidelines for injection and healthcare waste management practices
- 5) Construction and installation of waste disposal destructive facilities such as incinerators
- 6) Mobilized resources internally and externally to achieve the aimed goals
- 7) Training healthcare workers on injection safety and appropriate healthcare waste disposal.

CHALLENGES OF PROPER POLICY IMPLEMENTATION

Despite the resources pumped into the implementation of the policy, there is still a high burden of unsafe injections reported in many parts of the country. Regardless of injection safety training, inadequate knowledge of poor injection practice was found among surveyed healthcare workers as reported in some studies [12-14]. In Benin City, South-south Nigeria, a study on injection safety practices among nursing staff of a mission hospital revealed that knowledge of injection safety was poor among them although their practice of injection safety was encouraging [12].

According to another study [13], in Ibadan, Southwest Nigeria, nurses have heard about injection safety however, only 70.4% had knowledge associated with unsafe injection with blood-borne infection, 55.9% had information that recapping with both hands was not a safe injection practice, 84.4% claimed that contaminated sharps predisposed the community to bio-hazards and 76.1% had information that used syringes and needles should be discarded in a sharp waste box. This study reported that high knowledge did not translate to practice as about half of the nurses (50.4%) were seen to have sustained needle stick injury.

In the University of Calabar Teaching Hospital, Southeast Nigeria, about a third (35.6%) of the healthcare workers have fair knowledge of injection safety while 4.7% have poor knowledge [14]. The practice of injection safety can never be overemphasized among healthcare workers, this is because even a 1% lack of knowledge puts patients and the health community at risk. [14]. Healthcare waste still has a hazardous and infectious effect on the environment and the people because the stated guidelines are not strictly followed and adhered to in all healthcare facilities, although the level of adherence differs, and there is no full compliance [15].

Inadequate training, ineffective legislature and absence of data are also imminent challenges facing this policy implementation. Studies showed that the level of knowledge of Post-Exposure Prophylaxis and Needle-prick injury

accident management (NPIAM) protocol and register for post-exposure prophylaxis was poor. Also, the practice of injection safety standards was low except for routine use of hand gloves [9, 14].

CONCLUSION AND RECOMMENDATION

This policy provides the legal framework to ensure injection safety and appropriate healthcare waste management practices in Nigeria. The development of the policy has been followed by several achievements including advocacy programs, training, guideline development, infrastructural development and resource mobilization. However, poor knowledge of healthcare workers and the absence of data were some of the imminent challenges impeding full implementation.

In view of these the following recommendations were made: the need to train and re-train healthcare workers on knowledge of injection safety and the dangers that can ensue due to negligence. Also, enforcement of the guidelines and procedures on healthcare waste disposal in health facilities which includes generation, segregation, collection, storage, transportation, treatment, and disposal is necessary at all levels of healthcare in the country. Moreover, the hospital management needs to enshrine the practice of injection safety standards by providing the necessary consumables, including color-coded waste bins and liners, auto-retractable syringes and needles, safety boxes among others. Conclusively, there is also need for proper data collection for effective supervision, monitoring and evaluation of the policy implementation and impact.

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EXPLORING COVID-19'S IMPACT ON MENTAL HEALTH IN THE WORKPLACE: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The objective of this paper is to examine important research areas and emerging development trends while highlighting the challenges and opportunities associated with them. This is accomplished through a methodical examination of publications pertaining to the mental well-being of employees during COVID-19. The authors analyzed 177 articles and contributions from the Scopus database, that were listed by the Australian Business Dean Council (ABDC), using the bibliometric tool VOS viewer. According to the data, there have been increasing trends in the study of mental health and its effects during COVID-19, and psychology and human resource management are also seeing an increase in the study of mental health. The authors who have been referred to the most are "Chawla N.," "Mccarthy J.M.," "Trogakos J.P." and "Li J". The journal "American Psychologist" has published a significant amount of research in the psychology field and the "International Journal of Hospitality Management" has maximum publications in human resource management field. Using efficient bibliometric techniques, the authors give readers a thorough grasp of the research topic, which will be helpful to anybody interested in the field, particularly newcomers. They advise that future studies concentrate on creating hybrid models to forecast trends in particular fields of psychology and human resource management, which is a new field of study.

KEYWORDS

COVID-19, technostress, psychological wellbeing, remote work, bibliometric analysis, VOS viewer

INTRODUCTION

The COVID-19 pandemic has disrupted global employee routines, but there is limited understanding of its impact on work, domestic, and well-being related outcomes [1]. The crisis has caused negative impacts on employees' job security, and it is crucial to examine ways in which organizations can ease these harmful effects [2].

Researchers use transactional theory to assess the psychological challenges of traveller undergoing quarantine during the COVID-19 outbreak, often in specific hotels for two weeks [3]. Other such theories include Uncertainty Reduction Theory [4] and Scarcity Theory [5]. Scarcity theory investigates the connection between stresses related to financial insecurity and job and employees' self-reported engagement in specific behaviors [2]. Equity and social exchange theory is applied to know how furloughs impact intentions of employees to leave a job [6]. The pandemic has necessitated organizational changes, but successful implementation often requires employee preparedness, despite limited research on mental factors promoting such readiness [7].

COVID-19 has significantly impacted remote work, making it a challenging component that requires better understanding and adaptation to ensure global well-being [8]. The shift towards remote work has posed significant challenges for organizations and employees, necessitating a reassessment of isolation as a primary challenge in today's technology-mediated work environment [9]. But overuse of modern technology for both professional as well as personal use can lead to "techno-stress" [1][10]. Workers' hesitation and unease regarding the usage of information and communication technology (ICT) and their reliance on smartphones can serve as distractions that impede their ability to accomplish work objectives efficiently [11][12]. Since psychological well-being is as important as physical health, more research on this is required [13]. Most recent research have used Structural equation modelling to analyse their data.

To know the scope of the study, following questions have been asked:

- RQ1 What are the current research developments and countries contributing in the field of COVID-19 and mental health of employees?
- RQ2 Which are the literature's most renowned, noteworthy, and influential sources and contributors?

RESEARCH METHODOLOGY

On February 1, 2022, we conducted the search of the literature. To summarize the trends in research regarding the consequence of COVID-19 on cognitive wellbeing of employees, we employed bibliometric quantitative analysis and network visualization. We used the Scopus database to run the following search Figure 1):

FIGURE 1: SEARCH CRITERIA (AUTHOR'S OWN)

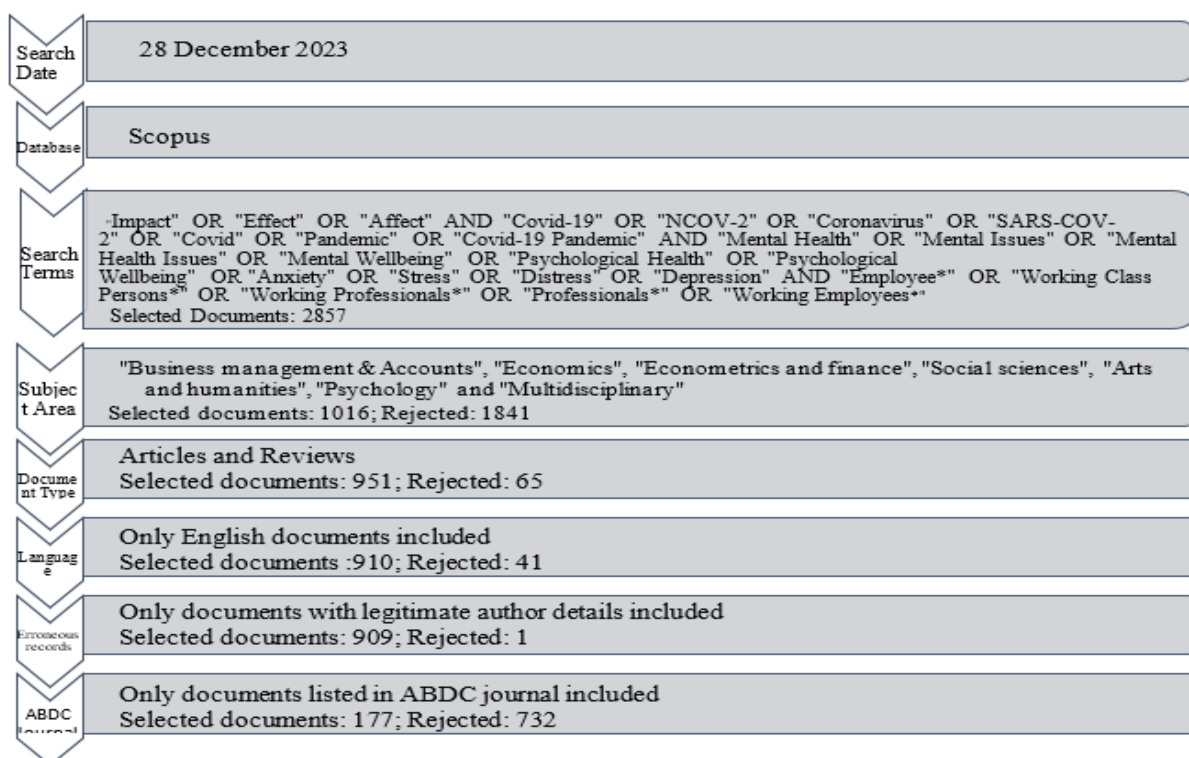
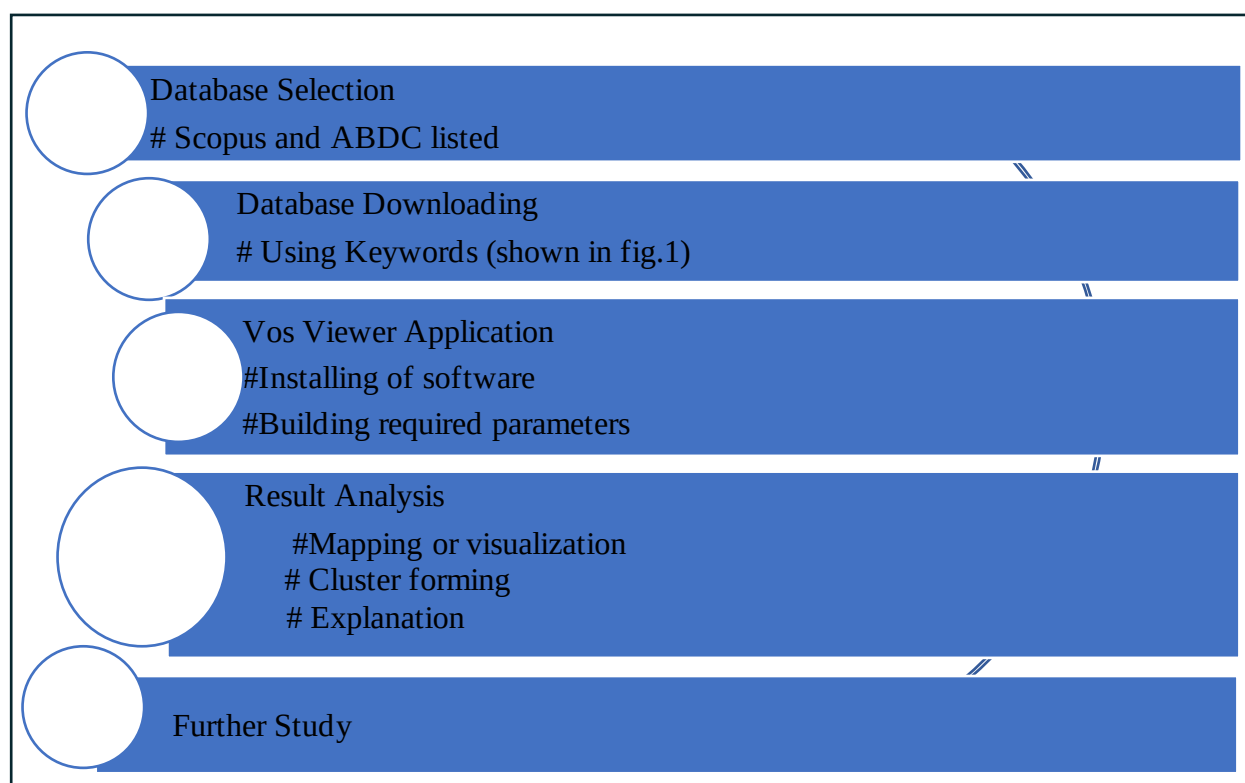


Figure 2 reveals the methodical process which is used to compile the final Scopus of (177 articles which are also ABDC listed papers) for evaluation. The search phrases were developed by brainstorming among the authors, who were methodological and subject-matter specialists.

RESEARCH TOOLS AND TECHNIQUES

Bibliometric analysis is a statistical technique used to evaluate published studies by analyzing citation links and their impact on other disciplines. It can be applied to data from other databases and is essential for scientific research. Bibliographic software like VOSViewer can provide accurate results and make finding relevant material easier. It is accessible for free, easy to use, and exhibit large bibliometric maps and interpret the presented clusters [14]. It is also pointed out that most computer applications for bibliometric analysis do not effectively display such maps. Further crucial conditions are outlined [15].

FIGURE 2: VOS VIEWER PROCESS (AUTHOR'S OWN)



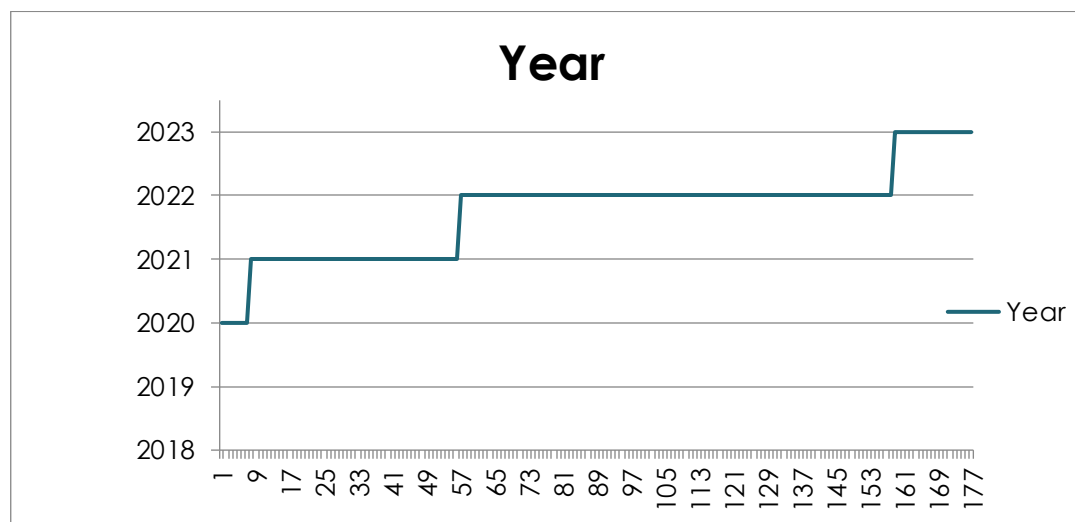
ANALYSIS AND FINDINGS

A. PERFORMANCE ANALYSIS OF 'COVID-19 AND MENTAL HEALTH OF EMPLOYEES'

1. Performance Analysis of Publications in 'COVID-19 and mental health of employees'

In Figure 3, the number of research papers is plotted against the years they were published to show the publishing trend of COVID-19, mental health, and employees. According to Figure 1, these have been used since 2005 but only recently, with the advent of COVID-19, the research in these fields exploded. The years with the most papers published are 2022 (102), 2021 (49) and 2020 (7). With 19 articles (or 18.6 % of the overall count of published articles in 2022) already published in the first quarter of 2023, it is anticipated that this upward trend will last past 2023.

FIGURE 3: TREND IN PUBLICATION OF RESEARCH IN COVID-19 AND MENTAL HEALTH OF EMPLOYEES (AUTHOR'S OWN)



2. Citation Analysis: Leading authors, institutions, and countries of 'COVID-19, mental health of employees'

Table 1 lists the top authors, identifying the institutions and countries at the time of authorship. "Chawla, N."; "Mccarthy J.M" and "Trougakos J.P.", who have 212 citations, is by far the most significant and prominent author [1]. They have two publications together out of which "Working in a pandemic: Exploring the impact of COVID-19 health anxiety on work, family, and health outcomes"

TABLE 1: CITATION ANALYSIS (AUTHOR'S OWN)

TC	Authors	TP	TC	Institutions	TP	TC	Countries	TP
212	"Chawla N."	2	366	"Edith Cowan University, Australia"	1	1480	United States	62
212	"Mccarthy J.M."	2	366	"Dokuz Eylul University, Turkey"	1	1137	Australia	22
212	"Trougakos J.P."	2	366	"The University of Western Australia, Australia"	1	1035	Canada	15
155	"Li J."	2	366	"Universiti Sains Malaysia, Malaysia"	1	742	United Kingdom	21
122	"Shao Y."	2	177	"Texas A&M University, United States"	1	541	France	6
116	"Yu J."	2	177	"University of Toronto Scarborough, Canada"	1	531	Netherlands	6
102	"Han H."	5	150	"Dalhousie University, Canada"	1	471	China	25
101	"Wong A.K.F."	4	150	"Shanghai Maritime University, China"	1	410	Turkey	5
93	"Sun R."	3	150	"The University of Sydney NSW, Australia"	1	373	Malaysia	3
85	"Li G."	2	144	"Department of Economics and Center for Statistics and Data Science, United States"	1	198	South Korea	8
59	"Lee Y."	2	144	"Vancouver School of Economics, UBC, Canada"	1	192	Hong Kong	8

59	"Li J.-Y."	2	101	"Sejong University, South Korea"	4	169	Spain	7
59	"Tao W."	2	99	"University of Las Palmas de Gran Canaria, Spain"	1	153	India	27
57	"Probst T.M."	2	99	"University of Greenwich, United Kingdom"	1	124	New Zealand	5

Note(s): TC = "total citations". TP = "total publications". The research includes (i.e., author, institution, country) appear according to total citations in this table

(2020) is the most cited paper with 177 citations. They are followed by Li J. who has 155 citations and is also the most productive author in terms of publications with two publications. "Edith Cowan University" and "The University of Western Australia", Australia; "Dokuz Eylul University", Turkey; and "Universiti Sains Malaysia", Malaysia are the most influential of all with 366 citations with one paper published in 2021 named as "COVID-19: potential effects on Chinese citizens' lifestyle and travel". They are second most influential organization is Texas A&M University, United States with 177 citations through publishing only one article in ABDC listed Scopus indexed Journals. United States leads all other nations in terms of intellectual contributions with 62 papers and 1480 citations.

3. Top Journals for 'COVID-19, mental health, and employees'

Table 2 lists the major financial journals which are ABDC listed Scopus indexed and that have published COVID-19, mental health and employees related research papers. The two most significant journals in terms of citations are "American Psychologist" and "Journal of Applied Psychology", with 533 and 509 citations, respectively. However, with 13 and 7 publications, respectively, "Journal of Applied Psychology" and "International Journal of Hospitality Management" are the two most productive journals in terms of publications.

A current rising trend in publication about this review is seen in the comparison of publication output versus various time periods. It's interesting that according to the "Australian Business Deans Council's (ABDC)" 2023 Journal Quality List, 54.8% of the most important publications are given an "A*" or "A" rating. This shows that prestigious publications are open to publishing research on COVID-19 and mental health. Publications in prestigious journals spur scholarly interest, and these trends point to an increase in the significance of mental well-being and COVID-19 in human resource management research in the coming years [16][17].

However, if we focus on Table 3 and compare HR-classified (HR: Human Resource Management) journals to non-HR-classified journals (as categorized by the "2023 Academic Journal Guide"), we find that journals of HRM have been comparatively more proficient in publishing mental health, COVID-19 and employee's publications up to this point. The "International Journal of Hospitality Management" has published seven articles which is an A* journal in Human resource management domain in the most recent of our sub periods, i.e, in the first quarter of 2023.

TABLE 2: TOP JOURNALS (AUTHORS' OWN)

TC	Journals	TP	HRM	ABDC	2020	2021	2022	2023
533	"American Psychologist"	2		A*	1	1		
509	"Journal of Applied Psychology"	13		A*	2	10	1	
320	"International Journal of Hospitality Management"	7	X	A*		5	2	
188	"Safety Science"	3		A	1	2		
104	"Journal of Hospitality Marketing and Management"	2	X	A		2		
89	"International Journal of Contemporary Hospitality Management"	4		A		2	2	

62	"Technological Forecasting and Social Change"	4		A		1	3	
59	"Public Relations Review"	2	X	A		1	1	
26	"Journal of Hospitality and Tourism Insights"	2	X	C			1	1
25	"Computers in Human Behavior"	2		A			2	
23	"Journal of Hospitality and Tourism Management"	4	X	A		1	3	
17	"International Journal of Organizational Analysis"	4	X	B		2	2	
17	"Service Industries Journal"	2	X	B			2	
14	"Journal of Business and Psychology"	5	X	A			4	1
14	"Stress and Health"	2		A			2	

Note: ABDC refers to the 2023 Journal Rating List from the Australian Business Deans Council. Total Citations is TC. Total titles are TP. If a publication is listed in the 2023 Academic Journal Guide as covering "Human Resource Management," then HRM = X. The journals are listed in this table by the overall number of citations.

4. Top Articles for 'COVID-19' and 'mental health in employees'

The most frequently cited 'COVID-19' and 'mental health' in employees research articles are listed in Table 4. The most highly cited paper is "Working in a pandemic: Exploring the impact of COVID-19 health anxiety on work, family, and health outcomes" with 177 citations, followed by "The scientific literature on Corona viruses, COVID-19 and its associated safety-related research dimensions: A scientometric analysis and scoping review" with 150 citations. CovH anxiety leads to emotional repression, which affects psychological needs and results in negative outcomes for work, home, and health. Frequent hand washing can mitigate the CovH anxiety effects because of increased repression of feelings and unmet psychological requirements [1]. "The scientific literature on Corona viruses, COVID-19 and its associated safety-related research dimensions: A scientometric analysis and scoping review" focused on other aspects of safety concerns in health sector. Aside from medical and clinical concerns, the most attention has been paid to mental/psychological well-being and home safety, patient transport safety, occupational safety for healthcare workers, bio safety of laboratories and facilities, social safety, and food safety [18]. Other potential safety issues, such as supply-chain safety, economic safety, and cyber safety may require more attention in the future. The authors can go for a comprehensive, interdisciplinary approach to lessen the crisis's many safety effects, whose ramifications go beyond biomedical risks and prepare for future pandemics.

TABLE 3: TOP ARTICLES (AUTHORS' OWN)

Authors	Articles	Year	Cited By
"Trogakos J.P., Chawla N., McCarthy J.M."	"Working in a pandemic: Exploring the impact of COVID-19 health anxiety on work, family, and health outcomes"	2020	177
"Haghani M., Bliemer M.C.J., Goerlandt F., Li J."	"The scientific literature on Corona viruses, COVID-19 and its associated safety-related research dimensions: A scientometric analysis and scoping review"	2020	150
"Probst T.M., Lee H.J., Bazzoli A."	"Economic stressors and the enactment of CDC-recommended COVID-19 prevention behaviors: The impact of state-level context"	2020	51
"Kniffin K.M., Narayanan J., Anseel F., Antonakis J., Ashford S.P., Bakker A.B., Bamberger P., Bapuji H., Bhawe D.P., Choi V.K., Creary S.J., Demerouti E., Flynn F.J., Gelfand M.J., Greer L.L.,	"COVID-19 and the workplace: Implications, issues, and insights for future research and action"	2021	496

Johns G., Kesebir S., Klein P.G., Lee S.Y., Ozcelik H., Petriglieri J.L., Rothbard N.P., Rudolph C.W., Shaw J.D., Sirola N., Wanberg C.R., Whillans A., Wilmot M.P., Vugt M.V."			
"Wen J., Kozak M., Yang S., Liu F."	"COVID-19: potential effects on Chinese citizen's lifestyle and travel"	2021	366
"Chernozhukov V., Kasahara H., Schrimpf P."	"Causal impact of masks, policies, behavior on early COVID-19 pandemic in the U.S."	2021	144
"Aguiar-Quintana T., Nguyen H., Araujo-Cabrera Y., Sanabria-DÃfÃaz J.M."	"Do job insecurity, anxiety and depression caused by the COVID-19 pandemic influence hotel employees' self-rated task performance? The moderating role of employee resilience"	2021	99
"Wong A.K.F., Kim S.S., Kim J., Han H."	"How the COVID-19 pandemic affected hotel Employee stress: Employee perceptions of occupational stressors and their consequences"	2021	88
"Yu J., Park J., Hyun S.S."	"Impacts of the COVID-19 pandemic on employees' work stress, well-being, mental health, organizational citizenship behavior, and employee-customer identification"	2021	82
"Agarwal P."	"Shattered but smiling: Human resource management and the well-being of hotel employees during COVID-19"	2021	56
"Tu Y., Li D., Wang H.-J."	"COVID-19-induced layoff, survivors' COVID-19-related stress and performance in hospitality industry: The moderating role of social support"	2021	52
"Jamal M.T., Anwar I., Khan N.A., Saleem I."	"Work during COVID-19: assessing the influence of job demands and resources on practical and psychological outcomes for employees"	2021	52
"Lee H."	"Changes in workplace practices during the COVID-19 pandemic: the roles of emotion, psychological safety and organisation support"	2021	51
"Li J.-Y., Sun R., Tao W., Lee Y."	"Employee coping with organizational change in the face of a pandemic: The role of transparent internal communication"	2021	49
"Lin W., Shao Y., Li G., Guo Y., Zhan X."	"The psychological implications of COVID-19 on employee job insecurity and its consequences: The mitigating role of organization adaptive practices"	2021	85

B. THEMATIC ANALYSIS: THEMATIC CLUSTERS OF 'COVID-19 AND MENTAL HEALTH OF EMPLOYEES'

The semantic connections between co-cited references found through co-citation analysis represent the knowledge foundation of a field (Figure 4). Remote work and Resilience (red nodes), Workplace stress and emotional exhaustion (green nodes), Challenges of Job satisfaction and employee well-being (dark blue/navy blue nodes), Positive Workplace environment (yellow nodes), Psychological health and COVID-19 pandemic (purple nodes), Financial stress and well-being (sky blue nodes).

TABLE 4: THEMATIC CLUSTER "COVID-19 AND MENTAL HEALTH" (AUTHORS' OWN)

Theme	Authors	Title	TC
Remote work and Resilience	"Aguiar-Quintana T., Nguyen H., Araujo-Cabrera Y., Sanabria-D��az J.M."	"Do job insecurity, anxiety and depression caused by the COVID-19 pandemic influence hotel employees' self-rated task performance? The moderating role of employee resilience"	99
	"Shao Y., Fang Y., Wang M., Chang C.-H.D., Wang L."	"Making daily decisions to work from home or to work in the office: The impacts of daily work- and COVID-related stressors on next-day work location"	37
Workplace stress and emotional exhaustion	"Wong A.K.F., Kim S.S., Kim J., Han H."	"How the COVID-19 pandemic affected hotel Employee stress: Employee perceptions of occupational stressors and their consequences"	88
	"Charoensukmongkol P., Phungsoonthorn T."	"The Interaction Effect of Crisis Communication and Social Support on The Emotional Exhaustion of University Employees during the COVID-19 Crisis"	35
	"Vo-Thanh T., Vu T.-V., Nguyen N.P., Nguyen D.V., Zaman M., Chi H."	"COVID-19, frontline hotel employees' perceived job insecurity and emotional exhaustion: Does trade union support matter?"	26
Challenges of Job satisfaction and employee wellbeing	"Agarwal P."	"Shattered but smiling: Human resource management and the wellbeing of hotel employees during COVID-19"	56
	"Jamal M.T., Anwar I., Khan N.A., Saleem I."	"Work during COVID-19: assessing the influence of job demands and resources on practical and psychological outcomes for employees"	52
Positive Workplace environment	"Tu Y., Li D., Wang H.-J."	"COVID-19-induced layoff, survivors' COVID-19-related stress and performance in hospitality industry: The moderating role of social support"	52
Psychological health and COVID-19 pandemic	"Kniffin K.M., Narayanan J., Anseel F., Antonakis J., Ashford S.P., Bakker A.B., et.al."	"COVID-19 and the workplace: Implications, issues, and insights for future research and action"	496
	"Wen J., Kozak M., Yang S., Liu F."	"COVID-19: potential effects on Chinese citizens' lifestyle and travel"	366

A key component of bibliographic coupling is citing articles. This process takes into account cited articles and, as a result, represents groundbreaking knowledge by taking into account the most significant publications pertaining to COVID-19 and mental health in the field of human resource management [14][15]. The six subject clusters that inform the conceptual framework of COVID-19 and employee mental health research are summarized in Table 6 based on bibliographic coupling.

According to ABDC listed Scopus index, Cluster 1, denoted by red nodes, contains work on remote work and resilience. 79 papers on remote work and resilience are found in Cluster 1 of Scopus, with 585 citations. With 211 citations, "remote work" is the most used keyword in this cluster. The two authors with the most citations in this cluster are Aguiar-Quintana *et.al.* (2021) and Shao *et.al.* (2021) with 99 and 37 respectively [19] [20] "Do job insecurity, anxiety and depression caused by the COVID-19 pandemic influence hotel employees' self-rated task performance? The moderating role of employee resilience" explained that employees' psychological health suffers when they are apprehensive about their jobs, but their task performance is unaffected [21]. The employee resiliency serves a vital purpose in reducing the detrimental effects of employment uncertainties on depression. Stresses related to job-family boundaries and job coordination are associated with working in the office, while workload stressors are associated with working from home [22]. Stress factors related to COVID-19 infection also lowered the impact of workload and technological pressures on where people choose to work.

The second cluster theme is "Workplace stress and emotional exhaustion" (green nodes) in which the top authors are Wong *et.al.* (2021), Charoensuk Mongkol *et.al.* (2022) and Vo-Thanh *et.al.* (2022) [22][23][24]. It consists of 49 papers with 1183 citations. Traditional job stresses, stressful work environments, and stressors from unethical labour practices are three different forms of stressors discovered during the pandemic [25]. The study titled "The Interaction Effect of Crisis Communication and Social Support on The Emotional Exhaustion of University Employees during the COVID-19 Crisis", examines that in private international organizations, communication during the COVID-19 crisis had an inverse effect on employees' perceived uncertainties and emotional tiredness. Support from coworkers lessens emotional weariness [24]. It is also evident that, support for labour unions lowers the job insecurity, whereas perceived COVID-19 health risks raise both perceived job insecurity and emotional exhaustion [26].

22 articles in Cluster 3 have received 388 citations. Challenges of Job satisfaction and employee wellbeing are there with 56 and 52 citations respectively [27][28]. Through the 3rd cluster (dark blue/navy nodes), it is proved that employee-centred HRM practices have a significant impact on employee welfare [27]. He recommends policymakers for managing people successfully during trying times. Employees experience exhaustion and stress because of a heavy workload, task interdependence, professional isolation, and home responsibilities, whereas autonomy, schedule flexibility, and enough technological tools enhance work-life balance, efficiency, effectiveness, and sense of accomplishment [28]. It is also investigated that how the COVID-19 outbreak, and subsequent layoffs affect employee performance in the hospitality sector [29]. The layoffs raise COVID-19-related stress in workers, which lowers performance in roles and outside of roles. These effects are reduced by perceived family assistance but amplified by the organisational support. This relation is depicted in cluster 4 in yellow nodes with Tu *et.al.* (2021) having highest citation (52 [27]). The 4th cluster is themed as "Positive workplace environment". 16 articles are found justifying this theme which have 217 citations in total.

Psychological health and COVID-19 pandemic theme are depicted by 5th cluster (purple nodes) with 'Kniffin *et.al.* (2021)' and 'Wen *et.al.* (2021)' as the topmost contributors (496 and 366 citations respectively) [30][31]. Emphasis is made on the modifications in the workplace procedures and their impacts on employees, including social isolation, stress, and unemployment, taking moderators such demographic traits, personality traits, and organizational norms [30]. It is suggested that through service design and distribution channels, the tourism sector can adapt to the changes in the pandemic [31]. This cluster covers the maximum number of articles and citations, ie., 217 and 4605 respectively.

The last theme, "Crisis, financial stress and wellbeing" which is depicted by the 6th cluster (sky blue nodes), which is covered by 30 articles and 23 citations in total. The top authors are Karatepe *et.al.* (2021) and Lai & Cai (2023) [26][32] How the pandemic affected the psychological wellness, productivity, and quality of life of hotel staff is discussed [26]. It is suggested that a human-centred strategy for handling crises in the hospitality industry, emphasising building the resilience and intrinsic motivation of the service employees [32].

C. CO-CITATIONS OF JOURNALS, AUTHORS, AND REFERENCES ANALYSIS VISUALISATION

The final map displays the full-count approach, which counts each occurrence of a phrase in a document and includes journals, authors, and references analysis. The final map shows bubble fields of various sizes and colors connected at

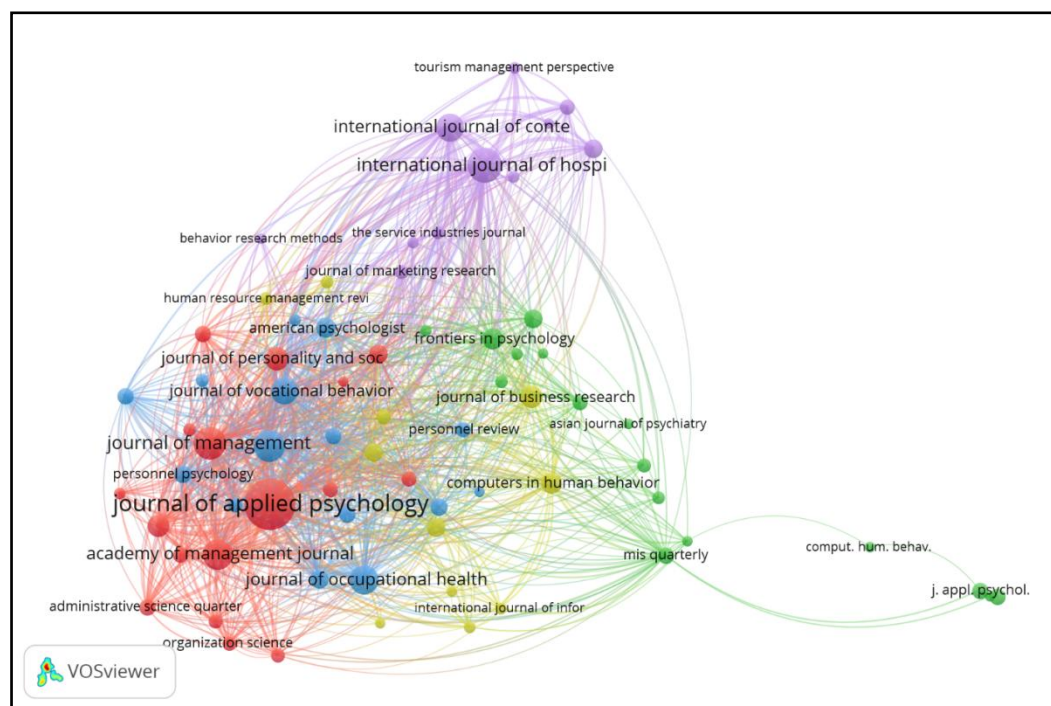
different distances. Colour belongs to a cluster or group. This grouping of subjects reveals those with several interrelated elements. The is the first area of emphasis. The larger the bubble, the more frequently a journal, author or reference is used in a sample. Shorter gaps between them indicate higher links between them, and ultimately, lines are used to depict the connections between phrases in studies.

1. Co-citation of Journals

This section analyses the co-citations network of journals about 'COVID-19' and 'mental health' of employees. In 1990, McCain suggested using citation analysis of a journal to study the organization of scientific fields [33]. The number of citations between two sources can reveal parallels between the research topics and the journal's scope. Figure 5 displays sources with a minimum of 20 citations. Out of the 5,057 journals cited in the analyzed journals, only 70 of them met the citation frequency requirement. Each node served as a source, and the number of citations received was indicated by the size of each node. There was a citation link seen in the connection between the two items. The nodes were classified according to how similar they were, thus sources that were closer together or in the same cluster (colour) were placed together.

The "Journal of Applied Psychology" (red cluster) has a total of 479 citations, with 64 other journals cited together. It has the maximum total reference strength of 16491. This journal is known for publishing high-quality articles on leadership; work motivation; individual differences in abilities, personality, and other characteristics; work stress, health, and well-being etc. Authors often rely on this journal for knowing the psychological health and behaviour of people for their subject areas. Another journal in this "psychological" cluster (red), "Journal of management", has a total of 197 citations and total reference strength of 8114. Another journal which is part of "Tourism" cluster (purple cluster), which has journals related to hospitality and tourism, is "International Journal of Hospitality Management" (233 citations, 8535 total link strength). Blue cluster is related to "organizational and managerial psychology" in which "Journal of organizational behaviour" has the highest number of citations (181) and is linked to 64 other journals with total reference strength of 7602. "Business Technology" related cluster is represented through yellow nodes which includes journals like "Journal of business research" (93 citations, 3589 total reference strength) and "Computers in human behaviour" (80 citations, 3177 total reference strength). The green cluster, the smallest cluster, has the least connections/links with other journals out of which "Frontiers in psychology" has the highest links with 64 other journals, 82 citations and 2295 total link strength.

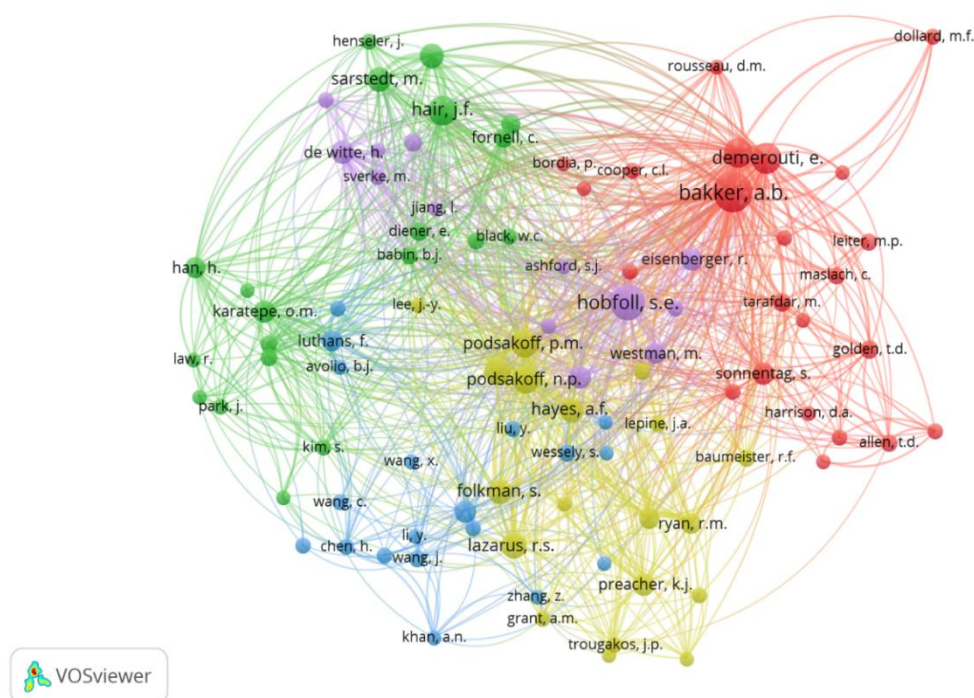
FIGURE 5: VISUAL REPRESENTATION OF CO-CITED JOURNALS (AUTHOR'S OWN)



2. Co-citation of Authors

In this section, we analyse the authors who have been cited and focus on the co-citation of authors, observing the quantity of citations and their collaboration. Using VOS Viewer, we can identify highly cited authors in the field of mental health of employees and COVID-19 research. Figure 6 is a visual representation of a co-citation network of authors, where the threshold value is set at 20, meaning that only authors cited at least 20 times will appear on the map. A total of 94 authors meets this criterion. The nodes represent the quantity of articles published by each author, and the connections signify cooperation between authors. The figure indicates that authors' research directions in COVID-19 and mental health of employees are closely connected with high level of connection and cooperation between them. Bakker *et al.* (2021) (157) has the highest number of cited publications [30]. Bakker, A.B. *et al.* is in the biggest cluster, i.e., red cluster containing 22 other widely cited authors [30]. Green cluster is second largest cluster with Hair, J.F. having 47 citations [34]. Other smaller clusters are represented by yellow and blue color. Dollard *et al.* (2021) is considerably distant from the rest, indicating a significant deviation in connection [35].

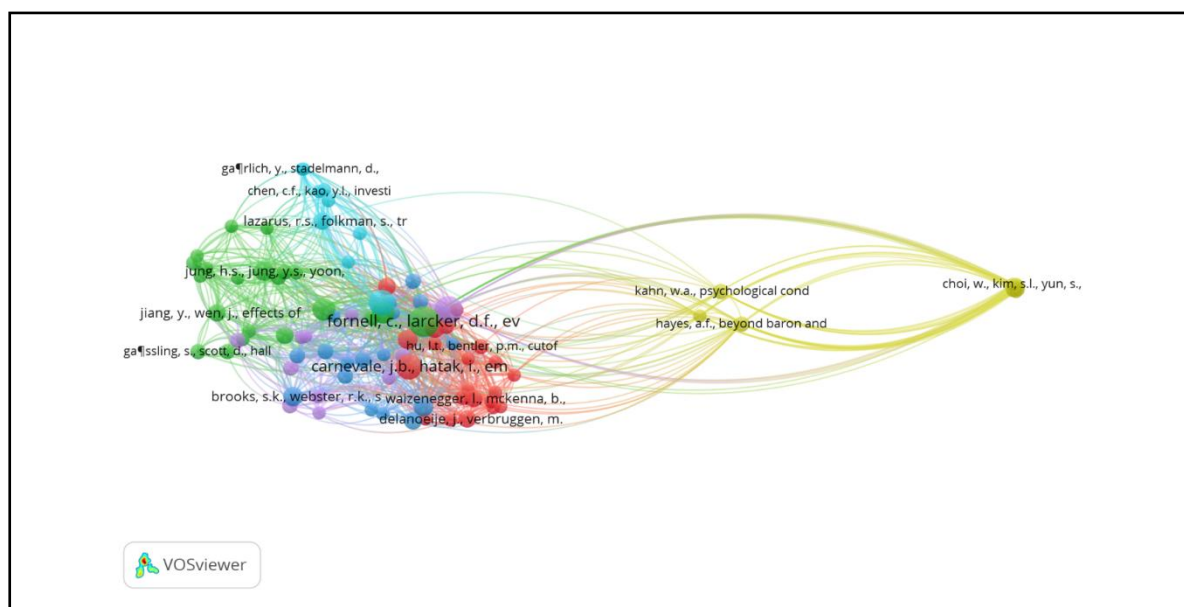
FIGURE 6: VISUAL REPRESENTATION OF CO-CITED AUTHORS (AUTHOR'S OWN)



3. Co-citation of references

This is another study on citations which examines a network of citations in articles on COVID-19 and mental health of employees that has human resource management and psychological implications. Cluster 1 (red nodes) and Cluster 2 (green nodes) are of same number of items (21). Yellow cluster (Cluster 4), which has 11 items, is distinctively placed which shows lowest connection with other clusters. Purple cluster has the same number of items as of the yellow cluster.

FIG. 7 VISUAL REPRESENTATION OF CO-CITED ARTICLES (AUTHOR'S OWN)



Other clusters are represented through sky blue (9 items) and navy blue (17 items). 90 of the papers that were examined met the requirement of having at least 3 citations each (Figure 7). Each node represented a single link, and the size of a node signified how many references a given document had. The strength of the quotations between the two mentioned articles was measured by the number of identical citations. The co-citation refers to how often two articles from earlier literature, as well as later literature, were referenced/cited.

SCOPE FOR MANAGERS

Promoting employee well-being is a major responsibility of managers, especially in times of emergency like the COVID-19 pandemic. Prioritizing mental health programs can help with problems like stress, anxiety, and emotional weariness. Policies supporting flexible remote work that promote work-life balance and lessen problems like isolation and techno-stress should also be established. Providing employees with focused training that builds resilience can aid them in navigating a variety of challenges, such as job instability. To prevent emotional burnout, managers should also include well-being into the culture of the company, maintain open lines of communication, and offer social and emotional support networks. To preserve trust and productivity, it's also critical to emphasize job security and justice. Managers must also exercise caution when it comes to how staff members utilize technology, providing assistance and training to minimize techno-stress while maintaining productivity. Managers can build a more resilient, healthy, and productive workforce during difficult times by concentrating on these areas.

LIMITATIONS OF THE STUDY

This bibliometric analysis has certain limitations. The data analyzed in the study were obtained only from Scopus, and its alternatives such as WOS, PubMed, or Google Scholar were not included. As a result, relevant articles that are readily accessible through other search engines have been overlooked. Furthermore, the study only includes publications in English language journals. The paper explores development in COVID-19, and the normal situation analysis is missing. The focus is on only employees. Lastly, the study only emphasizes on psychological wellness during the pandemic, and other potentially health aspects were not analyzed.

CONCLUSION

This article used bibliometric and information extraction methods to report on the state and impact of mental wellness research amidst the pandemic. The data was collected from Scopus database which were ABDC listed. These papers were used for trend and cluster analysis. The network analysis was performed on the compiled entities and relations. The results showed that mental health research during pandemic is increasing, with most studies focused on COVID-19, stress and resilience. The research was organized into six clusters, including remote work, psychological health, resilience, and positive work environment. The most commonly occurring entity was COVID-19, with a focus on mental health, stress, and anxiety. The relation extraction revealed that COVID-19 was most often associated with stress, mental health, techno stress, psychological well being, coping, job insecurity and resilience. United States and Australia are the most flourishing countries in terms of research in this area. The study provides useful information for researchers to understand the structure of the field and the relevant cross-disciplines and trends. The extracted entities and relations could also benefit physicians, patients, and their families in understanding and treating mental disorders. Furthermore, human resource managers and healthcare providers could use the data to design better policies and strategies to ensure sound mental health during such circumstances. Future studies could explore the effect of the global endemic on cognitive health and e-mental health.

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