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PRESIDENT MESSAGE

WELCOME TO THE FINAL ISSUE OF THE COLLEGE'S ASIA PACIFIC JOURNAL OF HEALTH MANAGEMENT FOR 2024

Dr Neale Fong FCHSM

President of Australasian College of Health Service Management

I want to take this opportunity to thank all the volunteers who support the Australasian College of Health Service Management. It is the work of dedicated volunteer College members, alongside our hardworking staff, which ensure we can continue to deliver the multitude of free and other programs that support the development of health managers and leaders, wherever our members are.

Without those willing to give of their time, we would not be able to offer such a volume and variety of support. To the Branch Councils, to the Committee members, to those who offer their time as a Mentor – we thank you.

As the year draws to a close for many of us it is often a time of reflection and gratitude. We are a privileged workforce in healthcare as we get to not only apply our training in scientific and technical capabilities, but the compassionate care that our patients and their families need in times of ill-health.

We also work in the midst of one of the most exciting and challenging environments going round, where the change and innovation and opportunities just keep rolling in.

For some this year will have brought more professional challenges than usual, and I hope that as you reflect you will take time to acknowledge both the need to care for your own wellbeing and your resilience in the face of these challenges.

2025 is going to be another massive year for all of us in healthcare, and I relish the opportunity of interacting with many of you throughout the coming year.

The upcoming one-day conference in Melbourne on March 21 and the annual congress in Darwin in October are going to be brilliant events. We are also advancing our advocacy and engagement agenda and will keep up the important message of the need to be investing in leadership development to increase the effectiveness of health care managers everywhere.

Finally, special thanks to Dr. Mark Avery our editor-in-chief and Yaping Liu our production manager who helps put this journal together so professionally.

On behalf of the board and management team I wish you and your loved ones a safe and happy Festive Season.

Dr Neale Fong
President of Australasian College of Health Service Management

EDITORIAL

ENHANCING IMPACT FOR KEY LEADERSHIP DOMAINS

Dr Mark Avery

Editor-in-Chief, Asia Pacific Journal of Health Management

Significant operational and functional action domains require health, aged and social care leaders and managers' expertise and responsibilities. Contemporary strategic; development and operational activities involving patient/client centred care; strategic vision articulation and alignment; financial performance; workforce management; effective communications; informatics challenges; enabling strong and positive organisational cultures as well as managing conflict and resistance to change are required and need to deeply focused on the context of clinical and social health care.

Effective performance and support for health organisations and systems require established and ongoing development of skills, competencies and experience in these areas of responsibility and unique application to the role and function of respective parts of organisations and health systems.

Learning and capacity building can foster growth and development for leaders and managers across these critical domains, empowering them to navigate healthcare management domains and address challenges with informed, adaptive expertise. Additionally, value and depth from some foundational pillars have been demonstrating impact and influence on several of these leadership and management responsibility areas.

Opportunities to reflect and develop depth in authentic leadership (self-awareness; moral perspective; relational transparency [1] capacities have been correlated to instilling vitality and learning within organisations and thereby enabling the culture of innovation [2, 3]. Strong abilities permeating facilities and organisations related to continuous learning in the workplace enhanced and support development and growth capabilities related to strategic management and the empowerment of teams [4]. Opportunities and mechanisms for to health

organisations support addressing requirements for the integration of continuums of care and effectiveness and efficiency of the system delivery in terms of role and function across the health, aged and social care sectors. Collaboration and partnering enables direct systems and improvement as well as contextual learning and engagement opportunities. There is growing understanding of the effectiveness of health and university organisations partnering in different ways and at different levels to deliver tangible and measurable positive value [5]. Lastly, importance and value of emotional intelligence to individuals and collectively for leaders and managers has been demonstrated. Opportunities to develop understanding and use of emotional intelligence effectiveness to modulate leadership styles, manage conflict and enhance persuasiveness show value in ongoing professional development [6].

Opportunities for healthcare leaders to extend beyond operational skills and competencies, to deepen their embrace on authentic leadership, fostering organisational learning, promoting collaboration and enhancing emotional intelligence provides opportunities for greater impact with roles and responsibilities. Investing in renewing growth and development in these areas leaders inspire trust, adapt to challenges, and create resilience that can ultimately drive sustainable success and delivery of exceptional patient/client centred care.

Papers from the Asia-Pacific Health Leadership Congress 2024

The Australasian College of Health Management (ACHSM) held the Health Leadership Congress 2024 23rd-25th October in Brisbane, Australia.

The overall 2024 congress theme was Sustainability in all its aspects and practical actions to achieve sustainability.

Conference presenters were invited to submit their work for publication in APJHM in a number of formats (research articles, practice analyses and practice briefs) and the collection of papers for this very successful congress are included in this issue of the journal.

Dr Mark Avery

Editor-in-Chief

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COMMENTARY

NEGLECTED VOICES: UNCOVERING THE HIDDEN CONSEQUENCES OF AIR POLLUTION ON RURAL SCHOOLCHILDREN'S HEALTH IN NORTHERN THAILAND

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ABSTRACT

Air pollution is a pressing global concern, with its consequences disproportionately impacting individuals in developing nations. This disparity in impact is especially pronounced among vulnerable groups, including women, children, and the elderly. This paper's primary objective is to illuminate the often-neglected ramifications of air pollution on the well-being of rural schoolchildren in Northern Thailand. Despite their heightened susceptibility, this demographic remains marginalized in discussions concerning air quality. The study aims to underscore the significance of recognizing the schoolchildren's heightened vulnerability to the adverse health effects stemming from air pollution, which is exacerbated by their critical developmental stage. The ensuing discussion comprehensively delves into the detrimental effects of pollution on the overall welfare and health of schoolchildren, thus accentuating the compounded socioeconomic disparities. By acknowledging and addressing the specific vulnerabilities of this demographic, policymakers and stakeholders can devise targeted interventions to safeguard their health and foster sustainable development.

KEYWORDS

air pollution, child health, environmental pollution, inhalation exposure, schools, Thailand

INTRODUCTION

Air pollution constitutes a significant and urgent global environmental threat to public health, contributing to an estimated seven million premature deaths annually. This issue represents a crisis of unparalleled significance in the realm of global health, accounting for nearly one in every nine global fatalities. Exposure to PM2.5, a category encompassing fine airborne particulate matter, resulted in an approximate reduction of one year in the average global life expectancy during the year 2019. In that same year, nearly the entire global population (99%) resided in areas where the stringent air-quality standards established by the World Health Organization (WHO) for 2021 were not met. These harmful particulates, primarily originating from human activities such as fossil fuel combustion, transportation, and agriculture, play a substantial role in the generation of air pollution [1]. Throughout 2022, nations in Southeast Asia exhibited diligent efforts to decrease PM2.5 concentrations in alignment with the WHO guidelines. However, Thailand stood out prominently by dominating the list of the 15 most heavily polluted cities. Impressively, Thailand achieved significant progress in its air quality

Neglected Voices: Uncovering the hidden consequences of air pollution on rural schoolchildren's health in Northern Thailand

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during 2022, marking a 10.4% decrease in the annual mean PM2.5 concentration, reaching 18.1 micrograms per cubic meter (μg/m³), a notable improvement from the levels recorded in 2021. Air pollution patterns in Thailand exhibit discernible seasonal variations, characterized by elevated PM2.5 levels during the dry season from November to February. This is followed by the summer season, commencing in March, which witnesses prevalent agricultural burning as farmers clear their lands. A noteworthy inclusion in the 2022 World Air Quality Report was data from 157 urban centers regarding PM2.5 concentrations. Strikingly, none of these urban centers adhered to the WHO's recommended guideline limit of 5 μg/m³ [2]. This underscores the persistent challenges associated in achieving and maintaining clean air standards on a global scale. Therefore, this article is intended for readers such as researchers, policymakers, and organizations across various sectors, emphasizing the importance of addressing the health effects of pollution on children, particularly school-age children in rural areas who are impacted by air pollution issues.

IMPACT OF AIR POLLUTION ON SCHOOLCHILDREN IN NORTHERN THAILAND

While a significant body of research has addressed urban-air quality and its associated health implications, the impact of air pollution on schoolchildren in remote regions has not received adequate attention. Within these populations, Northern Thai schoolchildren emerge as a particularly vulnerable demographic when it comes to the adverse health effects stemming from air pollution. Of noteworthy concern is the sharp increase in PM2.5 levels, which escalated by an astonishing 400% during forest fires in March and April, surpassing the established WHO guidelines. The exacerbation of air pollution is further compounded by transboundary haze, unauthorized crop burning, and illicit teak wood trade, all of which significantly contribute to the deterioration of air quality [2,3]. A variety of sources collectively contribute to the challenge of air pollution in Thailand, including vehicle emissions, industrial discharges, crop incineration, transboundary haze, and power generation. This multifaceted challenge is worsened by inadequate air-quality monitoring mechanisms, limited public awareness about the health consequences of crop burning, and weak enforcement of anti-crop burning regulations. Of particular concern is agricultural burning, a common practice in Thailand, which can elevate PM2.5 levels two to three times beyond WHO limits [4].

Furthermore, the daily averages of the hazard quotient (HQ), which is the basis in the assessment of the potential health risk of PM2.5, indicate a value exceeding 1 between January and April. The yearly mean HQ for children is calculated at 2.81 ± 3.97, surpassing the threshold of 1. This outcome signifies an unacceptable level of risk to human health throughout the entire year [5].

IMPACT OF AIR POLLUTION ON SCHOOLCHILDREN'S HEALTH

The health of schoolchildren bears a substantial burden due to diseases stemming from air pollution. Even minimal exposure to pollutants during pivotal developmental phases, such as in infancy, can lead to adverse outcomes that persist from childhood into adulthood [1,6]. Beyond respiratory issues, pollutants are demonstrably associated with central nervous system disorders, including childhood autism [1,7]. Compelling evidence also connects air pollution to health problems such as low birth weight, tuberculosis, cataracts, and nasopharyngeal/laryngeal cancers. It's noteworthy that air pollution is classified as a carcinogen [8]. Emerging data further associates air pollution with new cases of type 2 diabetes, obesity, inflammation, aging, and neurodegenerative conditions such as Alzheimer's and dementia [9]. Given these findings, it becomes abundantly clear that the impact of air pollution encompasses a wide spectrum of health concerns. These findings underscore the imperative need for effective mitigation strategies to safeguard lifelong well-being. From the author's perspective, there is a prevailing lack of awareness or recognition among the population and related organizations regarding the impact of air pollution on the occurrence of various diseases in school-age children. This lack of awareness persists due to the gradual development of certain health effects associated with air pollution, which often takes a considerable amount of time to manifest as specific diseases.

EFFECTS OF AIR POLLUTION DISPARITIES ON SCHOOLCHILDREN IN NORTHERN THAILAND

The significant and concerning consequences of air pollution on the health and well-being of rural schoolchildren, compounded by socioeconomic disparities, evoke a deep sense of concern. Urgent attention and steadfast commitment to rectify these injustices are imperative. Equity must serve as a guiding principle, especially as economically disadvantaged

children often bear the brunt of health impacts related to pollution. As pollution levels continue to rise, vulnerable individuals lack the resources to shield themselves, leading to pronounced disparities in both health and education. Policies ensuring equitable access to clean air and conducive learning environments take on paramount significance. Equitable distribution of resources, including essentials like N95 air filters, plays a pivotal role in mitigating health risks posed by pollution. The perpetuation of access disparities further entrenches cycles of disadvantage, compromising children's fundamental rights to health and education. Swift intervention is essential for rural schoolchildren facing respiratory infections and developmental hurdles due to air pollution's adverse impact on their developing respiratory systems. Resolving these complex issues holds the potential in empowering children for a healthier future and enables them to realize their full potential.

ADVANCING AIR POLLUTION AWARENESS AMONG SCHOOLCHILDREN

The application of these principles can be guided by The Lancet Commission on pollution and health recommendations [6]. Prioritizing the prevention of the impact of air pollution on schoolchildren is crucial on both national and global agendas. Integration of planning processes into countries and cities is essential. In addition, securing funding and international technical assistance is of critical importance. Consequently, adequate resources must be allocated for urban, national, and global pollution management. Establishing comprehensive monitoring systems for air pollution and its health impacts is of paramount importance. This is because national and local data collection is indispensable in quantifying pollution, identifying sources, evaluating interventions, enforcing actions, raising public awareness, and tracking progress. Moreover, a collaborative approach across sectors is strongly advocated. Partnerships between the public and private sectors, as well as government entities, can accelerate the adoption of clean energy and technology, addressing the root causes of pollution. Integrating pollution mitigation into noncommunicable disease planning is highly recommended. Lastly, emphasis on air pollution research is vital. Research underpins understanding and effective management as it uncovers links between pollution and diseases, identifies the evolving health impacts of pollutants, and accurately maps exposure, particularly within school environments.

CONCLUSION

The study sheds light on the often-overlooked consequences of air pollution on rural schoolchildren's well-being in Northern Thailand. It emphasizes the heightened vulnerability of this demographic, particularly due to socioeconomic disparities, and underscores the urgent need for targeted interventions. By comprehensively addressing the adverse health effects of air pollution on schoolchildren and advocating for equitable access to clean air and resources, policymakers can pave the way for improved health, education, and sustainable development among these young individuals.

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LEADING DURING A PUBLIC HEALTH CRISIS

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ABSTRACT

Leading teams during the COVID-19 pandemic had unique challenges often requiring timely decisions based on emerging new information to then rapidly implement changes. The usual scaffolding for system changes lagged behind the implementation. The command and control of crisis management blended with traditional health leadership styles as the emergency response became protracted and building sustainable teams became a focus of the response.

This paper presents the results of a survey of the leadership cohort at the Centre for National Resilience, a large quarantine facility in northern Australia, that managed over 30,000 people requiring quarantine and isolation.

METHODS:

A grounded explorative theory approach was implemented, with descriptive data analysis and thematic analysis of an online Leadership survey in conjunction with site data and information specific to the leadership structure.

RESULTS:

The core challenges for leaders were identified as establishing a workforce combining health and non-health resident care roles, rapid changes in legislation, communication, site logistics, and resident management and support.

CONCLUSION:

The survey highlights lessons for sustaining high-performing leadership in future protracted health emergencies such as the importance of peer support, attention to work-life balance, sharing positive work outcomes, early, clear communication and collaboration, and the need for flexibility and adaptability.

KEYWORDS

COVID-19, communication, leadership, quarantine, workforce

INTRODUCTION

Health leaders on the front line of pandemic responses are often required to be reactive and innovative with limited information. They rely on their team's compliance often with little work-team consultation and yet are expected to ensure they facilitate supportive work relationships and establish efficient communication channels. The multidisciplinary leadership team at a large regional quarantine and isolation facility in Northern Territory, Australia established and managed the safe quarantine of thousands of residents across domestic, humanitarian, repatriated and international travellers [1]. The quarantine and isolation facility was directed by both territory and commonwealth governments requiring innovative approaches to ensure coherent resident care across local and national legislation. New work models were

established to build workforce capacity integrating non-health staff to work alongside health professionals and the logistical adaptation of facilities to serve as a quarantine service occurred.

Having efficient and productive leaders in such an environment has been found to be vital to staff motivation and retention influencing how well staff will perform [2]. This is particularly evident for the middle management level who are often the front-facing leaders for the workforce and passing on decisions they may have had little input with [3]. As a result, they also bear the majority of criticism or pushback on decisions. As presented in the Australian Health Sector Emergency Response Plan for Novel Coronavirus (COVID-19), (2020) it is stated that leaders strive to make good decisions based on best available evidence [4]. Strong leaders were required in many areas of the pandemic response inclusive of pathology, epidemiology, disease surveillance, immunisation implementation, supervision of national and local borders and in quarantine and isolation services.

During the COVID-19 pandemic leadership required flexibility to adapt to changing situations often recognising it was preferable to move ahead with plans immediately rather than spend extensive time analysing possible outcomes [5,6]. Indeed, with the sudden onset of the COVID-19 pandemic, leadership teams were not provided the luxury of considered strategic planning but had to make decisions and implement actions immediately. This meant evaluation processes were instant and observational, occurring as a process was initiated such as airport arrival screening.

Dadich and Lopes (2022) point to limited clarity about how leadership manifested during the COVID-19 pandemic and a missed opportunity to learn from our experiences [7]. This study seeks to document key characteristics for the success of the leadership cohort at the Centre for National Resilience (CNR), a 3,000-bed quarantine and isolation facility in northern Australia to inform future protracted health crisis responses. The survey forms part of a larger project that aims to present a series of open-access quarantine guidelines for use in future disasters and emergencies where the isolation and quarantine of people is required.

METHODS

An anonymous online survey was sent to the leadership team at the time of closure of the CNR, including executive and middle-level roles. To ensure validity that participants represented the broader leadership team, the survey invitation was inclusive of: nurse, medical and allied health leaders, administration and site logistics leaders, and leaders from government areas and non-government organisations that had significant roles with the running of the quarantine site, such as site maintenance, catering and cleaning. Participant consent was assumed with the completion of the survey, with an opt-out approach. Survey questions identified the participant's workplace site and roles within the CNR, challenges faced in their role, the greatest successes they achieved and their recommendations for the future.

Results were analysed in conjunction with site data and information specific to the leadership structure and site operations. A grounded explorative theory approach was utilised, with descriptive data analysis and thematic analysis of open-ended survey questions to identify key trends and themes in staff responses. The qualitative research methodology of grounded theory is becoming more accepted in management and leadership areas and aligns well with the examination of the open-answer survey responses [8]. The text mining software Leximancer was additionally used to assist with open response data analysis.

Ethics approval was obtained by the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research (HREC Number 2022-4349).

RESULTS

The leadership team survey was sent to 45 participants and received 16 responses (response rate 35.5%) across both government and non-government staff. Participants were requested to identify which areas of Leadership their position was located with the option to add a role if it was not included with the list of 15 provided. This resulted with responsibilities nominated across corporate services, digital engagement, education and training, executive, executive planning team, finance management, infection prevention and control, media and communications management, medical and nursing services, operations,

quarantine services, security services, tele wellbeing, work health and safety, administration, maintenance, dispatch, catering, safety and quality.

Leaders were asked to describe their mission in their role at quarantine. The key themes were keeping the Northern Territory safe, leading and supporting staff, managing resident care, overseeing infrastructure, reporting outcomes, and being guided by Chief Health Officer Directions (government legislation). Respondents identified their main priority areas as site management, communication across the site, infection prevention and

control (IPC) measures, clinical administration, report writing, and work health and safety.

There were 13 detailed open responses to the most challenging aspects of their role and communication was central to the majority. The five core themes identified for this question set included: staff, legislation, communication, site logistics, and resident management. A sixth theme was added titled "emotive" as it was evident certain feedback related to personal feelings about the experience described (refer to Table 1).

TABLE 1: CENTRE FOR NATIONAL RESILIENCE (QUARANTINE SERVICE) LEADERSHIP TEAM RESPONSE ANALYSIS TO THE SURVEY QUESTION WHAT WERE THE MOST CHALLENGING ASPECTS OF YOUR ROLE?

Core theme	Descriptive theme	example
Communication	Site teams	• Communication between teams with different directors could be difficult if the directors were not collaborating effectively • Communication from key executive to the education to enable/ensure staff were aware of roles/responsibilities and changes in health directives.
	Stakeholders & external parties	• Communication between NTG and non-NTG stakeholders • Communicating between different organisations in order to find out what residents had recently been admitted.
	Rapid changes	• Sometimes work and decisions were changing so rapidly in order to keep up with an evolving situation, that decisions were not able to be communicated to all effectively • Communication and information sharing in a constantly changing environment
	Tools to share information	• Initially no access to written procedures. limited shared databases.
Staff	Recruitment	• Rotation of staff through CNR • Large numbers of staff
	Rostering	• Inflexibility with rostering of new staff fixed monthly rosters causing inflexibility of teams and managing business as usual no live roster to update with staff sickness
	Lack of experience with health	• Working with people who were new to health (non-health backgrounds and new graduate nurses) and teaching them health-related interactions with PPE and infection control.
	Unmotivated	• Sometimes staff did not have enough work to keep them occupied, and so they became demotivated
Resident management	Arrivals & departures	• Discovering that people had already arrived on site without us knowing they were arriving.
	Health care needs	• People transferred from NT health facilities without a clinical handover, without medications and without basic care being provided prior to being discharged from a facility (ie arriving from dialysis without having a meal and in some cases without receiving their dialysis). The hundreds of people who arrived from remote communities without a clinical handover and/or without their

		medications were where we had no access to their medical records and prescriptions. Then to discover a few days after they had arrived that they had significant health issues and needed their medications, putting them at a huge risk of harm. • Managing residents with mental health issues • Managing residents objections to the system of quarantine
Legislation	CHO Directions	• CHO directions changed on a dime • Adapting HSQF response to changing legislative requirements from the CHO Political overlay at all levels of the health and emergency response • Changes in disease transmission and CHO Directions and therefore changes in practice
Site Logistics	Maintenance	• Access to areas that required maintenance.
Emotive	Positive	• Embraced the challenges.
	Negative	• Providing positive leadership when personally fatigued

The survey presented an opportunity for the participants to rank their perceptions of their work-life balance at the quarantine facility. Responses demonstrate the leadership team members felt overworked and experienced a compromise with work-life balance. However, the two areas regarding feeling satisfied with work outcomes and being supported by your peers rated much higher (refer to Table 2).

In addition, there were 14 pieces of feedback provided for the aspects leaders felt most proud of in relation to their work at CNR. These can be summarised as achieving site goals (predominantly no community transmission of COVID-19), career progression, resident-focused outcomes, teamwork, and work responsibilities. Survey feedback varied from generalised comments regarding satisfaction with teamwork to identifying specific areas and/or projects they completed. Leximancer identified the core themes of team and safe for staff responses (refer to Table 3).

TABLE 2: CENTRE FOR NATIONAL RESILIENCE (QUARANTINE SERVICE) LEADERSHIP RESPONSE TO THE SURVEY QUESTION: ON A SCALE OF 1-5 (1 BEING NOT AT ALL TO 5 BEING EXTREMELY) STATE YOUR RESPONSE TO THE FOLLOWING QUESTIONS.

Field	Minimum	Maximum	Mean	Standard Deviation	Variance	Count
How overworked were you in your role at CNR?	2.00	5.00	3.29	0.96	0.92	14n
How compromised was your work-life balance?	2.00	5.00	3.67	1.30	1.69	15n
How satisfied were you with your work outcomes?	3.00	5.00	4.07	0.80	0.64	14n
How supported were you in your role by your peers?	4.00	5.00	4.62	0.49	0.24	13n

TABLE 3: CENTRE FOR NATIONAL RESILIENCE (QUARANTINE SERVICE) LEADERSHIP TEAM RESPONSE ANALYSIS TO THE SURVEY QUESTION: WHAT WERE YOUR GREATEST SUCCESSES/ WHAT ARE YOU MOST PROUD OF?

Core theme	Descriptive theme	Example
Achieving site goals	Nil COVID-19 transmission to staff	Leading a large amount of staff across the site no cross-infection of COVID between staff or residents The ability to not have one transmission of Covid 19 from residence to staff.
	Nil COVID-19 transmission to community	No community transmission of COVID
Work outcomes	Successfully completed projects	Arranging a system for a totally deaf woman should an emergency occur during the night when she is sleeping or in her room. Creating an onsite pharmacy room, with a workable impress list and working with the many pharmacies and remote health centres to ensure there was a minimal delay in getting medications to the people who arrived on site without them
Teamwork	Being part of or leading teams	The working relationships formed to achieve a common goal Leading an education team who proved to be more than just adaptive, reactive and proactive to the facility and staff needs, they were innovative and creative and dedicated to ensuring staff were supported to safely meet resident and site needs.
Career progression	Career and knowledge progression	Opportunity to learn and take on study to further my career The knowledge gained through working with some of the best infectious control leaders in their fields.
Resident	Resident management and safety	Making a difference in the lives of people returning to Australia often under extreme and traumatic circumstances. Keeping our residents safe.

Understanding what leaders prioritise regarding desirable leadership skills presents a valuable lesson for future leaders. For the CNR leadership team, 14 people responded to this question and the priority areas were distinctly identified as: clear communication, adaptability, collaborative approach, leads by example and team building (refer to Table 4).

TABLE 4 CENTRE FOR NATIONAL RESILIENCE (QUARANTINE SERVICE) LEADERSHIP RESPONSE TO THE SURVEY QUESTION: CONSIDERING LEADERSHIP ROLES AT CNR, WHICH OF THE FOLLOWING LEADERSHIP CHARACTERISTICS WERE IMPORTANT TO THE SUCCESSFUL OPERATION OF A QUARANTINE FACILITY OPERATING IN AN EMERGENCY RESPONSE ENVIRONMENT? IDENTIFY THE TOP 5.
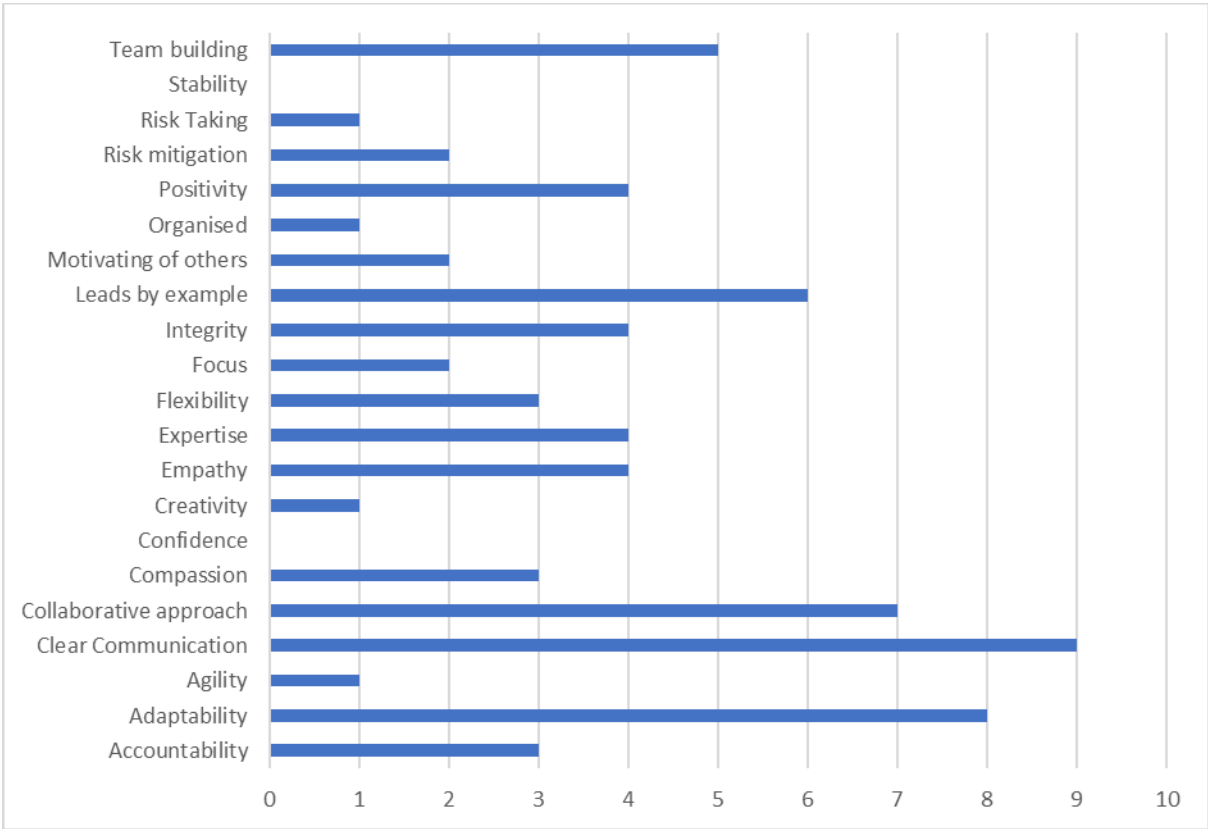
DISCUSSION

The goals of the leadership team at the CNR were underpinned by the public health mandate of protecting the community. The survey revealed leaders were focused on the protection of staff, residents, and the community from COVID-19, recognising the quarantine facility as a potential transmission hazard. The leadership was initially a command-and-control model but as the emergency became protracted, a more collaborative model of leadership was needed to retain and sustain the workforce. The initial emergency reactive response merged into a more sustainable proactive approach as it became evident the COVID-19 pandemic was an ongoing event.

The important leadership qualities in this unique setting included capacity to collaborate and communicate within and across agencies, the ability to make decisions quickly and implement change rapidly in an evolving health emergency, the fostering of peer support and celebrating the contribution every member of the workforce is making to the evolving crisis. Ahern and colleagues (2021) refer to sustaining trust in the workforce through remaining closely connected to those on whom decisions impact and this was critical at the CNR and achieved by leaders working alongside teams in the tropical heat and building a strong sense of purpose in the workforce [9]. This aligns with one study that examined the core leadership traits required as presented by their staff and identified three specific areas- attending to the person, taking charge, and showing the way forward and sustaining the spirit [10].

In complex emergencies, leaders need to be adaptive at all levels [9]. The protracted nature of the pandemic required a reset in terms of health workforce leadership from encouraging staff to surge to meet the demands with the expectation it would be over soon to accepting the new normal and providing opportunities for staff to achieve a better work-life balance. The staffing of new health services such as the CNR had to be balanced against the workforce needs of the acute and primary health care systems and as such new workforce models needed to be explored and implemented. The challenge for leaders in this protracted crisis setting is to have the courage to try untested innovations and be comfortable with the risk of failure.

The leadership at the CNR employed health and non-health staff to work in teams providing quarantine and isolation health and wellbeing care to its residents. The non-health staff were drawn from professional groups that had become unemployed because of the pandemic such as travel and hospitality workers. A model of assistants in nursing was developed to employ nursing students in the facility to also work within these teams. This adoption of innovative staffing models was successful and has subsequently been adopted into other settings.

The leadership at CNR identified clear communication and a collaborative approach as critical to the success of the service. Effective messaging during a public health emergency is vital and the resulting infodemic which occurred with COVID-19 made this an incredibly difficult task for governments and health organisations [11]. In a mixed workforce of health and non-health professionals it is important for leadership to provide tailored information sessions. It is additionally critical in a rapidly changing response such as the pandemic where public health orders impacted directly on the CNR operations that information can be rapidly disseminated from the leadership team to all staff.

LIMITATIONS

The number of participants in this research could be considered low and thus limiting in representing the true experience of the leadership team. The participants who did respond to the survey, however, are representative of the various leadership areas of the quarantine service and do represent a holistic view of leadership across the service.

CONCLUSION

The COVID-19 pandemic provided challenges for health leaders and an opportunity to capture those challenges and prepare for the future. Leaders who are currently in positions where they will likely be called on to respond should be provided training for the leadership skills required in health emergencies and particularly for protracted emergencies. Our work at the CNR suggests leadership should focus on rapid decision making, adaptability, innovation and acceptance of risk, communication strategies, leading from the front to build strong teams and fostering a sense of purpose.

ETHICS

This project received ethical clearance from the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research (HREC Number 2022-4349).

DECLARATION

The authors declare that there is no conflict of interest.

FUNDING

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RESEARCH ARTICLE

BEING AN WHOLISTIC AND DEVELOPMENTAL HEALTHCARE LEADER: INSIGHTS FROM A GROUNDED THEORY RESEARCH STUDY

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ABSTRACT

BACKGROUND

Healthcare is becoming increasingly complex, requiring leaders to cope with a significant degree of uncertainty, change and ambiguity. In this environment, the healthcare leader's ability to make sense of their experiences and thrive as a leader, is crucial to the efficient functioning of the healthcare system.

OBJECTIVE

To explore how the healthcare leader understands and makes sense of their leadership experiences and to develop a theoretical model which reflects contemporary leadership in a complex healthcare environment.

METHODS

A constructivist grounded theory methodology provided a comprehensive and rigorous model for the flexible exploration and analysis of the personal experiences and perspectives of the participant healthcare leaders. The rich and varied data was co-created through researcher interviews with participants, where participants engaged in two, one-hour interviews. Memo writing throughout the data collection and analysis process afforded additional valuable data.

RESULTS

Coding of data using constant comparative analysis rendered six key categories: Broadening perspectives and abilities as a leader, Creating the best possible healthcare environment, Experiencing and making sense of the bad times, Leading in alignment with personal values, Communicating and building relationships, Experiencing and making sense of the rewarding times. An overarching core category emerged of Being an wholistic and developmental leader, which connected all the categories.

CONCLUSION

This research provides an understanding of how healthcare leaders make meaning from their leadership experiences. A comprehensive model has been constructed to describe how contemporary healthcare leaders make sense of their leadership experiences in complex environments both wholistically and developmentally. This is useful for both informing and supporting the developmental growth of healthcare leaders.

KEYWORDS

leadership. healthcare leader, developmental, wholistic, complex, complexity

INTRODUCTION

Healthcare systems represent a substantial investment in human and economic resources, while also increasing in complexity [1]. Healthcare systems and the healthcare leaders within them are required to deliver an expanding range of technologically enabled healthcare to an aging population, with chronic and complicated health conditions. All in the context of a politically influenced environment [2].

Healthcare leaders at all levels are required to function with a significant degree of complexity, uncertainty, change and ambiguity. Testament to this was the recent COVID-19 global pandemic where rapid transformation of healthcare services presented critical leadership challenges [3]. Additional complexity is afforded by the highly professionalised nature of the healthcare workforce. To effectively manage this complexity, leaders require more than proficiency in technical skills and the attainment of base-level competencies [4, 5]. Given the complexity and fluid nature of the management and leadership role in healthcare, some of the growth capabilities needed to thrive in this variable environment include adaptation, innovation, collaboration and transformational change management [[5-7].

It is unclear how contemporary healthcare leaders understand and make sense of their leadership experiences and how this understanding influences their leadership behaviours [8]. A scoping review was conducted to identify this gap in the literature [9]. The scoping review was then used to inform this exploratory grounded theory study to answer the research questions: 1."How does the healthcare leader understand and makes sense of their leadership experiences? 2. "What are the leadership behaviours manifested by the healthcare leader?

METHODS

RESEARCHER POSITIONALITY

A constructivist ontology and epistemology [10-12] underpinned this research, where it was held that reality is mediated and shaped by the individuals' social environment and cultural context, and knowledge is constructed through their experiences and interactions. In this research, the meaning of the healthcare leaders' experiences was interpreted through their own sense-making, where they determined what is truth and knowledge. The data was co-constructed through the lens of both the researcher and the participant. Each of the researchers were health professionals who have worked in health leadership roles. Acknowledging the philosophical position guiding the study, the primary researcher also undertook bracketing and reflective strategies including memo writing, prior to and post interviews to advance the trustworthiness of the conclusions [13].

STUDY POPULATION

Participants included both doctors and nurses working in large acute care hospitals. The participants occupied leadership roles where they managed or led other clinicians and provided direction, guidance, co-ordination or planning in the allocation of resources for medical and health services in accordance with the objectives of the health care organisation. They may or may not have had fiscal or administrative responsibilities [14-16]

SAMPLING STRATEGY

A purposeful snowball sampling strategy was used to recruit a heterogeneous sample of healthcare leaders who presented with a mix of leadership experience and organisational environments. Participants were recruited through introduction and referral. A total of 24 participants were invited via email to interview, of which 17 were recruited and 16 completed both interviews with one participant completing interview one[17]. Data saturation was reached at approximately 14 participants. However, an additional three participants were already recruited.

CONTEXT AND STUDY SETTING

The study setting was in acute care hospitals within Australia, with one participant working in both the UK and Australian settings. Where possible, interviews were conducted face-to-face within the participant's office or meeting room, otherwise, interviews were conducted virtually via Microsoft Teams (version 1.7.00.1864). Data collection was from January to October 2022. Noting that at this time the COVID-19 global pandemic was still very much top of mind.

RESEARCH DESIGN

Constructivist grounded theory

Constructivist Grounded Theory (CGT) as developed by Charmaz [17] provided an appropriate methodology where the research process was inductive and cyclical. What is real and what is true was distinguished by the assumption that "what we take as real, as objective

knowledge and truth, is based upon our perspective" [18] The concept of emergence was a central concept and was predicated on the idea that outcomes or theory emerge from the data,[19]. The researchers' flexible exploration and analysis of the personal experiences and perspectives of the selected participants provided rich and co-created data [20]

DATA COLLECTION METHODS

Leadership Interviews

Two in-depth, semi-structured, one on one interviews with leaders were conducted to explore how the healthcare leader understands and makes sense of their leadership experiences, and how these leadership experiences manifested in their leadership behaviours. Open-ended questions were asked, for example, "How would you describe yourself as a leader? What would you describe as some of the most challenging/most rewarding aspects of your leadership? Questions were informed, in part, by research from an initial scoping study performed by the researchers [9]. Based on the ongoing analysis, as interviews progressed, additional questions and concepts were included to better explore and understand leaders' experiences on emergent topics or themes, such as [21] the notion of conflict and how this manifested in leaders' behaviours. The second interview was usually conducted within two weeks of interview one. The data from both interviews were combined and analysed. Further analysis of

the data from the second interview using constructive development theory will be reported elsewhere.

All interviews were recorded and transcribed by the researcher. Data collection and analysis were undertaken concurrently, thereby allowing for the integration of insights, and pursuit of additional data on promising themes.

Memos

Memos written before and after the interview captured a self-reflective noticing of key elements of the interaction. In between sessions, memos captured assumptions, observations or tenuous linkages that could be explored further. Memos played a pivotal role in the creation of theoretical categories [17].

ANALYSIS METHODS

Coding assigned meaning to segments of the data[22] and commenced with line-by-line coding of interview transcripts. It then progressed to focused coding by asking questions of the data, such as "What larger story are these codes conveying"? Following an iterative comparative process which continued throughout the analysis of both interviews, focused codes were then grouped into sub-categories which represented the emergence of key categories. Table 1 defines the CGT coding strategy used in the study.

The following figure 1 provides insight into how the elements of grounded theory aligned with the research.

TABLE 1. CONSTRUCTIVIST GROUNDED THEORY CODING STRATEGY

Coding	Description
Initial line-by-line coding	Initial codes were developed through line-by-line hand coding where each line or relevant segment of the data was interrogated for meaning and assigned a code which attempted to explicate the meaning of the segment[17]. Coding began on the data from interview one.
Focused coding	Focused coding took the process one-step further by comparing data with data, codes with codes, codes with categories, categories with new data and comparing codes between participants and within participants. The aim was to delineate the most representative codes as focused codes[23]. To this end, codes were often collapsed or merged into each other where it was considered that a more expansive code encompassed the extent of the data.
Theoretical coding	Theoretical coding involved abstracting the data to create a broader code which had both analytical and "explanatory power"[12].

FIGURE 1. GROUNDED THEORY ELEMENTS AS THEY ALIGNED WITH THE RESEARCH
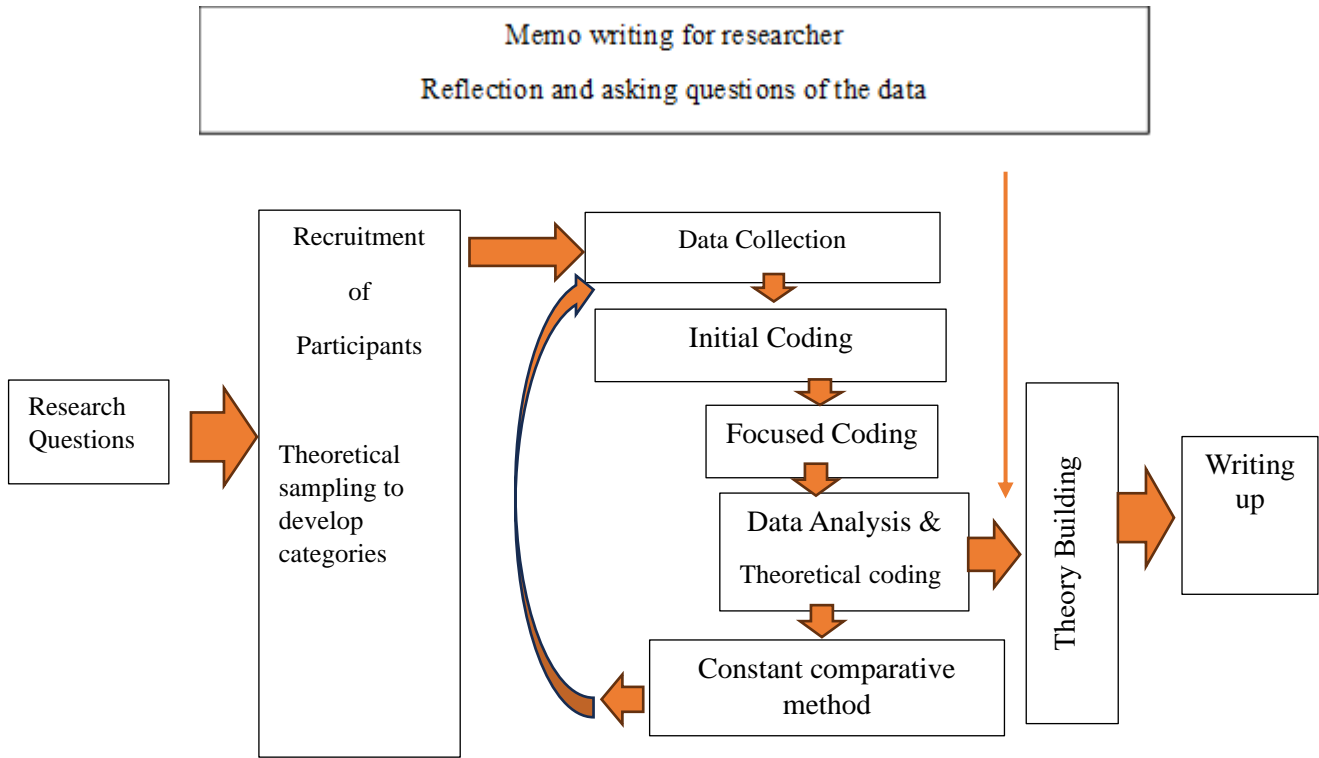
Adapted from Charmaz (2014, p.18) [17]

ETHICS

Bond University Human Research Ethics Committee (BUHREC) granted ethical approval on 05/05/2021 for project # SR00236.

RESULTS /FINDINGS

The demographics of the 17 participants are presented in Table 2.

TABLE 2. PARTICIPANT DEMOGRAPHICS

		Frequency (%) N=17
Gender	Female	10 (59)
	Male	7 (41)
Age	30-40	1 (6)
	40-50	5 (29)
	50-60	6 (36)
	60+	5 (29)
Profession	Registered Nurses	13 (76)
	Doctors	4 (24)
Years of leadership experience	5-10	7 (41)
	11-20	3 (18)
	21-30	5 (29)
	30+	2 (12)

*Percentages are rounded to a whole number

FINDINGS

Leaders described their behaviours at the same time as they described how they understood and made sense of their leadership experiences. Therefore, results for both research questions were integrated together. For example when discussing, how a leader understood and expressed the emotion of anger in the workplace, one participant commented, "This person basically went against everything that we as a team stood for and instantly, I was enraged, not just angry, I was absolutely fuming to the point where I could not talk to that person that day because I knew if I did, I would not come across the way a leader should" (P6).

Initial codes or sub-categories were created first and preceded the emergent development of the key categories. Following extensive line-by-line, focused and iterative coding of the data, six key categories emerged which represented the diverse plethora of leaders' perspectives. In addition, a seventh overarching or core category emerged, which connected and linked all the categories. By exploring each of the key categories in turn, there is a gradual unfurling of the leaders' understanding, sense making and associated behaviours.

Key category 1: Broadening perspectives and abilities as a leader

TABLE 3. PARTICIPANT QUOTES ILLUSTRATIVE OF THE KEY CATEGORY AND SUB-CATEGORIES

Broadening perspectives and abilities as a leader		
Description	**Sub-categories**	**Participant Quotes**
This category explained how the leaders viewed their leadership experiences and how their leadership had changed over time. It detailed how developing their emotional intelligence, increasing their self-belief and having environmental scaffolding supports influenced their leadership and how this manifested in their leadership behaviours.	1.1 Changing experience of leadership over time	"Be vulnerable and humble, just because I am in a leadership position doesn't mean I know everything" (P9).
	1.2 Developing emotional intelligence	"I have started to reflect recently on how I engage with others, what can I do differently?" (P16).
	1.3 Having self-belief	"Sometimes you realise that you are in the exact right position and point in your life to do this job" (P6)
	1.4 Providing and receiving scaffolding support	"My boss is an amazing listener" (P13) "You look at the negative behaviours, [and think], I am not going to touch that" (P15).

As participants progressed in their roles, their experience of leadership changed to a position where they learnt to navigate uncertainties, value diversity of thought, devolve power and responsibility, sponsor innovation, and manage risk more strategically. For some, there was a shift from operational to more strategic roles, where their leadership influenced on a broader scale. While 24% of leaders had post-graduate leadership qualifications, leaders noted that their leadership skills were primarily acquired or honed through practical on-the-job experiences rather than formal leadership training. "It has been a long journey…I am practical, I've learned along the way "(P3)

In developing their emotional intelligence, participants used reflection as a valuable tool for enhancing their self-

awareness, including identifying their values. This enabled participants to recognise the impact of their emotions on themselves and others. For some participants, there was the reflection that over time they became better at managing their emotions more effectively. Participants' self-belief grew as they embraced their vulnerabilities, set boundaries, and faced their fear of failure. They experienced a movement away from seeking constant approval and focussed on developing their personal authenticity, even if it meant not conforming to others' expectations. One participant recounted their experience with a more senior colleague, "He had a narcissistic injury and just got really defensive, condescending and unprofessional with me…I had to stand up for myself" (P1).

Scaffolding support in the form of role models, mentors, and supportive teams played a pivotal role in the participant leaders' growth. Both positive and negative role models influenced their behaviour, while mentors provided guidance and encouragement. Mentoring others and practicing self-care were also components of the leaders' development, even though self-care was often overlooked. As one participant commented, "I'm a wee bit desensitised, nurturing myself, I've never really thought about it" (P15). The scaffolding support which helped in their growth was also a factor in participants' developing confidence in their abilities and learning from failures. As one participant wryly observed, "You learn from your scars" (P13).

Key category 2: Creating the best possible healthcare environment.

TABLE 4. PARTICIPANT QUOTES ILLUSTRATIVE OF THE KEY CATEGORY AND SUB-CATEGORIES

Creating the best possible healthcare environment			
This category described the leaders' focus on prioritising patient safety, care, and advocacy. Demonstrating agility in managing rapid change and having a bias for action, in addition to creating a team environment where staff were safe, engaged, valued, and respected. This contributed to creating the best possible healthcare environment.	2.1	Prioritising patient safety, care and advocacy	"There are a few times when you need to stand by the patient and be a strong advocate" (P17).
	2.2	Demonstrating agility and getting things done	"At one stage there was a new thing you had to bring in on a daily basis" (P3).
	2.3	Creating a team environment	"By creating connection and building a sense of trust and respecting what people say…there are a lot more people feeling brave enough to speak up and speak out" (P16).

In creating the best possible healthcare environment, all participants expressed the view that prioritising patient safety, care and advocacy was integral to their role. To this end, participants' commitment involved addressing competency issues, making tough decisions, and investing in staff training and education. Several participants stated that advocating for the patient included mitigating the unintended consequences of budget cuts to services.

Demonstrating agility and getting things done, were key ingredients in the participants' aim of creating the best possible healthcare environment. This agility involved the practice of open communication with stakeholders, and the encouragement of innovation, underpinned by a commitment to professionalism and respect for both patients and staff "We didn't have to push back if something came up, you could just talk to each other…it was a really good dynamic" (P12).

Creating a team environment which was both cohesive and safe for staff and patients revolved around fostering an atmosphere that prioritised connection, active engagement, psychological safety, credible advocacy, and the embracing of diversity. There was an acknowledgement of the need to learn from failures and the importance of cultivating a culture of continuous improvement.

Key category 3: Experiencing and making sense of the bad times.

TABLE 5. PARTICIPANT QUOTES ILLUSTRATIVE OF THE KEY CATEGORY AND SUB-CATEGORIES

Experiencing and making sense of the bad times			
This category explored how leaders defined for themselves what challenges constituted the bad times, and how they	3.1	Experiencing and dealing with conflict	"No one likes to confront or have challenging conversations, I will have them though, I never shy away because I think that is also respectful to the other person"(P2).

| dealt with and made meaning from them. Conflict and exposure to negative leadership was challenging for leaders, however, it also provided opportunities. Building resilience, involved learning from and building strength from the challenges of bad times. | 3.2 | Accumulating exposure to negative leadership | "No matter what you did they just didn't listen" (P12)
"You can only put up with it for so long"(P4). |
| | 3.3 | Building resilient healthcare leaders | "Let us try and understand how we got to this unexpected point in the road"(P9) |

As participants discussed how they made sense of challenging leadership situations and experiences, they emphasised a requirement for reflecting on and aligning with their core values. Addressing conflict directly in a timely manner was seen as a way to pre-empt escalated disputes and improve relationships. The ability to engage in contentious dialogue was in part driven by values of making a difference and respect for themselves and others. Some participants avoided conflictual situations due to personal discomfort and a perceived potential threat to relationships: "I don't like conflict or upsetting people; I find that a challenge" (P3).

The toll of addressing conflicts and exposure to negative leadership behaviours was linked to undervalued staff contributions and the existence of toxic cultures. Having continued exposure to negative leadership behaviours, took a toll on participants, with some reporting stress responses and burnout. "It has probably just been too long and too many strikes" (P12). Participants also identified a lack of values alignment, frustration with organisational processes, a lack of work/life balance, and overwhelming job commitments as contributing to burnout. For several participants there was a decision to leave their positions due to experiencing these bad times. Leaders recounted that building resilience involved learning from mistakes, understanding their values, prioritising effectively, maintaining a curious outlook, taking a systems view, advocating for oneself, and building mutually supportive partnerships.

Key category 4: Leading in alignment with personal values.

TABLE 6. PARTICIPANT QUOTES ILLUSTRATIVE OF THE KEY CATEGORY AND SUB-CATEGORIES

Leading in alignment with personal values			
For leaders, being aware of, and aligning with their core values was fundamental in supporting them to flourish in their roles. Many felt a sense of vocation. Where there was a misalignment with their values the leader experienced a sense of cognitive dissonance, manifesting in various ways, such as burnout.	4.1	Being authentic and true to myself	"I am honest in the way I deal with things, and people either like it or they don't…I am never scared to say I disagree with something"(P10).
	4.2	Doing the job I was meant to do	"This is who I was meant to be"(P3).
	4.3	Having compassion, courage, honesty and integrity	"I think compassion is not just about patience, it is about being compassionate to everyone, even the people that you don't like(P11).

For participants, being aware of, and aligning with their core values was fundamental in supporting them to flourish in their roles. A majority of participants regarded the value of authenticity as a key element of their leadership. This value involved knowing themselves deeply and aligning their actions with their core values. Being authentic allowed participants to take risks, build confidence, set clear priorities and be reflective. It also empowered them to act when their values were compromised, even at a personal cost to themselves. Leaders' values were interwoven with behaviours around making a difference, helping others, supporting staff, and ensuring patient care, quality and advocacy.

Leaders perceived themselves as having an integral role to play in the patient's journey often describing this in the context of a 'vocation' or 'doing the job I was meant to do'.

Values such as respect, positivity, clinical competence, and compassion guided leaders to positively impact colleagues, staff and patients and make decisions aligned with their principles.

Participants nominated values of fairness, honesty, positivity, commitment, trustworthiness, compassion, courage, integrity and competency. For many, cultivating an atmosphere of openness, respect, and trust within the workplace, promoted staff engagement and a culture of accountability. "You just need to be honest with people, whether it is actually going to be challenging or a positive thing for them" (P8).

Key category 5: Communicating and building relationships.

TABLE 7. PARTICIPANT QUOTES ILLUSTRATIVE OF THE KEY CATEGORY AND SUB-CATEGORIES

Communicating and building relationships			
Leaders' emphasis on communicating and building relationships was supported by their ability to listen and have difficult conversations. Leaders had multiple approaches to getting the best out of people, which all involved facilitating communication.	5.1	Listening and having the difficult conversations	"If it is out of character for my team member, it raises a red flag for me, just to make sure that they are okay"(P7).
	5.2	Building networks, partnerships and strategic alliances	"My strategy is always to get to know the people and the personalities and to build relationships and to find the common ground that has nothing to do with work…Trust is something that is not transactional, it is something that is built"(P5)
	5.3	Getting the best out of people	"They know that they are going to get support from you when they need it and then that creates loyalty"(P6) "I like to think that empowering people is not about making them like you it is about saying, good for you for having an opinion on this and hopefully the way I respond will help them have an opinion next time"(P11).

Leaders recognised that building relationships involved attentive listening, understanding others' emotions and being willing to have the difficult conversations. "Some of the conversations had to be fairly gnarly because they [the team] had a bunch of blind spots" (P5). Honesty, courage, preparation, and a willingness to learn, were key elements in creating successful outcomes during difficult conversations and in developing professional relationships.

Participants in senior leadership roles emphasised the importance of building networks, partnerships and strategic alliances. Open communication supported organisational change, staff development, empowerment, patient-centered care, and an efficient workplace. Past clinical experience was seen as valuable in helping participant leaders to understand their team's environment and advocate for the profession.

Getting the best out of people involved engagement, active listening, letting go of perfection, building trust, and ensuring individuals feel valued and heard. As one participant commented, "Facilitating execution through others…I think that is something that has been a big learning for me (P2). Failure to listen actively or understand the emotional makeup of others led to misunderstandings and unexpected behaviours.

Key category 6: Experiencing and making sense of the rewarding times

TABLE 8. PARTICIPANT QUOTES ILLUSTRATIVE OF THE KEY CATEGORY AND SUB-CATEGORIES

Experiencing and making sense of the rewarding times			
Healthcare leaders explained how experiencing rewarding times was integrally allied to their ability to make a difference for their patient's, their staff, and the organisation. Developing individuals and teams was seen to be a significantly rewarding and worthwhile element of their leadership. Their role also provided a diverse range of opportunities for them to learn and engage with different and novel challenges. This variety was seen to be both advantageous and rewarding.	6.1	Making a difference	"I come in every day and even if it is only one small thing that makes a difference or makes the service even a snippet kinder or more responsive, then I have achieved something"(P14). "I know that I am creating a level of significant influence in the position I am in, where I can now shape what is happening, it is really rewarding" (P11).
	6.2	Growing and developing individuals and teams	"Part of the legacy will be around people, growing the team"(P13)
	6.3	Exploring new challenges and novelty	"What I value is the opportunity to explore and expand and go, I wonder if we could do that?...I don't do well with humdrum"(P9).

For healthcare leaders, the rewarding aspects of their roles were derived from making a meaningful difference where they coped with challenges and could feel a sense of achievement through positively impacting the lives of others. As one participant commented, "There is a lot of good you can do in this role and that is probably what keeps me in it" (P17). Leaders also found fulfillment in growing and developing individuals and teams, irrespective of whether it was appreciated or not. Knowing that they had helped others was the reward. "Making a difference for each and every nurse on each and every shift" (P16). Having opportunities for exploring diverse areas, engaging in challenging circumstances and exposure to novel situations were all rewarding aspects of the participant's leadership role. Leaders also mentioned the importance of collaborating with like-minded individuals within an intellectually stimulating and professionally rewarding environment.

In the following Figure 2, the emergent model is represented by the overarching category "Being an wholistic-developmental leader" (innermost ring), this category emerged to connect and link all the categories. The six key categories, (middle ring), emerged to describe the diversity of leaders' perspectives. The sub-categories emerged to describe detailed behaviours, (outermost ring).

FIGURE 2 THIS SUNBURST DIAGRAM REPRESENTS THE QUALITATIVE FINDINGS. CORE CATEGORY (INNER RING), KEY CATEGORIES (MIDDLE RING) AND SUB-CATEGORIES (OUTER RING)

DISCUSSION

STATEMENT OF PRINCIPAL FINDINGS

For the healthcare leader, understanding and making sense of their healthcare leadership involves a constellation of thinking and behaviours. Leaders recognised that their perspectives and abilities broadened over time, as they focused on creating the best possible healthcare environment. They described the importance of leading in alignment with their personal values and fostering communication and relationships. They also described recognising and making sense of the bad and the rewarding times.

From these six key categories, a unifying theme of being an wholistic-developmental leader emerged to describe both the perspectives and behaviours of contemporary health leaders. These categories embody the wholistic elements of this cohort of healthcare leaders, in both the development of the self and a focus on others and the environment. As evidenced from alignment with the existing literature referenced in Table 9, a focus on these elements creates the conditions for effective leadership. Each category is intrinsically linked in an ecosystem such that the absence of one category impacts the whole.

Staying close to the data through interviewing, transcribing and hand-coding provided the researchers with a front row seat in observing and defining how the healthcare leader makes sense of their leadership experiences. Looking at the data from different perspectives allowed an integrated approach and assumed that "what we take as real, as objective knowledge and truth, is based upon our perspective" [18].

DISCUSS THE MAIN RESULTS WITH REFERENCE TO PREVIOUS RESEARCH

This study builds on previous research which found that healthcare leadership is multifaceted and complex [5-7]. Hearing from the leader's themselves has outlined a much broader and integrative landscape for the leader than the nomination of adherence to a specific leadership theory, process or system. The grounded theory, "Being an wholistic-developmental leader" model, aligns with the extant leadership literature by capturing elements of Authentic, Adaptive, Transformational, Complexity and Caring Science leadership theory as outlined in Table 9. [Do not delete section break]

TABLE 9 LINKING AND INTEGRATION OF LEADERSHIP THEORIES WITH THE BEING AN WHOLISTIC-DEVELOPMENTAL LEADER MODEL

Leadership theory	Elements of the Theory	Links with Being an Wholistic Developmental Leader Model
Authentic Leadership	"A pattern of leadership behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of leaders working with followers, fostering positive self-development" [24]	Being Authentic and true to myself Developing emotional intelligence Leading in alignment with personal values Communicating and building relationships
Adaptive leadership	This theory highlights the ability of a leader to adapt to changing circumstances in complex and uncertain environments, elements include; communication, relational leadership, providing purpose, empowering team members, conflict resolution, resilience, mobilizing and inspiring action [25].	Demonstrating agility, and getting things done Communicating and building relationships Making a difference Changing experience of leadership over time Creating a team environment Growing and developing individual and teams Listening and having the difficult conversations

Transformational leadership	Transformational leadership is a leadership style that focuses on inspiring and motivating followers to achieve their full potential and exceed their own expectations [26]	Communicating and building relationships Creating the best possible healthcare environment Getting the best out of people Emotional intelligence Changing experience of leadership over time
Complexity Leadership Theory	Complexity leadership includes a number of key elements which align with the model where leaders need to adapt to changing circumstances, learn from experience as well as promoting self-organising of teams Understanding, leveraging and navigating dynamic interactions within the organisation [27, 28]	Demonstrating agility and getting things done Changing experience of leadership over time Creating a team environment Providing and receiving scaffolding support Making sense of the bad times Experiencing and making sense of the rewarding times Broadening perspectives and abilities
Caring science leadership theory	This model emphasises a holistic and humanistic approach to leadership, elements include; Fostering caring relationships, Developing self-awareness and knowing one's values, cultivating empathy and compassion, encouraging stress-reduction and resilience, prioritising a positive work environment, service to others, Creating a culture of innovation, Authentic presence, Supporting the growth and development of team members [29]	Providing and receiving scaffolding support Broadening perspectives and abilities as a leader Developing emotional intelligence Making a difference Exploring new challenges and novelty Building resilient healthcare leaders Creating the best possible healthcare environment Being authentic and true to myself Growing and developing individuals and teams

CONCLUSION AND RECOMMENDATION: MEANING (IMPLICATIONS) OF THE STUDY FOR HEALTHCARE LEADERS

The aim of this research was to explore how the healthcare leader understands and makes sense of their leadership experiences, and to develop a theoretical model which reflects contemporary leadership in complex healthcare environments. The "Being an wholistic-developmental leader" model gives a powerful rendition of the key elements which are essential to being an effective healthcare leader. These provide a valuable foundation on which to build scaffolding supports for healthcare leaders to grow and thrive in highly complex and dynamic workplace environments.

Having a leadership model specifically developed from healthcare leader's experiences, captures shared priorities such as caring, compassion, and a focus on the safety of both patients and staff. Effective healthcare leadership in highly complex environments, is critical for the safety, care and wellbeing of patients, staff and the community.

STRENGTHS AND WEAKNESSES OF THE STUDY

The application and coherence of the study design using a constructivist ontology and epistemology and a constructivist grounded theory methodology, provided a comprehensive and rigorous real-world exploration of how the healthcare leader understands and makes sense of their leadership experiences. The resulting emergence of the "Being an wholistic-developmental leader" model is grounded in the data and supported by adherence to the evaluative concepts of credibility, originality, resonance and usefulness [17]

Credibility was achieved through in-depth data collection and analysis involving a significant range, number and depth of observations. A comprehensive audit trail was maintained throughout using NVivo V12, memos and hard copies of the data. Originality was demonstrated by the uniqueness of the model which has a dual focus, on both the development of the self and leading and developing others. Resonance was attained through incorporating the data from comprehensive memos written throughout the research process that sought to move beyond surface meaning and interrogate meaning from what is not readily visible. Usefulness is demonstrated by the importance of healthcare leaders to the efficient functioning of the healthcare system. For healthcare leaders to survive and thrive in their complex daily working environment and to be an effective healthcare leader requires attention to each of the key categories.

These results represent a small group of healthcare leaders at a certain time and place (i.e. the acute hospital setting) and may not be easily transferable to other healthcare systems.

FUTURE RESEARCH

Applying the model more broadly with other professions a more diverse group of leaders both within healthcare and outside the healthcare industry could determine the transferability of the theory.

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QUALITY OF HEALTH CARE SERVICES OF EMERGENCY DEPARTMENTS BETWEEN PUBLIC AND PRIVATE SECTORS FROM THE PATIENTS' COMPANIONS EXPERIENCES

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ABSTRACT

BACKGROUND:

People frequently choose private hospitals despite public healthcare services are provided free of charge in the Kurdistan Region, Iraq. We assessed quality of health services of emergency departments (EDs) between public and private sectors.

METHODS:

In this comparative cross-sectional study, individuals who received health services from either public or private ED in the Kurdistan Region of Iraq were personally invited.

RESULTS:

Most of the admitted patients in both private and public EDs were in the middle age group, female and were from urban areas. A greater proportion of government employees sought care at public EDs (20.0%) than at private ones. A considerable percentage of patients did not trust the competence of medical staff in both public and private ED. But a lower percentage of trust was found in the public ED (35.67% vs. 53.67%; P<0.0001, respectively) compared to the patients in the private ED. The patients in the private ED significantly received great attention from the medical staff, were taken seriously by the medical staff, the medical staff listened to their medical conditions, the patients had better clarity of explanations of the results of examinations. Also, the private ED had better state of seriously taken by medical staff, hygiene, and care rapidity, assessment, and clarity of explanations of the health problem. However, the private ED had worse condition about the information by medical staff on readmission in case of health problems.

CONCLUSION:

This study indicated that the private EDs provide higher quality services across various aspects compared to public EDs.

KEYWORDS

Quality of health care, emergency departments, public sectors, private sectors

Quality of Health Care Services of Emergency Departments Between Public and Private Sectors from The Patients' Companions Experiences

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INTRODUCTION

Iraq, historically known as Mesopotamia, is a nation situated in the Middle East and is home to a population of around 45 million people. As recently as the 1970s, Iraq had a robust healthcare system and provided health care for all its citizens, a feature enshrined in its constitution and admired by many nations globally. However, fast-forwarding to today, Iraq has endured four devastating conflicts last three decades; the Iran-Iraq war, the 1991 Gulf War, the 2003 US-led invasion, and the attack of Islamic State of Iraq and Syria (ISIS) resulting in significant negative impact to the nation regarding medical services, health promotion, medical surveys and advancements in medical research within the country [1-3]. Official reports indicate that by 2003, approximately 12% of healthcare facilities had been damaged, with an additional 7% subjected to looting. Furthermore, over a third of the establishments offering family planning services were destroyed, and around 15% of community childcare units were closed [4]. While most Iraqis welcomed the liberation from tyranny in 2003, the administration of the 'post-liberation' Iraq turned out to be a significant disappointment for many of them [5].

The northern region of Iraq, specifically the Kurdistan Region, is also experiencing its most severe humanitarian and health crisis in recent years. The influx of refugees and internally displaced individuals from the ISIS has created an overwhelming demand that surpasses available medical supplies and personnel in the region [6]. Moreover, since the disparity between the supply and demand for healthcare services is expanding. The absence of a robust primary care system and relatively low salaries for emergency medical professionals seem to have led to shortages in emergency medical resources. Furthermore, Iraq allocates a comparatively lower expenditure towards healthcare when compared to many other nations [7]. As a result, the rising need for healthcare services is being predominantly fulfilled by private entities. Consequently, the primary challenge lies in harmonizing patient needs with constrained public resources amid the rapid expansion of the private healthcare sector, especially private hospitals. Balancing these dynamics poses a significant challenge in the healthcare landscape [8].

Emergency departments play a crucial role in the healthcare system, providing essential care to many patients. They are accessible to everyone, regardless of their financial situation, and offer services around the clock [9]. Furthermore, the rise of emergency medicine as a specialized field has led patients to view the ED as a provider of high-quality care [10]. Nevertheless, EDs face numerous challenges, including overcrowding, boarding (where patients are held until an inpatient bed becomes available), and an increase in ambulance diversions [11]. Despite the fact that ED crowding leads to delays in care, an increased number of patients leaving without being seen, lower patient satisfaction, and poorer outcomes, including higher inpatient mortality [12, 13], early notification of potential admissions can mitigate ED crowding. By anticipating the demand for inpatient beds, hospitals can allocate additional resources as part of their capacity management strategy [14].

Despite the absence of health insurance and the provision of free healthcare services for the public in the Kurdistan Region, individuals often opt for private hospitals, believing that they offer superior healthcare services than public hospitals do. In addition, in contrast to other nations where EDs in private sector receive comparatively less investment than other specialties [15], private EDs are crowed in this area. Hence, it's crucial to assess the quality of health care services offered by private hospitals. Studies addressing this issue in Iraq are scarce. After a thoroughly literature search, we only found a study by Ali [16] who examined the quality of nursing care immediately after operation in public and private hospitals in Erbil City, Iraq. His findings revealed a notable discrepancy: the overall quality of nursing care in public hospitals was significantly poorer compared to that in private hospitals. It could be argued that this conclusion stem from research carried out in a surgical unit, potentially presenting differences compared to the ED. This study aims to fill the gap in research by evaluating the quality of healthcare services in EDs across public and private sectors. It focuses on understanding patients' experiences to assess and compare the care provided in these settings, providing valuable insights into the differences, if any, between the two sectors.

METHODS

STUDY DESIGN AND SAMPLING

In this comparative cross-sectional study, patients who received care or health services from public or private emergency hospitals in the Duhok Governorate of the Kurdistan Region of Iraq were personally invited to

participate. Patients' companions were asked to report their experiences of receiving health services. They were invited through personal invitations and convenience sampling techniques. Patients were recruited from the main public and private emergency hospitals in Duhok City in 2023. To obtain a representative sample from both public and private sectors, we endeavored to visit the hospitals at different times, on different days, and during various weeks between June and December 2023 (encompassing the summer and fall seasons).

SETTINGS

In this study, patients were collected from the public sector at Duhok Emergency Hospital and the private sector at Vin Private Hospital in Duhok City, Kurdistan Region. Duhok Emergency Hospital serves as the primary emergency facility in Duhok Governorate, with only Zakho district also housing an emergency hospital. Similarly, Vin Private Hospital serves as the main and sole emergency hospital in Duhok Governorate. By including patients from these two main emergency hospitals across different periods and days, we can assert that the sample in this study is likely representative of outpatients in the Duhok Region.

INCLUSION AND EXCLUSION CRITERIA

The patients aged 18 years and older of both genders who attended the emergency hospitals regardless of socio-demographic aspects were eligible for this study. Only the patients who were not willing to participate were not included in this study. The patients admitted for the less than 12 hours were not included in the study.

DATA COLLECTION AND MEASURES

The requited data of this study were collected from patients' companions. The quality of care was measured by the consumer quality index (CQ-index). It has 20 items to measure the quality of care in emergency hospitals. The items were rated from 1 (no/a big problem/never/not important), to 2 (sometimes/of some importance), 2.5 (a bit of a problem), 3 (a great deal/important), and 4 (yes/not a problem/always/extremely important). The

score is obtained by adding the numbers together. A higher score means higher quality of care [17]. The data were collected through a self-reported technique.

STATISTICAL ANALYSES

The general information of the patients is presented in mean (SD) or number (%). The comparisons of scores of quality of care are examined in an independent t-test. The comparisons of the quality care areas between the private and public EDs were examined in Pearson chi-squared test. The significant level of difference was determined in a $p<0.05$. The statistical calculations were performed in JMP Version 17.0. SAS Institute Inc., Cary, NC, 1989–2023.

ETHICAL VIEWS

The ethical approval of this study was obtained from the local health ethics committee. The protocol of this study was registered on 21 August 2022 with the register number 21082022-6-4. We did not apply any force on the patients to participate in this study. We protected the confidentiality of the personal information of patients.

RESULTS

The study found that there was no significant difference in the age and gender distribution of patients admitted to private and public emergency hospitals (p=0.7052 and P=0.0608, respectively). Most of the admitted patients in both private and public EDs were in the middle age group and were female. Regarding arrival times, the study revealed that the majority of patients arrived in the morning at both private (62.33%) and public (62.0%) EDs. Furthermore, most patients were admitted for less than one day in both private (58.33%) and public (60.0%) EDs, with a predominant urban patient demographic. Regarding education levels, the study identified a higher percentage of illiterate patients attending public EDs (38.33%) compared to private EDs (27.0%; P=0.0055). Additionally, a greater proportion of government employees sought care at public EDs (20.0%) than at private ones (11.0%; see Table 1).

Quality of Health Care Services of Emergency Departments Between Public and Private Sectors from The Patients' Companions Experiences   3

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TABLE 1: GENERAL CHARACTERISTICS OF ADMITTED PATIENTS TO PRIVATE AND PUBLIC EMERGENCY HOSPITALS

Characteristics (n=600)	Emergency department no (%)		
	Private emergency hospital (n=300)	Public emergency hospital (n=300)	P
Age mean (SD)	40.51 (16.88)	41.92 (16.71)	
Range	18-83	18-78	
Age category			
18-19	9 (3.00)	8 (2.67)	
20-29	100 (33.33)	86 (28.67)	
30-39	50 (16.67)	53 (17.67)	0.7052
40-49	51 (17.00)	49 (16.33)	
50-59	41 (13.67)	47 (15.67)	
60-69	20 (6.67)	25 (8.33)	
70-79	27 (9.00)	32 (10.67)	
80-89	2 (0.67)	0 (0.00)	
Gender			
Male	118 (39.33)	96 (32.00)	0.0608
Female	182 (60.67)	204 (68.00)	
Education			
Illiterate	81 (27.00)	115 (38.33)	
Under high school	45 (15.00)	56 (18.67)	
High school	48 (16.00)	42 (14.00)	0.0055
Associate degree	43 (14.33)	30 (10.00)	
College graduate	83 (27.67)	57 (19.00)	
Occupation			
Unemployed	102 (34.00)	51 (17.00)	
Govt. employee	33 (11.00)	60 (20.00)	
Housewife	105 (35.00)	133 (44.33)	
Military staff	4 (1.33)	10 (3.33)	<0.0001
Retired	6 (2.00)	8 (2.67)	
Self-business	36 (12.00)	29 (9.67)	
Student	14 (4.67)	9 (3.00)	
Arrival time			
Morning	187 (62.33)	186 (62.00)	0.9329
Afternoon/evening	113 (37.67)	114 (38.00)	
Admission time			
< one day	175 (58.33)	180 (60.00)	
1-3 days	124 (41.33)	114 (38.00)	0.1312
> 3 days	1 (0.33)	6 (2.00)	
Residency			
Rural	60 (20.00)	60 (20.00)	1.0000
Urban	240 (80.00)	240 (80.00)	

The study showed that a considerable percentage of patients did not trust the competence of the medical staff in both the public and private ED, but a lower percentage of trust was found among the patients who were admitted in the public ED (35.67% vs. 53.67%; P<0.0001, respectively) compared to the patients in the private ED. In addition,

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the healthcare needs of the patients significantly received great attention from the medical staff in the private ED (47.67% vs. 27.33%; P<0.0001). The patients who were admitted to the private ED were taken seriously by the medical staff (62.00% vs 36.79%; P<0.0001). The patients reported the great importance of cooperation between medical staff in the private ED (55.33% vs.32.00%; P<0.0001). The patients reported a higher percentage of consistency of the provided information in a great important in the private ED compared to the public ED (70.0% vs. 35.00%; P<0.0001). The patients who were admitted to the ED reported that the medical staff listened to their medical conditions (75.0% vs. 39.33%l P<0.0001). Also, the patients were taken seriously by the reception staff member at the reception desk in the private ED (58.67% vs. 36.67%; P<0.0001; Table 2; figure 1).

TABLE 2: VIEWS OF PATIENTS TOWARDS HEALTHCARE PROFESSIONALS BETWEEN PRIVATE AND PUBLIC ED

Views of patients towards medical staff (n=600)	Emergency department no (%)		P
	Private emergency hospital (n=300)	Public emergency hospital (n=300)	
CQ-index Mean (SD)	54.89 (3.66)	53.28 (5.19)	<0.0001
Range	46.5-68	39-68.5	
Trust in competence of medical staff			
no/a big problem/never/not important	0 (0.00)	1 (0.33)	<0.0001
sometimes/of some importance	72 (24.00)	71 (23.67)	
a bit of a problem	57 (19.00)	104 (34.67)	
a great deal/important	161 (53.67)	107 (35.67)	
yes/not a problem/always/extremely important	10 (3.33)	17 (5.67)	
Patients' healthcare needs			
no/a big problem/never/not important	1 (0.33)	10 (3.33)	<0.0001
sometimes/of some importance	2 (0.67)	31 (10.33)	
a bit of a problem	18 (6.00)	28 (9.33)	
a great deal/important	143 (47.67)	82 (27.33)	
yes/not a problem/always/extremely important	136 (45.33)	149 (49.67)	
Being taken seriously by medical staff			
no/a big problem/never/not important	5 (1.67)	12 (4.01)	<0.0001
sometimes/of some importance	36 (12.00)	56 (18.73)	
a bit of a problem	40 (13.33)	71 (23.75)	
a great deal/important	186 (62.00)	110 (36.79)	
yes/not a problem/always/extremely important	33 (11.00)	50 (16.72)	
Cooperation between medical staff			
no/a big problem/never/not important	6 (2.00)	17 (5.67)	<0.0001
sometimes/of some importance	48 (16.00)	79 (26.33)	
a bit of a problem	50 (16.67)	56 (18.67)	
a great deal/important	166 (55.33)	96 (32.00)	
yes/not a problem/always/extremely important	30 (10.00)	52 (17.33)	
Consistence of the provided information			
no/a big problem/never/not important	5 (1.67)	13 (4.33)	<0.0001
sometimes/of some importance	23 (7.67)	71 (23.67)	
a bit of a problem	44 (14.67)	49 (16.33)	
a great deal/important	210 (70.00)	105 (35.00)	
yes/not a problem/always/extremely important	18 (6.00)	62 (20.67)	

Listening to patients by medical staff			
no/a big problem/never/not important	4 (1.33)	30 (10.00)	
sometimes/of some importance	6 (2.00)	48 (16.00)	
a bit of a problem	30 (10.00)	84 (28.00)	<0.0001
a great deal/important	225 (75.00)	118 (39.33)	
yes/not a problem/always/extremely important	35 (11.67)	20 (6.67)	
Feeling safe in the Accident & Emergency Department			
a bit of a problem	4 (1.33)	9 (3.00)	
sometimes/of some importance	0 (0.00)	5 (1.67)	0.0046
a great deal/important	112 (37.33)	81 (27.00)	
yes/not a problem/always/extremely important	184 (61.33)	205 (68.33)	
Being taken seriously by the reception staff member at the reception desk			
no/a big problem/never/not important	1 (0.33)	43 (14.33)	
sometimes/of some importance	33 (11.00)	45 (15.00)	
a bit of a problem	41 (13.67)	24 (8.00)	<0.0001
a great deal/important	176 (58.67)	110 (36.67)	
yes/not a problem/always/extremely important	49 (16.33)	78 (26.00)	

FIGURE 1: DISTRIBUTION OF QUALITY OF HEALTHCARE OF PRIVATE AND PUBLIC EDS
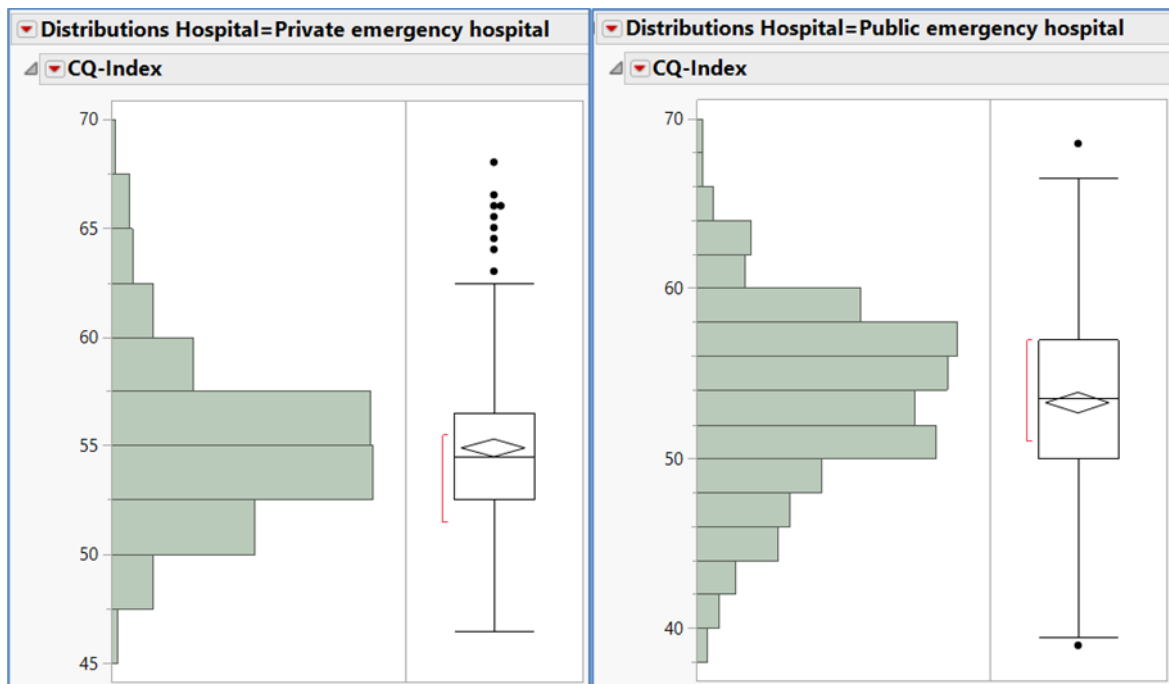
The obtain to healthcare expectations were low in both the private and public ED, but the patients who were admitted to the private ED reported that they were less likely to obtain their healthcare expectations in a great important competed to those in the private ED (15.33% vs. 22.33%; P=0.0001). However, the patients reported that the private ED had better clarity of explanations of the results of examinations compared to the public ED (52.0% vs. 29.67%; P<0.0001). In terms of the hospital environment, the patients reported that the private ED had better hygiene of great importance compared to the public ED (75.0% vs. 47.0%, P<0.00001). The availability of a parking space near the Accident & ED was a problem in both public and private ED, but the private ED had a worse situation (6.67% vs. 15.33%; P<0.0001). But the finding of the Accident & Emergency Department in the private ED was better compared to the public ED (53.33% vs. 39.00%; P<0.0001; Table 3).

The information by the healthcare professionals on danger signals to watch out for after leaving the Accident & Emergency Department was low in both private and public EDs. However, the private ED had a worse situation compared to the private ED (15.67% vs. 19.33%; P<0.0001). However, the private ED had better situation about the explanation of the aim of new medication and information on side-effects medication (Table 4).

In terms of the general information and rapidity of care, the patients reported that the private ED had better situation about the rapidity of treatment (56.67% vs. 32.67%; P<0.0001). A similar pattern was found for assessment by the acuity of the patient's problem (52.33% vs. 28.00%; P<0.0001), and clarity of explanations of the health problem (69.67% vs. 40.33%; P<0.0001). However, the private ED had worse condition about the information by medical staff on readmission in case of health problems (12.33% vs. 15.33%l P<0.0001; Table 5).

TABLE 3: VIEWS OF PATIENTS TOWARDS INFORMATION AND EXPLANATION GIVEN BY MEDICAL STAFF AND A&E ENVIRONMENT BETWEEN PRIVATE AND PUBLIC ED

Patients' views	Emergency department no (%)		
Information and explanation	**Private emergency hospital (n=300)**	**Public emergency hospital (n=300)**	**P**
Patients' healthcare expectations			
no/a big problem/never/not important	22 (7.33)	30 (10.00)	
sometimes/of some importance	72 (24.00)	92 (30.67)	
a bit of a problem	158 (52.67)	103 (34.33)	0.0001
a great deal/important	46 (15.33)	67 (22.33)	
yes/not a problem/always/extremely important	2 (0.67)	8 (2.67)	
Clarity of explanations of results of examinations			
no/a big problem/never/not important	8 (2.67)	15 (5.00)	
sometimes/of some importance	44 (14.67)	64 (21.33)	
a bit of a problem	36 (12.00)	65 (21.67)	<0.0001
a great deal/important	156 (52.00)	89 (29.67)	
yes/not a problem/always/extremely important	56 (18.67)	67 (22.33)	
A& E environment	**Private emergency hospital (n=300)**	**Public emergency hospital (n=300)**	**P**
Hygiene in the Accident & Emergency Department			
no/a big problem/never/not important	1 (0.33)	5 (1.67)	
sometimes/of some importance	3 (1.00)	22 (7.33)	
a bit of a problem	16 (5.33)	53 (17.67)	<0.0001
a great deal/important	225 (75.00)	141 (47.00)	
yes/not a problem/always/extremely important	55 (18.33)	79 (26.33)	
Availability of a parking space near the Accident & Emergency Department			
no/a big problem/never/not important	72 (24.00)	68 (22.67)	
sometimes/of some importance	172 (57.33)	112 (37.33)	
a bit of a problem	18 (6.00)	60 (20.00)	<0.0001
a great deal/important	20 (6.67)	46 (15.33)	
yes/not a problem/always/extremely important	18 (6.00)	14 (4.67)	
Finding the Accident & Emergency Department in the hospital			
no/a big problem/never/not important	10 (3.33)	7 (2.33)	
sometimes/of some importance	31 (10.33)	19 (6.33)	
a bit of a problem	52 (17.33)	15 (5.00)	<0.0001
a great deal/important	160 (53.33)	117 (39.00)	
yes/not a problem/always/extremely important	47 (15.67)	142 (47.33)	

TABLE 4: VIEWS OF PATIENTS TOWARDS LEAVING THE ACCIDENT AND EMERGENCY HOSPITAL BETWEEN PRIVATE AND PUBLIC ED

Leaving the accident and emergency (n=600)	Emergency department no (%)		
	Private emergency hospital (n=300)	Public emergency hospital (n=300)	P
Information by the healthcare professionals on danger signals to watch out for after leaving the Accident & Emergency Department			
no/a big problem/never/not important	25 (8.33)	50 (16.67)	<0.0001
sometimes/of some importance	51 (17.00)	95 (31.67)	
a bit of a problem	142 (47.33)	55 (18.33)	
a great deal/important	47 (15.67)	58 (19.33)	
yes/not a problem/always/extremely important	35 (11.67)	42 (14.00)	
Explanation of the aim of new medication			
no/a big problem/never/not important	61 (20.33)	79 (26.33)	0.0001
sometimes/of some importance	98 (32.67)	122 (40.67)	
a bit of a problem	96 (32.00)	47 (15.67)	
a great deal/important	35 (11.67)	44 (14.67)	
yes/not a problem/always/extremely important	10 (3.33)	8 (2.67)	
Information on side-effects of the medication			
no/a big problem/never/not important	159 (53.00)	203 (67.67)	<0.0001
sometimes/of some importance	85 (28.33)	46 (15.33)	
a bit of a problem	30 (10.00)	10 (3.33)	
a great deal/important	19 (6.33)	22 (7.33)	
yes/not a problem/always/extremely important	7 (2.33)	19 (6.33)	

TABLE 5: VIEWS OF PATIENTS TOWARDS GENERAL INFORMATION AND RAPIDITY OF CARE BETWEEN PRIVATE AND PUBLIC ED

General information and rapidity of care (n=600)	Emergency department no (%)		
	Private emergency hospital (n=300)	Public emergency hospital (n=300)	P
Rapidity of the treatment			
no/a big problem/never/not important	5 (1.67)	6 (2.00)	<0.0001
sometimes/of some importance	41 (13.67)	80 (26.67)	
a bit of a problem	37 (12.33)	59 (19.67)	
a great deal/important	170 (56.67)	98 (32.67)	
yes/not a problem/always/extremely important	47 (15.67)	57 (19.00)	
Assessment by the acuity of the patient's problem			
no/a big problem/never/not important	17 (5.67)	16 (5.33)	<0.0001
sometimes/of some importance	39 (13.00)	68 (22.67)	
a bit of a problem	39 (13.00)	78 (26.00)	
a great deal/important	157 (52.33)	84 (28.00)	
yes/not a problem/always/extremely important	48 (16.00)	54 (18.00)	

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Clarity of explanations of the health problem			
no/a big problem/never/not important	6 (2.00)	26 (8.67)	
sometimes/of some importance	28 (9.33)	44 (14.67)	
a bit of a problem	32 (10.67)	54 (18.00)	<0.0001
a great deal/important	209 (69.67)	121 (40.33)	
yes/not a problem/always/extremely important	25 (8.33)	55 (18.33)	
Information by medical staff on readmission in case of health problems			
no/a big problem/never/not important	46 (15.33)	46 (15.33)	
sometimes/of some importance	98 (32.67)	148 (49.33)	<0.0001
a bit of a problem	91 (30.33)	44 (14.67)	
a great deal/important	37 (12.33)	46 (15.33)	
yes/not a problem/always/extremely important	28 (9.33)	16 (5.33)	

DISCUSSION

A glance of the results of the current study indicates that patients experienced high-quality care from private emergency departments in nearly every aspect when compared to those in the public sector. This suggests that the service quality of the emergency department in private hospitals was superior to that of public hospitals. These findings align with studies conducted across various countries, including Australia [18, 19], and Middle East [20]. In contrary to our findings, a study by Jin, Zhang, Seery, Fu, Yu, Zhang, Sun, Tian, Xu, Yue [15] in China revealed that public EDs deliver higher-quality healthcare services than private emergency facilities. This superiority is attributed to the significantly greater presence of doctors, nurses, and monitoring beds in public EDs in comparison to private hospitals. However, it's important to note that the overall length of stay in public EDs was found to be significantly longer compared to private EDs. Moreover, a systematic review by Basu, Andrews, Kishore, Panjabi, Stuckler [21] assessed the relative performance of private and public healthcare systems in low- and middle-income countries. Studies reviewed in this systematic analysis did not provided evidence to support the assertion that the private sector is typically more efficient, accountable, or medically effective than the public sector. However, the public sector is often noted for its deficiency in terms of timeliness and patient hospitality.

The findings revealed that a majority of patients seeking admission to private EDs were from urban areas. This trend could be associated with higher economic status, as public healthcare services are provided free of charge in this particular region despite the substandard quality of care offered by the public sector. This study identified a significant association between education levels and the preference for public sector utilization, with the majority of patients attending public EDs being illiterate. In line with these findings, it has been discovered that among the personal factors significantly linked to the utilization of public or private healthcare services are income, self-perceived health status, educational attainment, gender, possession of health insurance, and nationality [22]. Our findings also indicate that a larger percentage of government employees sought medical attention at public EDs compared to private ones. This trend may be attributed to the fact that healthcare services provided by the government in this area are offered free of charge, and there is no provision for health insurance. Contrary to our findings, in certain nations, individuals are required to utilize public healthcare services, whether they are employees or retirees, due to the inclusion of basic medical insurance provided by their employers. They can seek reimbursement for expenses incurred for ambulatory health services, hospital admissions, and medications from retail pharmacies, all of which are authorized under these insurance schemes [23].

The findings of this study indicated that patients lacked confidence in the competence of medical personnel in both public and private EDs. A study conducted in Northern Iraq found that the majority of patients expressed satisfaction with private healthcare services, whereas they were not satisfied with the healthcare services provided by public hospitals [24]. This could be attributed to the fact that many of these staff members work in both public and private EDs, especially during evening and night shifts. In this region, medical staff members have limited hours working in government agencies, leaving them with free

time to take on additional shifts in the private sector. Patients expressed greater trust in the services provided by private EDs compared to public ones. This could be due to the availability of facilities offered by private EDs compared to public ones. In this area, there is a limited budget for the public healthcare system, compounded by economic crises. This is because, Kurdistan Region is experiencing its most severe humanitarian and health crisis in recent years, with the demands of refugees and internally displaced people surpassing available medical supplies and personnel; additionally, political wrangling in central government has meant that no general budget has been passed for many years to this region, moreover, conflict and war have also resulted in the physical deterioration of health infrastructure, exacerbating the brain drain of many healthcare personnel [6]. Therefore, it has been suggested that establishing a quality management system will be directly linked to enhancing patient satisfaction [8].

In this study, patients reported receiving greater attention not only from the medical staff in private EDs regarding their healthcare needs as well as taken seriously by the medical staff but also by the reception staff member at the reception desk compared to public EDs. Additionally, patients reported the great importance of cooperation between medical staff in the private ED. This could be attributed to the stringent measures in terms of rules and regulations implemented by emergency management. To mitigate this inconsistency, it might be better to highlight the importance of implementing policy programs for rewards and punishments in the public sector [16]. Concerning providing information clarity of explanations of the health problem, and listening to their medical conditions at ED, patients reported a higher consistency in the information provided and that the healthcare professionals listened to their medical conditions, which they deemed critically important, in private EDs compared to public ones. They also reported better clarity of explanations of the health problems and results of examinations in private ED compared to the public ED. Similarly, a study by Mollaoğlu, Çelik [25] found that the patient satisfaction rate regarding the level of information provided by health care personals concerning drug application, nutrition, and tests in ED was low. Therefore, to ensure adequate information for patients and their relatives in EDs, it is essential to enhance the educational skills among healthcare professionals. Additionally, obstacles hindering communication between healthcare professionals and patients should be eliminated. The EDs should maintain appropriate settings that allow patients and relatives to be adequately informed, and hospitals should encourage such initiatives. We posit that the satisfaction of medical staff in private EDs plays an essential role in providing patients with relevant and comprehensive information. Research has demonstrated that health professionals employed in public EDs tend to experience notably lower levels of job satisfaction compared to their counterparts in private EDs, largely due to fewer opportunities for promotion and less competitive compensation [26, 27].

In terms of the hospital environment, our findings indicated that patients reported better hygiene, which they deemed of great importance, in private EDs compared to public ones. This is likely a result of strong financial capabilities of private sector driving the rapid advancement of healthcare markets, intensifying competition among both public and private providers, and the expanding diversity of patients' requirements [8]. On the other hand, parking availability near the Accident and ED was an issue in both public and private EDs, although the private facility experienced a more severe situation. Primarily, the limited space allocated by the government to the public sector contributes to this situation, as most private hospitals are situated near city centers and are typically smaller in size. In contrary it has been argued that inadequate public funding has resulted in a void being filled by a large and unregulated private sector [28]. Since private EDs play a significant role in delivering acute medical care, granting access to private hospitals can potentially easing the burden on public EDs [29]. During the COVID-19 pandemic, private EDs proved crucial and saved numerous lives despite the considerable expense of treatment [30]. Thus, the future policy in supporting the private sector should be made by the government to create opportunities aimed at overcoming obstacles.

This study also found that patients are depriving from basic needs that must be provided by the hospitals. Some services such as the locating of the Accident & Emergency Department was easier for patients in the private ED compared to the public one. Additionally, the provision of information by healthcare professionals regarding warning signs to monitor after discharge from the ED was inadequate in both public and private settings. However, the private ED exhibited a more deficient situation in this regard compared to the public ED. Despite having considerably greater healthcare

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services by private ED, making investments in these services should prioritize the public sector to uphold patients' rights.

Several research findings indicate that one of the principal issues considered by patients for utilizing private EDs is attributed to overcrowding in the public sector and the lengthy wait times. Nevertheless, public ED patients primarily consider out-of-pocket payment as the principal issue when contemplating accessing private EDs [18, 22]. Consistent with these findings, our results suggested that the speed of treatment in private EDs surpassed that of public EDs.

Given the information presented earlier, it becomes evident that private EDs outweighed their public counterparts in nearly every aspect of healthcare service provision. To the best of our knowledge, this is a unique study assessed quality of healthcare service of EDs between public and private sectors in this region. Few limitations of the study warrant attention. The study focused solely on EDs, neglecting healthcare services provided by other departments within hospitals. Therefore, it would be beneficial for future studies to encompass a broader scope within hospital settings.

CONCLUSION

This study provides the initial public portrayal of patients seeking care at private EDs in Kurdistan Region. The empirical evidence indicates that private EDs offer superior quality services in numerous aspects compared to public EDs. Private EDs are shown to have a substantial impact on the community, potentially relieving pressure on public EDs.

Conflict of interest: All authors declare no conflicts of interest.

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RESEARCH ARTICLE

BUILDING PSYCHOLOGICAL HEALTH IN UNDERGRADUATES WITH THE APPLICATION OF A CLASSROOM-BASED POSITIVE PSYCHOLOGY EDUCATIONAL INTERVENTION: A PILOT STUDY

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ABSTRACT

BACKGROUND:

Stress and depression have been increasing among undergraduates in India. The psychological wellbeing of undergraduates in India has become a critical focus of attention for the education community. Evidence shows that positive psychology interventions can be effective in enhancing psychological wellbeing and may help prevent stress and depression in undergraduates. In this study, we aimed to explore the potential effect of positive psychology educational interventions on improving the psychological health of Indian undergraduates.

METHODS:

A 10-week classroom-based positive psychology educational intervention was conducted at the Bhopal School of Social Sciences, Undergraduate Institute (MP), India. Institute undergraduates in their second and third years participated. The participants' self-reported data on psychological health and self-efficacy were collected and analyzed at pre-intervention (n= 45) and post-intervention (n=45) times. The instrument's reliability and validity were checked with the help of SEM (Structural Equation Model) software. The same software was used for data analysis.

RESULTS:

The analysis showed that the psychological health of the undergraduates improved after the intervention. Their mean scores on psychological health and self-efficacy were significantly improved, while the symptoms of stress and depression were significantly reduced.

CONCLUSIONS:

The study highlighted that a positive psychological intervention improves the psychological health and self-efficacy of undergraduates, even mitigating digital fatigue challenges.

KEYWORDS

psychological health, positive psychology educational intervention, positive emotions, self-efficacy, positive relationship

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INTRODUCTION

Positive psychology has been established as a major field of knowledge that helps to understand how people live and do well. Martin Seligman started this for the first time and focuses on positive aspects of life instead of negatives, which helps in reducing stress, depression, and anxiety and promotes well-being and self-growth. [1] Positive mental health helps individuals to cope with the normal stress of life; therefore, it positively contributes and is increasingly recognized in policymaking and national mental health programs. [2] Positive mental health interventions focus on strengthening resilience and mental health promotion. [3] Various factors such as family, school, peer group, and academic atmosphere influenced students' learning. [4] Positive psychology intervention has had a significant effect on personal growth, positive thinking, positive relationships, autonomy, environmental mastery, self-acceptance, and many more. [5] The association between positive psychology constructs including academic engagement, motivation, well-being, and mental health has been relatively effectively implemented. [6] Therefore, positive psychology plays an important role in the overall development of children. Constructs such as academic engagement, academic motivation, wellbeing, resilience, social connectedness, growth mindset, and optimism play an important role in education, especially during the time of the pandemic, when the entire education system was disturbed due to the sudden shift from face-to-face to digital learning. Both learners and teachers faced various challenges due to a lack of knowledge of technology and a lack of infrastructure. This is the visible side of the impact in education. However, there is a less visible aspect that concerns psychological wellbeing. But there is also one dark or hidden side of the coin that deals with psychological wellbeing. Due to digital education, learners lose their interest in studies, which creates a monotony in virtual classrooms, especially with reference to application-based subjects, and this situation develops various mental challenges that affect learners' psychological health.[7]

Positive psychology is a theoretical and methodological process that can help people cope with mental health issues with the help of customized intervention programs for different psychological challenges. [8] Traditionally, psychologist has mostly focused on the negative factors like stress, anxiety, depression, etc. that threaten human mental health, but with the emergence of positive psychology, human strengths have also started to be studied, where different positive constructs like happiness, joy, gratitude, positive emotions, self-efficacy, self-esteem, etc. have increased psychological wellbeing. [9] Positive psychological impact extends a person's feelings towards their activeness and enthusiastic behavior; it is also referred to as "positive emotion" and shows a different broadening and attention. [10] It is also associated with the adaptive digital era. [11] Positive emotions are considered a means to enhance psychological wellbeing and are also helpful as the desired outcome of institution-based counselling for learners. [10]

The last five years have witnessed an increase in social media activities that has brought new risks and negatively affected students' academic performance. Academic self-efficacy was identified as a significant construct in determining students' performance. [12] Self-efficacy and learning achievement are positively correlated with each other; it also proved that students with high self-efficacy are better at academic performance. They are ready to take on tasks that are hard and challenging to comprehend. [13] It also determines the subject-wise relationship between English and mathematics. [14] Self-efficacy helps in reducing speaking anxiety and provides a supportive learning environment, which will help learners learn in a stress-free environment. [15] Self-efficacy positively predicts language proficiency and achievement. [16] In collaboration with the problem-solving technique, self-efficacy helps in the motivation and performance of the learners. [17] Emotional arousal enhances self-efficacy, helping students improve their performance in all areas. [18]

Behavioral sciences addressed various research areas such as mental health, mental disorders, counseling, and mental health measurement. [19] There are various measurement tools to measure the effect of an individual's mental health, including the Zung self-rating depression scale, the Minnesota Multiphasic Personality Inventory (MMPI-2), Hamilton Depression Rating Scale (HDRS) and Beck Depression Inventory (BDI). [15] During the lockdown, the most common symptoms of anxiety were linked to a decline in learners' academic performance. [20] To cope with the high-level anxiety, learners required psychological support, which has favorable results. [21] Meditation has also had a significant effect on undergraduate behavior. [22] Psychology and the health and wellbeing of students tend to have pathogenic approaches to mental health and other psychological variables like stigma, stress, etc. [18] It also supports the teaching process. [23] Higher levels

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of perceived stress were more likely to be experienced by females, who were unable to focus on academic work [24] due to the prevailing anecdotal view of professional students possessing personality traits that negatively impact their psychological health. [25] Social interventions should be provided during such outbreaks, and university administration should strengthen the cultivation of students' mental health. [26]

The current pandemic has a significant negative impact on the mental health of college students [24] and many of them have lost loved ones and suffered family financial loss. They should be given special attention particular care [27] and providing them with appropriate coping strategies is important to prepare students. [28] Love-kindness meditation has been shown to improve wellbeing in a study based on positive mental health scales among university students. [29] Students' perceptions related to mental health, after measurement, tend to be good for all three aspects of cognition, affection, and communication, with only one statement having the largest negative percentage. [30]

In the present study, we aimed to examine the effects of virtual classroom-based positive psychology interventions on improving psychological health and self-efficacy in undergraduate students. The participants' scores on psychological health and self-efficacy were measured before and after the sessions, respectively.

METHODS AND MEASURES

The positive psychological intervention was designed with regard to the virtual classroom environment for second and final-year undergraduate students of humanities and social sciences at the Bhopal School of Social Sciences, Undergraduate Institute (MP), India. A self-reported questionnaire was developed to measure the effect of the intervention in terms of their psychological health and academic self-efficacy. questionnaire used has 29 indicators (nine indicators based on psychological intervention, ten on psychological health, and ten on academic self-efficacy). All the indicators are correlated by each respective construct, such as indicator 1 from positive psychology intervention, which measures positive emotion. In parallel, indicator 1 from psychology, health, and self-efficacy also measures psychological health and self-efficacy in terms of positive emotion. A pilot study was

conducted to check the reliability and validity of the self-constructed tool (Table 1.2).

All respondents were anonymous, except for their academic year and the calendar year, to obtain honest answers as much as possible. To test the effect of the intervention as being identical, a set of interventions was performed. None of the participants reported any previous experiences with positive psychology interventions.

A total of 45 undergraduates in their final year of academic study attended the intervention. With the same sample size, a random section of the same class is also taken as a controlled group. Only participants who completed the entire intervention, assignments, and pre- and post-intervention questionnaires were included in the comparative analysis to determine the effectiveness of the intervention.

Undergraduates who participated in the study were first invited to complete a questionnaire before the commencement of the intervention to collect pre-test data. After collecting the pre-test data from all the participants, an intervention of 10 weeks was executed for the intervention group only. Twenty sessions were completed with different activities. Activities were designed in such a way that they included more participation from the learners' side, though the intervention was provided virtually. It was noticed that the learners enjoyed the activities and interacted a lot. They were very prompt in answering questions and assignments. The most enjoyable activity was the emotional storytelling. All learners narrated their stories very well, and others were connected with the same as the time of the pandemic it left some footprints in everybody's life. The intervention connected everyone emotionally. After the twenty sessions, the intervention group and the control group were again asked to fill out the self-reported questionnaire for the post-test data.

The pre-and post-intervention scores were then compared and analyzed with the help of PLS-SEM software.

Before proceeding further with the collection of data, the researchers first presented the proposal. In front of the research ethics committee of the BSSS IAS for the ethical clearance of the same, and after getting the approval from the Research Ethics Committee of BSSS IAS, the researcher proceeded further with the collection of the data for the intervention. While collecting data, utmost

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care was taken not to violate India's privacy policy law (Information Technology Act 2009 Amendment), so a disclosure was included in the questionnaire stating that sensitive personal information would not be shared without respondents' prior consent.

INTERVENTIONS

Interventions were set up as a two-hour class held twice a week and lasted for 10 weeks. The intervention program consisted of various activity-based models (Table 1.1) to inculcate positivity for improving their psychological health and self-efficacy. All the interactions, sharing experiences, and research were conducted in an intervention group (De Vibe et al., 2018). [31] The protocol of the intervention, which is detailed in Table 1.1, was derived from Dr. Martin Seligman's theory of PERMA, with minor changes or adjustments made to the original theory to better fit the specific needs or context of the intervention. with slight modifications. A single teacher (the investigator) led and completed the entire intervention.

TABLE 1.1: INTERVENTION MODULE

Module	Topic Covered	Academic hours	Activities Involved
Positive Emotions	Expression	4Hrs (2-Session)	Image analysis
	Management of Emotions	4Hrs (2-Session)	Show short emotional stories and writing
	Gratitude	4Hrs (2-Session)	Remember all the good things and express gratitude
Self-Efficacy	Academic Self-Efficacy	6Hrs (3-Session)	Three Things Exercise
		6Hrs (3-Session)	Positive Self-Talk
Positive Relationship	P-relationship	8Hrs (4-Session)	Speech on "Importance of Positive relationship in life"
	Empathy	8Hrs (4-Session)	Identifying and Modeling Emotions: By Showing Movies

Control Group: The control group was a no-intervention group. The control group did not have any positive psychological interventions, and they continued with their regular classes, but pre- and post-tests were conducted on them also for the comparison with the intervention group to know the effect of intervention on psychological health and self-efficacy.

Intervention Group: The intervention group had interventions for 10-weeks with positive psychological interventions based on the PERMA Intervention Model during their regular classes. A pre- and post-test were conducted on the undergraduates before and after the intervention respectively.

CONCEPTUAL FRAMEWORK

This research investigates the impact of Positive Psychological Educational Intervention (PPEI) on undergraduate students' psychological health and academic self-efficacy. It aims to understand how PPEI influences these variables, contributing to positive psychology interventions in educational settings. Through empirical study, it explores the relationship between PPEI and students' well-being and academic confidence.

FIGURE 1: CONCEPTUAL FRAMEWORK OF THE CONSTRUCTS
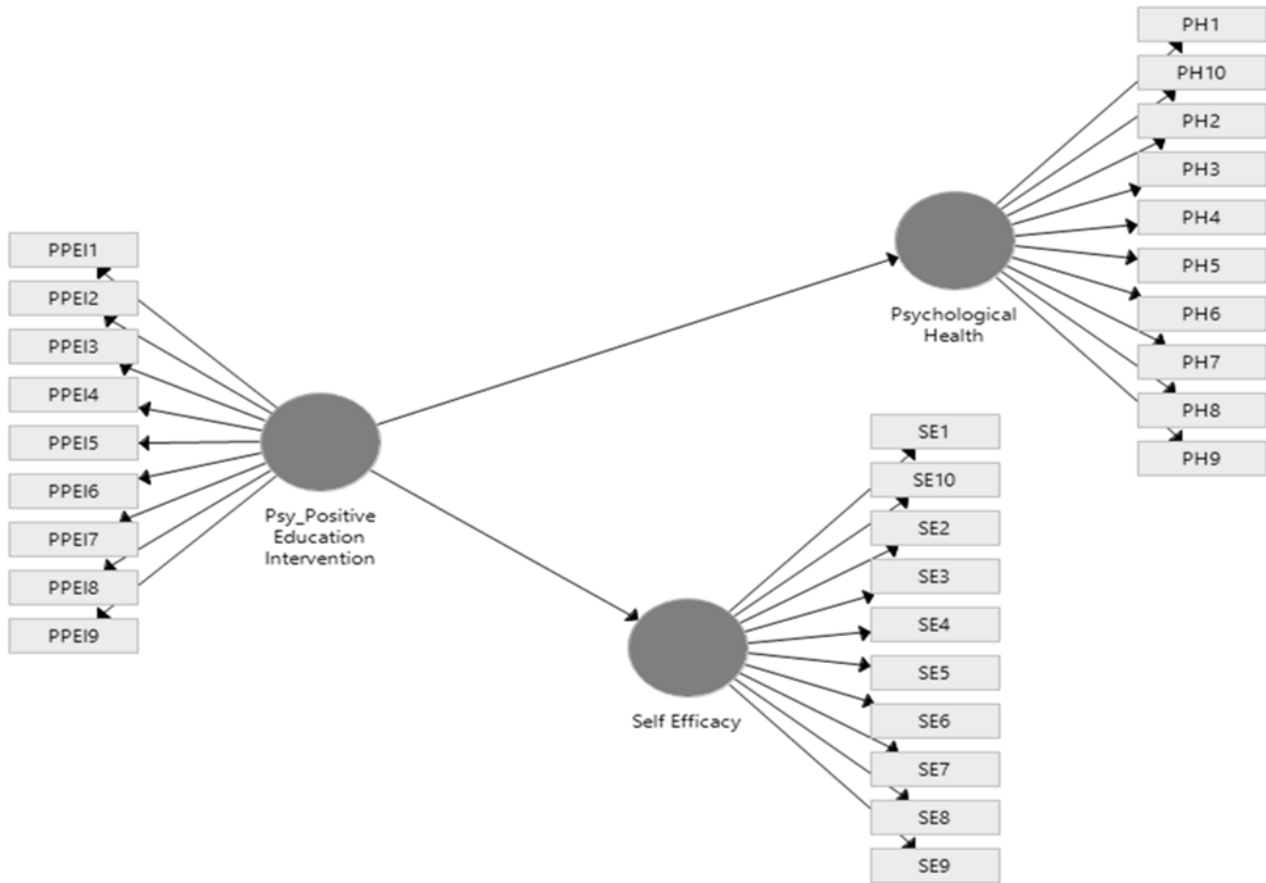
RESEARCH HYPOTHESES DEVELOPMENT

This study attempted exploration of the following research hypotheses based on the research model illustrated in Figure 1.

- Hypothesis 1 (H1): Positive Psychological Educational Intervention has a significant direct impact on the psychological health among Undergraduates.

- Hypothesis 2 (H2): Positive Psychological Education Intervention has a significant direct impact on the Academic Self-Efficacy of Undergraduates.

The process of evaluating the results of partial least squares structural equation modeling (PLS-SEM) involves two steps. In Step 1, the examination of reflective measurement models is conducted. This is a necessary part of the evaluation because it provides support for the measurement quality. When quality is confirmed, the structural model evaluation is conducted in Step 2. While in Step 1, the measurement theory is examined, Step 2 covers the structural theory that involves testing the proposed hypotheses and addresses the relationships among the latent variables. Our model contains only reflective measures.

Table 1.2 presents construct reliability and validity for positive psychological educational intervention, psychological health, and self-efficacy demonstrates excellent reliability and internal consistency across all constructs, as evidenced by high scores in Cronbach's alpha, rho_A, and composite reliability, all exceeding the 0.9 thresholds. These metrics collectively indicate a strong degree of internal consistency and reliability in the measurement of these constructs, suggesting that the survey or assessment tool used is both valid and reliable for capturing the association between the three constructs of the study.

TABLE: 1.2: CONSTRUCT RELIABILITY AND VALIDITY

Constructs	Cronbach's Alpha	rho_A	Composite Reliability
Positive Psychological Educational Intervention	0.924	0.928	0.937
Psychological Health	0.939	0.949	0.948
Self-Efficacy	0.947	0.961	0.954

Source: Authors own calculations using SmartPLS3 Software.

TABLE 1.3: PLS-SEM ASSESSMENT RESULTS OF MEASUREMENT MODELS.

Latent Variable	Indicators		Convergent Validity	
			Loadings	AVE
			>0.70	>0.50
PH	PH1	I see myself as a good person	0.802	0.624
	PH2	I feel positive about my relationships with others and my interpersonal connections	0.863	
	PH3	I get satisfaction from the things I do	0.845	
	PH4	I feel I handle things quite well when obstacles get in my way	0.826	
	PH5	I have a positive outlook on my life	0.836	
	PH6	The things that I do have an impact	0.824	
	PH7	I feel upset when any of person around me is not well	0.809	
	PH8	I lose my temper very easily	0.613	
	PH9	I've been dealing with problems well	0.796	
	PH10	I've been interested in new things	0.793	
PPEI	PPEI1	Positive Emotion: I keep my emotions to myself.	0.804	0.646
	PPEI2	Positive Emotion: I do not fear expressing my understanding for the concept in the class	0.728	
	PPEI3	Positive Emotion: I am thankful for my teachers taking pains to facilitate the concept in easy way	0.753	
	PPEI4	Positive Emotion: I do not feel frustrated in classes	0.81	
	PPEI5	Positive Emotion: I try to connect the concepts with my daily life	0.812	
	PPEI6	Positive Relationship: I like to interact with my classmates during digital classes	0.786	
	PPEI7	Positive Relationship: My teacher gives me enough opportunities for constructive digital engagement with my peers	0.855	
	PPEI8	Positive Relationship: I reach out to help my fellow classmates who miss the digital classes due to unavoidable reasons	0.848	

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	PPEI9	Positive Relationship: I do not create nuisance in digital class and help the teacher to facilitate an effective conduction of class	0.699	
SE	SE1	I can always manage to solve difficult problems if I try hard enough	0.855	0.677
	SE2	If someone opposes me, I can find the means and ways to get what I want.	0.733	
	SE3	It is easy for me to stick to my aims and accomplish my goals.	0.697	
	SE4	I am confident that I could deal efficiently with unexpected events.	0.733	
	SE5	Thanks to my imagination, I know how to handle unforeseen situations	0.863	
	SE6	I can solve most problems if I invest the necessary effort.	0.9	
	SE7	I can remain calm when facing difficulties because I can rely on my coping abilities.	0.878	
	SE8	When I am confronted with a problem, I can usually find several solutions	0.922	
	SE9	If I am in trouble, I can usually think of a solution	0.697	
	SE10	I can usually handle whatever comes my way	0.872	

Source: Authors own calculations using SmartPLS3 Software.

Convergent validity was calculated, which is the extent to which a construct converges in its indicators by explaining the items' variance. Convergent validity is assessed by the average variance extracted (AVE) across all items associated with a particular construct and is also referred to as "community." An acceptable threshold for the AVE is 0.50 or higher. This level or higher indicates that, on average, the construct explains more than 50% of the variance of its items.

The last step in reflective measurement is to assess discriminant validity. This analysis reveals to what extent a construct is empirically distinct from other constructs, both in terms of how much it correlates with other constructs and how distinctly the indicators represent only this single construct.

TABLE 1.4: DISCRIMINANT VALIDITY

Constructs	Positive Psychological Educational Intervention	Psychological Health	Self-Efficacy
Positive Psychological Educational Intervention	0.79		
Psychological Health	0.682	0.803	
Self-Efficacy	0.69	0.871	0.823

Source: Authors own calculations using SmartPLS3 Software.

Discriminant validity assessment in PLS-SEM involves analyzing Henseler et al.'s (2015) heterotrait-monotrait ratio (HTMT) of correlations. [33] The discriminant validity presented in Table 1.3 for positive psychological educational intervention, psychological health and self-efficacy demonstrates that each construct is distinct and measures unique phenomena within the model. This is evidenced by the square root of the AVE for each construct being higher than the correlations between psychological health and self-efficacy is relatively high (0.871), the square root of AVE values for each construct (0.803 and 0.823 resp.) still exceeding this correlation, maintain discriminant validity. This analysis ensures that the constructs are not only reliable but also distinct from one another, reinforcing the integrity and interpretability of the research findings by confirming that these constructs capture different dimensions of the psychological and educational phenomena under this study.

STRUCTURAL EQUATION MEASUREMENT

The data for this research was collected through a survey in Google Forms. As the nature of the study was experimental, the data was collected before and after the intervention of ten weeks.

Next, the data were screened; there was no missing frequency since it was guaranteed by the structure of the survey. The sample size of 45 is sufficient for the experimental study and also for the PLS path model estimation as it meets the recommended minimum sample size criteria for PLS path modeling, ensuring statistical reliability. After the pilot test of the survey structure, the researcher found that some items (PH8, PPEI9, SE3, and SE9) did not show any connection with the latent construct, so these items were taken as outliers of the study and not included in the final data collection and analysis.

The numbers on the path relationships represent the standardized regression coefficients, while the numbers displayed in the circles of the constructs represent the R2 values.

FIGURE 2:
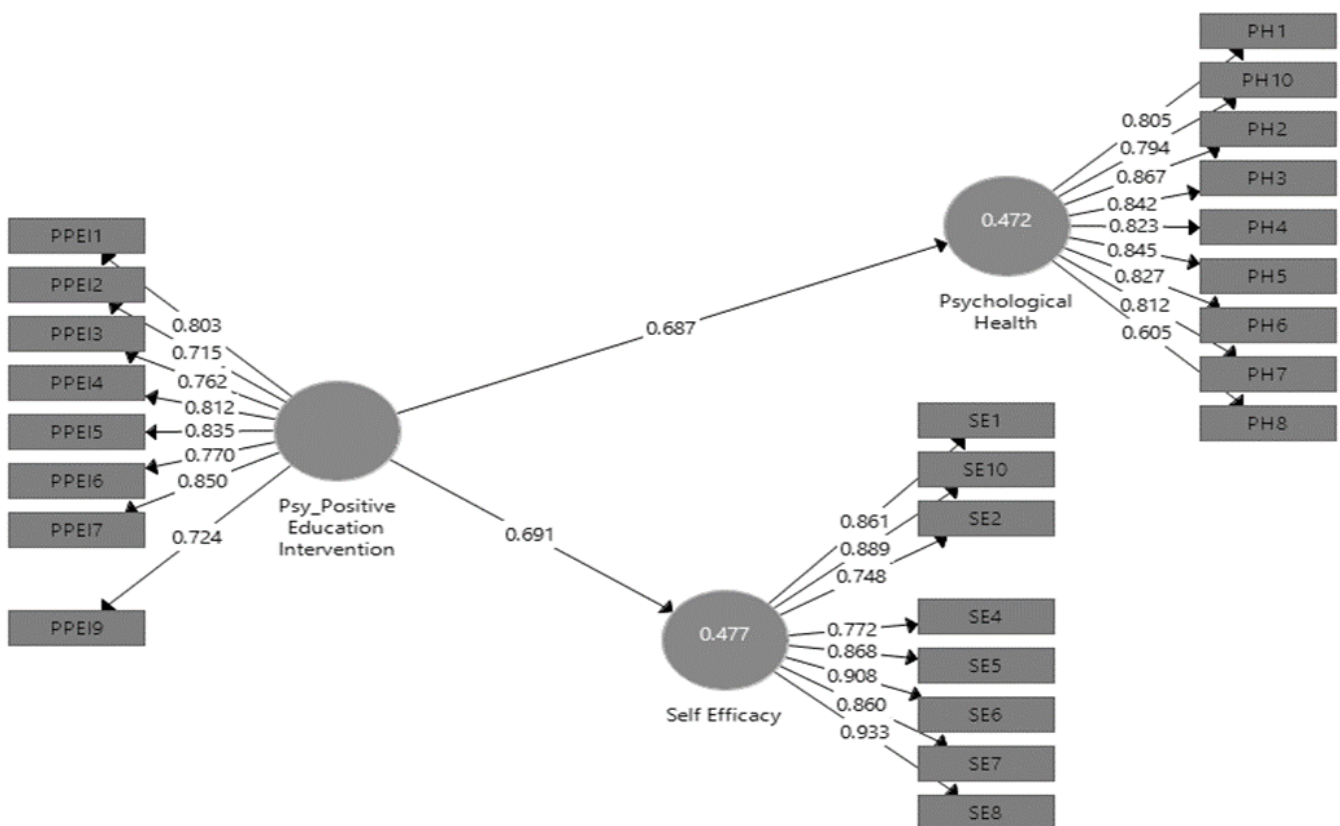
Source: Authors own calculations using SmartPLS3 Software.

TABLE 1.5: PATH COEFFICIENT OF THE STRUCTURAL MODEL AND SIGNIFICANCE TESTING RESULTS (PRE & POST SCORES)

Constructs Connections	PRE-TEST SCORES					POST-TEST SCORES				
	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
PPEI -> PH	0.432	0.448	0.368	1.172	0.242	0.687	0.693	0.107	6.404	0.000
PPEI -> SE	0.603	0.665	0.148	4.081	0.000	0.691	0.707	0.096	7.188	0.000

Results reveal that positive psychological educational interventions affected undergraduates' psychological health. The first hypothesis, H1 is true. A comparison of pre-test scores (t-value 1.172 with a P-value of 0.242) and post-test scores (t-value 6.404 with a P-value of 0.000) showed that intervention affected students' psychological health. With the positive psychological educational interventions, students were able to develop positive emotions in terms of expressing their emotions, such as gratitude; they were also able to develop positive relationships with their peers.

The second hypothesis of the study, H2 was not true. In both the cases before and after the intervention, self-efficacy is significant, though there are differences in t-values (pre-test t scores are 4.081 and post-test t scores are 7.188), it was found that there is no huge effect of the intervention on the self-efficacy of undergraduates.

DISCUSSION

In the present study, we tested and validated the potential effect of a classroom-based positive psychology training course on improving psychological well-being and alleviating depressive symptoms in Chinese medical students. The effects of the intervention seemed promising. and encouraging. The hope scale, life satisfaction scale and subjective happiness scale of the participants appeared to improve, while their symptoms of depression and anxiety decreased. These findings suggest the promising effects of positive psychology education on improving the mental well-being of Chinese medical students, and indicate that teaching psychological well-being in school may be feasible and desirable.

CONCLUSIONS

In the current study, the investigator tested the effect of a positive psychological intervention based on the PERMA Model by Seligman on improving the psychological health and self-efficacy of an undergraduate. The effects of the intervention seemed encouraging and promising. The findings suggest the promising effects of positive psychology intervention (PPI) on improving the psychological health and self-efficacy of undergraduates and indicate that teaching PPI in educational institutions may be feasible and desirable. In this study, we established the intervention model as an elective short program embedded in the regular curriculum based on some unavoidable reasons: Psychological health-based intervention is more cost-effective and can benefit more students as compared with traditional counseling, as it goes with the curriculum. It also helps increase positive emotions and positive relationships, which help students keep away from anxiety and stress. This finding indicates the possibility and feasibility of positive psychology interventions in increasing the psychological health of undergraduates, even though the intervention was virtual. In the higher education community, investigators have proposed that positive psychological intervention concepts such as happiness, joy, positive emotions, positive relationships, self-efficacy, etc. should be included in the curriculum. The findings of the present study may therefore provide insights for PPI among undergraduates in the future. The findings of the present pilot study may provide a positive psychological intervention to improve the psychological health and self-efficacy of undergraduates. Further assessments of a larger sample cohort may yield more significant and reliable results.

Incorporating the significance of digital fatigue into the discussion, it is essential to acknowledge that the prevalence of digital fatigue among students has been a growing concern, particularly with the increased reliance on virtual environments for education and intervention delivery. Despite the potential for digital platforms to aggravate students' fatigue and stress, the design and execution of the positive psychological educational intervention (PPEI) stand out as a testament to the innovative approaches that can mitigate these challenges. This intervention was meticulously crafted to be highly interactive and engaging, effectively countering the usual pitfalls of virtual delivery methods. This strategic approach not only facilitated the removal of digital fatigue but also enhanced the effectiveness of the intervention, as evidenced by the significant improvement in psychological health and self-efficacy among participants.

LIMITATION AND FUTURE DIRECTIONS

To build upon the demonstrated efficacy of positive psychological educational interventions in improving psychological health and self-efficacy, future direction should encompass a multifaceted approach. Research should focus towards longitudinal studies to uncover the enduring the impacts of PPEI, while also broadening the demographic spectrum of participants to enhance the generalizability of findings. Investigating the mechanism underlying the observed benefits could unveil critical insights, guiding the refinement of intervention components.

While the present study provides promising implications for the application of PPI among undergraduates to improve their psychological health, the following limitations and weaknesses should be noted: First, the sample used in the present study was small, consisting of 45 undergraduates in each group. Moreover, the gender distribution among the participants was also not mentioned in the study. To make the finding more convincing, therefore, a larger participant pool and gender-wise distribution should be employed in future studies. Many constructs of positive psychology, like optimism, accomplishments in life, emotional adjustment, etc., were not part of the present study, so further studies may include all these constructs. These factors together may raise the possibility that a higher positive result was observed.

AUTHORSHIP

Both the authors Ms. Tanuja Khan and Dr. Amit Kumar Nag have contributed equally in this research paper.

CONFLICTS OF INTEREST

This is to certify that the present research work, titled "Building Psychological Health in Undergraduates with the Application of a Classroom-Based Positive Psychology Educational Intervention: A Pilot Study" is an original piece of research work that we have undertaken for APJHM. The contents of this research article are purely based on our interpretation of primary data. Neither the contents of the paper nor any other matter related to the manuscript have any conflict of interest.

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NEWLY HIRED NURSES: LEARNING NEEDS, CHALLENGES, SATISFACTION, AND SUPPORT STRATEGIES IN THE CLINICAL SETTING

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ABSTRACT

With a growing shortage of nurses globally, there is a deep concern to address the transition to practice and effectively prepare newly hired nurses to become skilled to enable them to deliver essential health services without compromising the safety and effectiveness of patient care. This study utilizes a descriptive cross-sectional correlational design which elicited responses from 100 newly hired Filipino nurses (local & international) with the use of a validated self-constructed purpose designed survey.

Results revealed that there is a need to address the learning requirements of newly hired nurses. Challenges at various degrees were also identified during this stage and that learning and development support is necessary. It was found that there are significant relationships between the clinical learning needs and transition challenges; support strategies and transition challenges; and clinical learning needs and support strategies for newly recruited nursing personnel.

It is therefore evident that the healthcare system and organizations need to systematically meet the developmental requirements of newly trained nurses. Healthcare organizations need to utilize international standards that are effective, relevant, and supportive of clinical practice to address these essential needs during the transition to newly hired nurses.

KEYWORDS

learning needs; nursing transition; transition into the clinical setting; support strategies and interventions; newly hired nurses in the clinical setting

BACKGROUND

There is a global concern to address the transition of new graduate nurses to qualified nurses as this transition has been found stressful and intimidating. [1, 2, 3, 4] Poor expertise throughout this transition amount will delay newly qualified nurses from reaching their full potential and they will be forced to leave the profession altogether [5] or leave their first job in less than twelve months. [6]

As organizations tend to be pressured to refill their nursing vacancies, typically the primary or transformation method is curtailed to satisfy the immediate wants of the organization (including patient care needs) and to decrease monetary prices. [7, 8, 9, 10, 11]

In recent years, the Philippine healthcare delivery has experienced significant challenges, most notably with a looming shortage of nurses in hospitals that can affect the

delivery of essential health services. Various factors contribute to the diaspora of the nursing workforce in foreign countries making the Philippines one, if not the leading, source of nurses overseas. [12] There is an average of 19,000 Filipino nurses leaving the country each year, and 92,277 nurses left the country from 2012 to 2017. [13] Comparatively, for the last five years, data from the Professional Regulation Commission (PRC, 2024) showed an average of 15,450 (2015-2020) nurses are joining the profession with only a small portion joining healthcare facilities [14]. These facilities are suffering high attrition rates, and staffing issues become a significant concern.

With the current staffing challenges, there is an urgent need to efficiently prepare nurses for an effective transition to clinical practice and field them to the bedside without compromising the safety and effectiveness of patient care. As the backbone of the healthcare delivery system, it is in these critical periods when nurses entering the clinical setting, need to be supported as they journey in progression into practice.

While most new graduates are proficient with the necessary skills and core competencies, there is still a need for support and improvement that needs to be addressed. [15] It is the poor practices during the shift that prevents newly skilled nurses from direction to their total capacity. [5] Those who become frustrated can abandon the workplace or quit less than 12 months after their first task and consider leaving their nursing role. [6, 16] The result is an increase in the already extended personnel concentration and a reduction of equity in personnel preparation. To counteract these efforts, change was facilitated by policies that could directly influence confidentiality and anxiety reduction, stress on employee, turnover rates, and maintenance levels in the organizations.

The shift from education to clinical practice is a pivotal professional development phase of nurses. Positive experiences may be reported but various challenges may be identified that needs mechanisms during transition. [17] This transition is a challenging and stressful experience for nurses regardless of the employment setting. Transition programs are more successful when experiential learning is provided in the clinical setting. [18] It is necessary to be able to bridge the gap between educational preparation and actual clinical practice. It is, therefore, imperative to facilitate the transition and integration of new nurses into

the workforce utilizing structured organizational strategies. [19]

It is in the context of this background that this study aims to determine the learning needs, challenges, satisfaction, and support strategies encountered by newly hired nurses in the clinical setting to enable an efficient transition into the nursing practice.

DATA AND METHODS

A descriptive cross-sectional correlational design was adopted in this study which investigates the statistical descriptions and their relationships, associations, and correlations. [20] A purposive web-based survey was employed with 100 participants. Eligible respondents were registered nurses in the Philippines; working in health institutions that are either government or private; who joined the organizations from 2018 to 2019 regardless of prior experiences, to determine their learning needs, challenges, satisfaction, and needed support strategies.

A self-constructed survey questionnaire adapted and partially modified from Casey-Fink [21] and the Hennessy-Hicks Training Needs Analysis [22] with an averaged Cronbach alpha internal consistency of 0.9262 was validated by panel of experts with a computed S-CVI of +1 was utilized to elicit survey responses. The survey instrument consisted of five parts: (I) Demographic Profile (12 items), (II) Staff Clinical Needs (research/audit, communication/teamwork, clinical tasks, administration, and management/supervisory task) (30 items), (III) Staff Experience/Perception (25 items), (IV) Staff Satisfaction (10 items), (V) Transition Assessment (5 items). The tool was then distributed to key persons of organizations who were able to identify and invited nurses who recently joined their organizations.

Ethical considerations were made in accordance with ethical standards and the study was duly approved by the Dr. Gloria D. Lacson Foundation College, Inc (DGDLFCI) Ethics Committee.

RESULTS

DEMOGRAPHIC PROFILE OF THE RESPONDENTS
A total of 100 newly hired nurses participated in the study selected by purposive web-based sampling. The majority of the respondents were within the age range of 20 to 35

years (88%) while 12% were within the age range of 36 to 50 years. The participants were mostly male (62%), and holders BSc degrees (86%) while only 14% have earned a Masters degree.

About 36% of the respondents had more than 6 years of clinical experience, while 30% had between 3 to 5 years of experience. Only 10% had 1 to 2 years of experience. Of all respondents, 88% are within the Philippines while those working overseas comprised the remaining 12%. The private sector seems to be the preferred employer for 65% of the respondents compared to the 35% who opted for employment in government institutions.

The study included staff nurses (81%), Head Nurses (17%), and Chief Nurses (2%). A number of nurses were specialized in medical/surgical nursing (27%), emergency (12%), adult/pediatric critical care (11%), OR/PACU (9%), OB/Post-Partum (8%), Renal Dialysis (8%), ambulatory clinic/OPD (6%), nursing administration and training (5%), as well as in other areas of clinical specialty relative to aged care, diagnostics, general, neonatal critical care, nursing service office, occupational, pediatrics, rehabilitation (2% each of the survey cohort). Of which, 80% had a work schedule of rotating shifts while only 18% have straight mornings and only few (2%) are on a regular 8 to 5 schedules.

In terms of the orientation that they received; the majority of the respondents (83%) received only less than one month of orientation with only 17% who have received an orientation that would last from 5 to more than 11 weeks. But during this orientation, most nurses had more than 5 preceptors (58%), while a 34% had about 2 to 4 preceptors. Only a few nurses had 1 or no preceptors at all (8%).

ASSESSMENT OF NURSES ON THEIR CLINICAL LEARNING NEEDS

There were 30 questions in this survey which assessed the nurses' clinical learning needs. It yielded a Grand Weighted Arithmetic Mean of 5.354 which is equivalent to an overall descriptive rating of "Quite Well" performance (Table 1).

Grouping clinical learning needs from the survey into categories (Table 2) showed that nurses were able to perform "Slightly Well" in the Research and Audit Category (4.89) while "Quite Well" on Communication and Teamwork (5.83), Clinical Tasks (5.52), Administration (5.59), and Management & Supervisory Task (5.50).

TABLE 1. NURSES' CLINICAL LEARNING NEEDS

	7 VW	6 QW	5 SW	4 N	3 SNW	2 QNW	1 NW	(n)	AWM	SD	Survey Question Descriptive Rating
1. Establishing a relationship with patients.	26	40	24	8	0	0	2	100	5.76	1.1292	Quite Well
2. Doing paperwork and/or routine data inputting.	17	37	30	16	0	0	0	100	5.55	0.9574	Quite Well
3. Critically evaluating published research.	11	9	33	31	14	2	0	100	4.66	1.2162	Slightly Well
4. Appraising your own performance	11	31	42	12	4	0	0	100	5.33	0.9646	Quite Well
5. Getting on with your colleagues	24	48	22	6	0	0	0	100	5.9	0.8348	Quite Well
6. Interpreting your research findings.	10	12	41	22	8	0	7	100	4.66	1.444	Slightly Well
7. Applying research results to your own practice.	8	39	26	17	6	2	2	100	5.12	1.2735	Slightly Well

#	Item								Total	Mean	SD	Verbal Description
8.	Communicating with patients face-to-face.	34	43	16	7	0	0	0	100	6.04	0.8867	Quite Well
9.	Identifying viable research topics.	10	13	42	23	6	2	4	100	4.76	1.3342	Slightly Well
10.	Treating patients.	31	50	13	6	0	0	0	100	6.06	0.8266	Quite Well
11.	Introducing new ideas at work.	12	33	28	15	10	2	0	100	5.16	1.2368	Slightly Well
12.	Accessing relevant literature for your clinical work.	12	26	28	28	4	0	2	100	5.06	1.2294	Slightly Well
13.	Providing feedback to colleagues.	12	39	25	16	4	4	0	100	5.27	1.2215	Quite Well
14.	Giving information to patients and/or carers.	26	49	19	4	2	0	0	100	5.93	0.8905	Quite Well
15.	Statistically analyzing your own data.	4	28	34	22	8	2	2	100	4.84	1.2121	Slightly Well
16.	Showing colleagues and/or students how to do things.	17	54	15	4	8	2	0	100	5.62	1.1788	Quite Well
17.	Planning and organizing an individual patient's care.	19	39	32	8	2	0	0	100	5.65	0.9468	Quite Well
18.	Evaluating patients' psychological and social needs.	15	42	30	13	0	0	0	100	5.59	0.9	Quite Well
19.	Organizing your own time effectively.	20	46	22	8	4	0	0	100	5.70	1.0101	Quite Well
20.	Using technical equipment, including computers.	33	41	16	10	0	0	0	100	5.97	0.9477	Quite Well
21.	Writing reports of your research studies	2	16	39	23	14	2	4	100	4.47	1.2589	Slightly Well
22.	Undertaking health promotion studies.	10	24	36	20	6	0	4	100	4.96	1.3175	Slightly Well
23.	Making do with limited resources.	10	40	29	19	2	0	0	100	5.37	0.9708	Quite Well
24.	Assessing patients' clinical needs.	26	39	25	10	0	0	0	100	5.81	0.9395	Quite Well
25.	Collecting and collating relevant research information.	9	30	28	23	8	0	2	100	5.01	1.2431	Slightly Well
26.	Designing a research study.	4	13	29	34	14	4	2	100	4.39	1.2301	Slightly Well
27.	Working as a member of a team.	40	35	19	6	0	0	0	100	6.09	0.9112	Quite Well

28. Accessing research resources (e.g. time, money)	6	24	36	24	6	0	4	100	4.84	1.2611	Slightly Well
29. Undertaking administrative activities	22	26	20	22	8	2	0	100	5.26	1.3456	Quite Well
30. Personally coping with change in health services	27	41	18	12	2	0	0	100	5.79	1.0376	Quite Well
Grand Arithmetic Weighted Mean									**5.35**	**Quite Well**	

TABLE 2. CLINICAL LEARNING NEEDS CATEGORIES

Category	AWM	SD	Descriptive Rating
Research and Audit (Items #3, 6, 7, 9, 15, 21, 25, 26, 27)	4.89	1.2359	Slightly Well
Communication and Teamwork (Items # 1, 5, 8, 13, 14, 27)	5.83	0.9790	Quite Well
Clinical Task (Items # 10, 12, 17, 18, 22, 24)	5.52	1.0266	Quite Well
Administration (Items # 2, 20, 29)	5.59	1.0836	Quite Well
Management / Supervisory Task (Items # 4, 11, 16, 19, 23, 30)	5.50	1.0665	Quite Well
Grand Arithmetic Weighted Mean	**5.35**		**Quite Well**

These results corroborate an affirmative clinical learning needs finding and a similar study which emphasized that nurses provide essential and complete patient-centered care relative to professionalism, attention to detail, critical thinking, compassion, time management, and communication [23, 24]

ASSESSMENT OF NURSES' JOB EXPERIENCE

The assessment of the nurses' job experience (Table 3) shows that the majority of the respondents have answered "Agree" to "Strongly Agree" with a grand arithmetic weighted mean is 3.146 which has an equivalent descriptive rating of "Agree" that shows most of the nurses-respondents have positive job experience within their respective institution. However, questions 16, 17, and 24 respectively have been answered by the respondents as "Disagree" and question 5 is "Strongly Disagree".

TABLE 3. NURSES' JOB EXPERIENCE

	4 (SA)	3 (A)	2 (D)	1 (SD)	(n)	AWM	SD	Survey Question Descriptive Rating
1. I feel confident in communicating with physicians.	33	63	4	0	100	3.29	0.5374	Agree
2. I am comfortable knowing what to do for a dying patient.	37	55	6	2	100	3.27	0.6645	Agree
3. I feel comfortable delegating tasks to the Nursing Assistant.	35	49	14	2	100	3.17	0.7393	Agree

4.	I feel at ease asking for help from other RNs on the unit.	55	43	2	0	100	3.53	0.5404	Strongly Agree
5.	I am having difficulty prioritizing patient care needs.	0	9	50	41	100	1.68	0.6337	Strongly Disagree
6.	I feel my preceptor provides encouragement and feedback about my work.	40	52	6	2	100	3.30	0.6742	Agree
7.	I feel staff is available to me during new situations and procedures.	37	56	5	2	100	3.28	0.6526	Agree
8.	I feel overwhelmed by my patient care responsibilities and workload.	14	36	48	2	100	2.62	0.7491	Agree
9.	I feel supported by the nurses on my unit.	54	42	4	0	100	3.50	0.5774	Strongly Agree
10.	I have opportunities to practice skills and procedures more than once.	54	44	0	2	100	3.50	0.6113	Strongly Agree
11.	I feel comfortable communicating with patients and their families.	47	53	0	0	100	3.47	0.5016	Strongly Agree
12.	I am able to complete my patient care assignment on time.	49	41	10	0	100	3.39	0.6651	Strongly Agree
13.	I feel the expectations of me in this job are realistic.	45	45	10	0	100	3.35	0.6571	Strongly Agree
14.	I feel prepared to complete my job responsibilities.	49	47	4	0	100	3.45	0.5752	Strongly Agree
15.	I feel comfortable making suggestions for changes to the nursing plan of care.	35	49	16	0	100	3.19	0.6919	Agree
16.	I am having difficulty organizing patient care needs.	5	16	47	32	100	1.94	0.8266	Disagree
17.	I feel I may harm a patient due to my lack of knowledge and experience.	15	24	25	36	100	2.14	1.0649	Disagree
18.	There are positive role models for me to observe in my unit.	55	39	6	0	100	3.49	0.6113	Strongly Agree
19.	My preceptor is helping me to develop confidence in my practice.	53	39	6	2	100	3.43	0.7000	Strongly Agree
20.	I am supported by my family/friends.	76	22	2	0	100	3.74	.4845	Strongly Agree
21.	I am satisfied with my chosen nursing specialty.	55	37	8	0	100	3.47	0.6428	Strongly Agree
22.	I feel my work is exciting and challenging.	63	33	2	2	100	3.57	0.6397	Strongly Agree
23.	I feel my manager provides encouragement and feedback about my work.	44	43	9	4	100	3.27	0.7895	Agree
24.	I am experiencing stress in my personal life.	12	41	28	19	100	2.46	0.9366	Disagree
Grand Arithmetic Weighted Mean							**3.15**	**Agree**	

For those who agree or strongly agree to item #24 indicates that stress for the newly hired nurses may be caused primarily by finances (48%), personal relationships (13%), Child-care (12%), job performance (12%), living situation (10%), and a handful (5%) with other various reasons. This has a resemblance to the that tackles various job experiences of nurses relative to numerous clinical practices. [25] Congruently, it was also confirmed that nurses have experienced some stress and difficulties in performing their jobs in the hospital however it is manageable following their research findings. [26]

ASSESSMENT OF NURSES' JOB SATISFACTION

There were four questions in the assessment of nurses' job satisfaction (Table 4) wherein the respondents have answered moderately satisfied on the criteria of job satisfaction namely, "Number of off duties per month",

"Opportunities for career advancement", "Amount of encouragement and feedback", and "Opportunity for choosing work shifts". The other questions were answered by the respondents as neither satisfied nor dissatisfied as portrayed on the table summary presented below. The grand arithmetic weighted mean is 3.323 which has a corresponding descriptive rating of "Neither Satisfied nor Dissatisfied" implies that most of the nurses-respondents of this study were neutral in terms of job satisfaction. Most of the nurses have a medium level of job satisfaction wherein there were criteria that they satisfied and equivalently there were areas wherein they were dissatisfied. [26] It also emphasized that satisfied employees play a crucial role in an organization's success, so health care organizations must be aware of the importance of employees' jobs. [27]

TABLE 4. NURSES' JOB SATISFACTION

	5 VS	4 MS	3 NSD	2 MD	1 VD	(n)	AWM	SD	Survey Question Descriptive Rating
1. Salary	2	29	36	19	14	100	2.86	1.0543	Neither Satisfied nor Dissatisfied
2. Vacation	8	26	29	21	16	100	2.89	1.1968	Neither Satisfied nor Dissatisfied
3. Benefits package	5	16	37	26	16	100	2.68	1.0813	Neither Satisfied nor Dissatisfied
4. Hours that you work	20	30	25	14	11	100	3.34	1.2571	Neither Satisfied nor Dissatisfied
5. Number of off duties per month	20	39	20	12	9	100	3.49	1.2018	Moderately Satisfied
6. Your amount of responsibility	6	45	25	22	2	100	3.31	0.9502	Neither Satisfied nor Dissatisfied
7. Opportunities for career advancement	19	37	32	6	6	100	3.57	1.0565	Moderately Satisfied
8. Amount of encouragement and feedback.	17	51	18	12	2	100	3.69	0.9608	Moderately Satisfied
9. Support from colleagues and supervisors	25	45	18	10	2	100	3.81	0.9918	Moderately Satisfied
10. Opportunity for choosing work shifts	22	31	37	4	6	100	3.59	1.0645	Moderately Satisfied
Grand Arithmetic Weighted Mean							**3.32**	**Neither Satisfied nor Dissatisfied**	

ASSESSMENT OF NURSES' TRANSITION

Nurses perceived role expectations (63%) were the most difficult challenge, while 19% shared that workload is difficult. Only a handful experienced lack of confidence

(10%) and orientation issues (8%). On the other hand, the presence of the nurse's integrated unit support and satisfaction shows a need for an improved orientation (50%),

increased support (24%), Improved work environment in the unit (17%), and socialization (9%).

There were 66% nurses that were satisfied with peer support within their institution. Patients' and their family's treatment of them account for 15% of their satisfaction while 12% are content with the on-going learning on their respective institutions. A mere 5% account their professional nursing role and positive work environment (2%) to be satisfactory. Most of the nurses are not satisfied with their work environment (47%), system (23%), interpersonal relationships (21%), and the orientation (9%) they received.

RELATIONSHIP BETWEEN CLINICAL LEARNING NEEDS, SUPPORT STRATEGIES, AND INTERVENTIONS, AND THE IDENTIFIED CHALLENGES DURING STAFF NURSES' TRANSITION

Statistical analysis shows that the clinical learning needs and the transition challenges of the new nurses on clinical practices, shows a very strong correlation (0.73) and significance (0.033) (Table 5). The support strategies and interventions of the healthcare institutions among new nurses are essential and could alleviate challenges experienced by nurses in terms of transition into clinical practices which depicts the strong correlation (0.60) between the two different variables and a p-value of 0.046 which is lower than the p-value threshold of 0.05. Clinical Learning Needs and Support Strategies were also of a strong correlation (0.62) and significance (0.002).

TABLE 5. RELATIONSHIP BETWEEN CLINICAL LEARNING NEEDS, SUPPORT STRATEGIES AND TRANSITION CHALLENGES

	Correlation	Significance	Descriptive Equivalent
Clinical Learning Needs and Transition Challenges	0.73	0.033	Very Strong Correlation/ Significant
Support Strategies and Transition Challenges	0.60	0.046	Strong Correlation/ Significant
Clinical Learning Needs and Support Strategies	0.62	0.002	Strong Correlation/ Significant

This portrays that the continuous and consistent clinical learning is essential on the transition challenges and have lessened the problems and conflicts encountered by nurses in their transition to clinical practices in the hospital setting. A nurse transition program is any professional training program designed to turn a new registered nurse from the college environment into the clinical practice setting and will serve as the intervention to assist new nurses assigned to perform clinical duties. Clinical learning among nurses is essential in managing the challenges to be encountered during the transition onto the nursing practice specifically in the clinical setting. [28] Similarly, the relevance of the clinical learning needs among new nurses on the support and intervention strategies being implemented in their respective healthcare institutions to address the essential transition points and needs of the newly hired nurses. [23]

NURSES' PROFILE VARIABLES & TRANSITION CHALLENGES, CLINICAL LEARNING NEEDS, AND SUPPORT STRATEGIES AND INTERVENTIONS

The nurse's profile is mostly significant to their experienced transition challenges. There are also observed moderate correlation between educational attainment, clinical experience, employment location, and employment sector to transition challenges. The computed correlation coefficient of the said variables showed a p-value less than 0.05 which can be interpreted as significant (Table 6).

TABLE 6. RELATIONSHIP BETWEEN THE INDIVIDUAL PROFILE AND TRANSITION CHALLENGES

Nurses' Profile	Correlation	Significance	Descriptive Equivalent
Age	0.13	0.98	Weak Correlation/ Not Significant
Gender	0.008	1.385	No Correlation/ Not Significant
Educational Attainment	0.36	0.042	Moderate Correlation/ Significant
Clinical Experience	0.41	0.049	Moderate Correlation/ Significant
Employment Location	0.30	0.033	Moderate Correlation/ Significant
Employment Sector	0.45	0.028	Moderate Correlation/ Significant
Position Level	0.52	0.019	Strong Correlation/ Significant
Area of Specialty	0.63	0.038	Strong Correlation/ Significant
Work Schedule	0.55	0.024	Strong Correlation/ Significant
Duration of Unit Orientation	0.64	0.026	Strong Correlation/ Significant
Number of Preceptors	0.61	0.018	Strong Correlation/ Significant

It is the position level, area of specialty, work schedule, duration of unit orientation, and the number of preceptors that has a direct relationship on the identified challenges of the nurses' transition into clinical practice. The socio-demographic profile of nurses somehow positive correlation on the transition challenges being encountered by new nurses on their transition into clinical practice. [29] Transition is a challenging and stressful experience for nurses regardless of employment settings, thus, transition programs are more successful when experiential learning is provided in the clinical area.

NURSE'S PROFILE AND THE CLINICAL LEARNING NEEDS

The nurses' position level and duration of unit orientation shows very strong significant correlation revealing that this is essential on the transition of nurses on the clinical setting (Table 7). New nurses need various clinical learning experiences and opportunities to be able to adjust and position themselves appropriately on the clinical practice in the hospital.

TABLE 7. RELATIONSHIP BETWEEN THE INDIVIDUAL PROFILE AND CLINICAL LEARNING NEEDS

Nurses' Profile	Correlation	Significance	Descriptive Equivalent
Age	0.42	0.003	Moderate Correlation/ Significant
Gender	0.015	1.0541	No Correlation/ Not Significant
Educational Attainment	0.575	0.0041	Strong Correlation/Significant
Clinical Experience	0.6245	0.0025	Strong Correlation/Significant

Employment Location	0.1525	0.9851	Weak Correlation/Not Significant
Employment Sector	0.1945	1.0542	Weak Correlation/Not Significant
Position Level	0.7556	0.0045	Very Strong Correlation/Significant
Area of Specialty	0.0845	0.8255	No Correlation/Not Significant
Work Schedule	0.226	1.5645	Weak Correlation/Not Significant
Duration of Unit Orientation	0.715	0.0028	Very Strong Correlation/Significant
Number of Preceptors	0.355	0.0451	Moderate Correlation/Significant

Educational attainment and the clinical experience of nurses were found to have a strong correlation and is significant on the clinical learning needs which depict that new nurse. Consequently, the age of the respondents is moderately correlated and significant to the clinical learning needs.

Employment location and employment sector that have a weak correlation and shows no significance to the clinical learning needs while gender and area of specialty have no apparent correlation and significance on the clinical learning needs.

Few of the socio-demographical variants have a direct relationship on the clinical learning needs among nurses as they have differences in their ability and capability to adapt to the new clinical setting. [30] The transition from schooling to clinical activity is full of joy and excitement but rather of anxiety and frustration. Initial impressions of new workers are often made in a clinical environment where specifications

and guidelines, informal rules, official procedures, and processes are easily enforced.

NURSE'S PROFILE AND SUPPORT STRATEGIES

There were four profile categories: age, clinical experience, duration of unit orientation, and the number of preceptors which resulted to have a significantly strong correlation on the support strategies and interventions among nurses which tells us that new nurses at a younger age will be needing higher amount of support and intervention from the healthcare institution to be able to appropriately perform their clinical duties (Table 8). The same is true with the clinical experience wherein the new nurses have little to no experience and require support and intervention from their respective departments. The unit orientation is needed by the new nurses to be able to be well-informed on the essential processes of the clinical practice as well as the number of preceptors who will guide new nurses in their transition to the clinical setting.

TABLE 8. RELATIONSHIP BETWEEN INDIVIDUAL PROFILE AND SUPPORT STRATEGIES AND INTERVENTIONS

Nurses' Profile	Correlation	Significance	Descriptive Equivalent
Age	0.525	0.0026	Strong Correlation/Significant
Gender	0.148	1.245	Weak Correlation/Not Significant
Educational Attainment	0.346	0.042	Moderate Correlation/Significant
Clinical Experience	0.625	0.033	Strong Correlation/Significant
Employment Location	0.215	0.083	Weak Correlation/Not Significant

Employment Sector	0.105	0.095	Weak Correlation/Not Significant
Position Level	0.472	0.031	Moderate Correlation/Significant
Area of Specialty	0.128	0.572	Weak Correlation/Not Significant
Work Schedule	0.205	1.354	Weak Correlation/Not Significant
Duration of Unit Orientation	0.578	0.002	Strong Correlation/Significant
Number of Preceptors	0.605	0.004	Strong Correlation/Significant

These results resemble the findings of Franquiz and Seckman (2016) as they have reiterated that the support strategies and interventions being employed among new nurses in the hospital will greatly improve their performance and clinical ability to perform their duty efficiently.

CONCLUSIONS

Based on the findings of the study, there is a continuous need to address and improve the clinical learning needs of nurses. Nurses in the transition stage of their professional career encountered challenges with role expectations, lack of confidence, workload, and orientation issues with the nursing work environment, system, interpersonal relationships, and orientation as the least satisfying. Support should be given to these nurses to enhance job satisfaction, with considerations made on the work hours and day-offs, career development, superior encouragement and feedback, and collegial & supervisory support. There should also be an increase in peer support, patient and family's relationship management, on-going learning, professional nursing role development, and positive work environment. Orientation, social support, and work environment are essentials for their satisfaction during the transition period.

Further, it was found that there is a significant relationship between clinical learning needs and transition challenges; support strategies and transition challenges; and clinical learning needs and support strategies. Transition challenges are affected strongly by position level, area of specialty, work schedule, duration of unit orientation, and the number of preceptors. On the other hand, clinical learning needs are affected strongly by educational attainment, clinical experience, position level, and duration of unit orientation. Support strategies and interventions are affected strongly by age, clinical experience, duration of unit orientation, and the number of preceptors.

Given these findings, it is therefore recommended that health organizations utilize a program that will improve the clinical learning needs of the nurses during the transition into clinical practice utilizing acceptable international standards of clinical practice. The transition program should be able to prepare them for their clinical duties and responsibilities and provide support strategies and relevant interventions essential for nurses to minimize difficulties and challenges being encountered.

Further, challenges and difficulties must be regularly addressed with provisions of alternative course of action to assist the nurses with their transition. Healthcare institutions should be able to provide new nurses with equal supportive opportunities to guide them in the management of challenges.

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THE EFFECT OF NURSES' PSYCHOLOGICAL CLIMATE PERCEPTIONS ON THEIR PROFESSIONALITY IN THE CONTEXT OF WORK ENGAGEMENT

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ABSTRACT

BACKGROUND:

The psychological climate of the organization, the individual's perspective on work and whether they are engaged are meaningful in terms of the professionalism level of nurses. Work engagement, as a concept completely opposite to burnout, refers to the emotional and motivational state of the employee towards his work.

AIM:

The aim of this study is to determine the effect of nurses' positive psychological climate perception on their professionalism and to investigate the mediation role of work engagement in this relationship.

METHOD:

Related data were gathered from 190 nurses who are working in a public hospital belonging to Health Ministry Erzurum Public Hospitals Union. In the research, the questionnaire form was used as data collection method. The questionnaire consists of statements determining the participants' perceptions of psychological climate, work engagement and professionalism. Validity and reliability of the scales were measured by item analysis, exploratory and confirmatory factor analysis and internal consistency coefficient method. The model, which was developed to analyze the relations between the variables, was tested by structural equation modeling.

FINDINGS:

In the research model and correlations between the variables were determined, and it was concluded that the relationships between all three variables were significant at the level of p <0.001. In the second stage of the analysis, a structural equation test was applied to the research model and the relationships between the variables were determined. Then, Baron and Kenny approach and bootstrap analysis were used to determine the mediating effect related to the structural model. By testing the structural model, it was determined that the results of the goodness of fit index values were within the specified reference ranges.

RESULT:

According to the analyzed results, it is seen that work engagement has a partial role on the effect of positive psychological climate perception on professionalism.

KEYWORDS

Professionalism, psychological climate, work engagement

INTRODUCTION

Professionalism is defined as the individual's orientation towards social interests rather than personal interests [1]. Nursing is one of the professions in which the sense of professionalism is most discussed, especially considering the welfare and health of the society. Since the profession is an important part of the health sector, it increases the importance of nursing in society [2]. When evaluated from this point of view, this value and meaning attributed to nursing should be strengthened with professional principles because professionalism expresses the behavioral aspect of the profession [3]. Rather than professional knowledge and experience, the behavior used in the transfer of this knowledge and experience is a part of professionalism. The concept of professionalism is also defined as the relations, behaviors and values expected from the professional in accordance with the social contract between the professional and the organization he is a member of [4].

Professionalism is a necessity for the institution to achieve its goals and to protect the ethical and moral values of the institution. A professional is expected to act in line with humane, moral and ethical values while performing the technical parts of his job. Professionalism emphasizes the existence of ethical principles related to the profession as well as the commitment to the principles [5]. Ali and Bradbum emphasizes that the qualifications of the professional encompass education and training that includes basic behaviors [6]. Having technical equipment related to any field of expertise will not be enough for professionalism. Therefore, a professional must exhibit attitudes and behaviors in line with the basic values of the field in which he is an expert. It is important for the management of the organization on which factors the behavioral and attitudinal side of professionalism depend [7].

A professional approach is needed for the nursing profession, as in all professions. Nursing is one of the oldest professions known, which has a sanctity in the society with its service to human health and requires ethical / moral responsibility [8].

The professional identity of the nursing profession consists of three dimensions. The first is the personal dimension, which emphasizes the characteristics that nurses should have in order to take on authority and responsibility. The second is the interpersonal dimension, which expresses the process of adopting the values, norms and culture associated with their profession through the social interactions of nurses in their work environment. Finally, the third dimension consists of the historical and social development of the nursing profession. Based on these dimensions, it can be stated that the professional identity of nursing is significantly affected by individual perception and interpersonal relationships. Therefore, the possibility that nurses' perceptions of professionalism may be affected by their perceptions of the institution they serve and it could be examined.

Many approaches to professionalism state that professionalism is related to individuals' perceptions, motivations, attitudes, and logic. On the other hand, some approaches underline that professionalism is affected by environmental factors [9]. Both approaches are essentially complementary to each other because the perception, motivation, attitude and logic of the employee are significantly affected by environmental factors.

Psychological climate is basically the cognitive descriptions of the employees about the organization they are in [10]. Therefore, the organization's creation of a positive psychological climate for its members will be effective in exhibiting positive organizational behaviors. Nurses who feel the support of the organization they work for, who think that their efforts and contributions are aware of the organization management and whose contributions are appreciated will not have difficulty in exhibiting the professional attitudes and behaviors desired by the organization. Each employee creates a psychological climate for himself by interpreting his own perception in a meaningful way. This cognitive representation makes it possible for individuals to attribute meaning to organizational events and to determine which behavior will lead to the best results [11]. Specifically, psychological climate refers to the perceptual and experiential components of the interaction between the organizational environment and the employee. This indicates that there is a relationship between employees' giving their personal energies to their roles in the workplace, depending on whether their organizational environment is meaningful and safe [12]. When employees think that their psychological needs are met in the workplace, they put their time and energy in response to this effort of the organization. This situation leads to the estimation that there is a direct positive relationship between psychological climate and employee effort [13]. Many studies also support this prediction. Psychological climate has positive effects on employees' work attitudes and behaviors

towards the organization [14]. Employees' climate perceptions have significant effects on employees' citizenship behaviors and job satisfaction, and therefore positively affect their job performance [15]. In addition, there are studies showing that positive psychological climate is positively related to various work-related attitudes and behaviors such as work engagement, job satisfaction, dedication, effort, employee performance, and productivity (16). In addition to the psychological climate of the organization, the individual's perspective and work engagement may also be meaningful in terms of the professionalism level of nurses. Because work engagement, as a concept completely opposite to burnout, expresses an emotional and motivational state of the employee towards his work. Therefore, being engaged in the work enables employees to be energetic and excited about their work [17]. In this respect, it can be expected that the individual who is engaged to work will form a professional identity that easily adopts professional values.

When management is perceived as supportive, employee roles are clearly defined, employees feel free to express themselves, and they feel that they make a meaningful contribution to the organization, they are more engaged and put more effort into the work [18]. These findings are similar to studies showing that a positive work environment reduces employee demands, motivates them, and increases employee dedication to their work [19]. According to these data, it can be predicted that nurses' positive psychological climate perceptions may increase their level of engagement in their work.

Considering that the positive psychological climate is a resource that increases the level of work engagement of the employees and the level of work engagement is evaluated as a factor that can increase professionalism, it can be predicted that work engagement may have a mediating role in the effect of the psychological climate on professionalism.

Although there are many studies in the literature on the effect of psychological climate on work engagement, there aren't enough studies that reveals its relationship with professionalism. In the study, it is aimed to obtain the required information by using the model that may explain in the context work engagement the relationship between psychological climate and professionalism.

METHODS

POPULATION AND SAMPLE OF THE RESEARCH

The research is of a descriptive type. The population of this research consists of 414 nurses who have been working for more than 1 year in a state hospital affiliated to the Erzurum Public Hospitals Association of the Turkish Ministry of Health. The sample size to be selected was calculated as 200 by estimating a 5% margin of error within the 95% confidence limits of the research population in question (http://www.surveysystem.com/sscalc.htm). 207 nurses voluntarily participated in the study and answered the questionnaires. However, 190 questionnaire forms were deemed suitable for use. As a result of data collection, 83.2% of the survey participants were women and 70% were married, 41.6% were 24-30, 34.7% were 31-37, 16.3% were 36-44, It was found that 7.4% of them were in the age group of 45 and above. In addition, 52.2% of the participants fulfill their profession for 1 to 5 years, 31.3% for 6 to 10 years, and 16.5% for more than 10 years.

DATA COLLECTION TOOLS AND DATA COLLECTION

A questionnaire technique was used as a data collection tool in the research process. Questionnaire forms were delivered to the determined sample group by the researcher himself, distributed on a voluntary basis and collected in the following days (April 2018).

The scale consisting of a total of 21 questions to measure the professionalism of nurses was created by compiling from two different scales. The first of the scales used is the 44-item scale developed by Weis and Schank [20]. In line with the purpose of the research and the characteristics of the research universe, 13 items related to the dimensions of responsibility, safety and human dignity of the original scale were used. Another scale used is the professionalism scale of Chisholm et al. [21]. The 8 items in the original scale were selected in terms of their compatibility with the other scales used in the research and their suitability for the purpose of the research. The finalized scale was graded on a 5-point Likert scale (1- Never, 2- Rarely, 3- Sometimes, 4- Very often, 5-Always).

The psychological scale developed by Brown and Leigh was used to measure the psychological climate perceived by the participants in the institution where they work [22]. The scale consists of 21 questions expressing the dimensions of supportive management, role clarity, contribution, recognition, self-expression and difficulty. All statements in

the scale were rated with a 5-point Likert scale (1- Strongly disagree, 2- Disagree, 3- Undecided, 4- Agree, 5- Strongly agree).

The 9-question short version of the work engagement scale developed by Schaufeli and Bakker was used to measure the level of work engagement of the participants, grading as a 5-point Likert scale (1- Never, ..., 5-Always) [23]. The scale consists of vigor, dedication and adoption dimensions, and each dimension is measured with three questions.

The goodness-of-fit indices obtained for the scales as a result of Confirmatory Factor Analysis are given in Table 1.

TABLE 1 CONFIRMATORY FACTOR ANALYSIS GOODNESS OF FIT INDICES FOR SCALES

Variables	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA	SRMR
PC	1.737	.909	.850	.919	.964	.946	.963	.062	.060
WE	1.362	.977	.942	.983	.996	.991	.995	.044	.025
PRO	1.226	.942	.905	.900	.980	.970	.979	.035	.048

(PC: Psychological Climate, WE: Work Engagement, PRO: Professionalism)

EVALUATION OF DATA

While reliability analysis, exploratory factor analysis and correlation analysis were applied to the research data, confirmatory factor analysis was carried out and direct and indirect relationships between the variables of the model were determined by testing the structural model.

ETHICAL ASPECT OF RESEARCH

The research questionnaire includes scales related to the variables of the research model and demographic and factual questions. Since the scales with validity and reliability tests are universal scales that have been used before, it was concluded that they would be sufficient to define the research variables. After the questionnaire form was created, it was evaluated by Atatürk University Social and Human Sciences Ethics Committee, and it was decided that the questionnaire study was ethically and scientifically appropriate (14.06.2017; Decision no: 22)

A state hospital affiliated to Erzurum Public Hospitals Association was determined as the research universe and an official application was made to the institution. Our research request was approved by the institution and necessary permissions were given. Hospital nurses were asked to participate on a voluntary basis, and any concerns that might arise were tried to be resolved by stating that the questionnaires would only be used for academic purposes, the names of the participants were not required, and the results of the research would not be given to any person or institution. In this respect, it is assumed that the participants in the study perceive and interpret the statements in the questionnaire correctly and share their sincere views. In addition, the Helsinki Declaration 2008 Principles were complied with during the study.

RESULTS

The descriptive statistics (mean and standard deviation) related to the variables in the research model and the correlations between the variables are given in Table 2. As seen in Table 2, there are significant relationships between the variables that make up the research model.

TABLE 2 MEANS, STANDARD DEVIATIONS OF VARIABLES AND CORRELATIONS BETWEEN VARIABLES

Factor	Mean	SD	1	2	3
1- P	3.47	.655	1		
2- WE	3.65	.784	.490**	1	
3- PRO	4.37	.419	.410**	.385**	1
*p<0.05 **p<0.01					

(PC: Psychological Climate, WE: Engagement, PRO: Professionalism, Mean: Average, SD: Standard Deviation)

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In the second stage of the analysis, the structural model was tested and the relationships between the variables related to the model were determined. Then, Baron and Kenny approach and bootstrap analysis were used to determine the mediator relationship in the structural model [24]. The research hypotheses created in line with the theoretical background regarding the variables that are the subject of the research were tested by applying them to the research model through validated scales. In the model, psychological climate is included as the only exogenous variable. Engagement and professionalism are the endogenous variables of the model. In addition, the variable of being engaged to work was added to the model as a mediator variable in line with the theoretical framework. The regression loads between the variables of the research model are given in Figure 1.

The fit index results obtained from testing the structural model are as follows: CMIN/DF= 1.887; GFI= .950; AGFI= .887; NFI=.909; IFI=,955; TLI=.939; CFI=.954; RMSEA=.069; SRMR=.060. When the data are examined, it is seen that the obtained fit index results are within the specified reference ranges. Therefore, it is realized that the research model in question is at an acceptable level.

The predictive values of the model obtained in the structural equation analysis performed to test the research hypotheses are given in Table 3. According to the table, it is seen that there is a significant relationship at p<0.001 significance level between psychological climate and work engagement. There is a significant relationship between psychological climate and professionalism at p<0.001 significance level. In the research model, it was found that there was a significant relationship at p<0.01 importance level between being engaged in the work, which was taken as a mediator variable, and professionalism.

After examining the direct relations of the research variables with each other, the analysis methods and results performed to examine the indirect relations are taken into account.

Psychological climate affects professionalism positively, directly and significantly (.448; p<0.001). Since the necessary conditions for the mediation test were fulfilled, in the next step, the tool of engagement was placed in the model as a variable and the effect of the psychological climate on professionalism was examined. The psychological climate has also an indirect effect on professionalism by influencing work engagement. (.285; p<0.01). Therefore, according to the Baron and Kenny (1986) approach, it can be said that engagement to work has a partial mediation role. However, it remains to be determined whether this partial mediation role is significant [25]. For this reason, the significance table of the model was examined by means of the bootstrap test, and it was determined that the partial mediating role of being engaged in the work on the effect of the psychological climate on professionalism was significant at the p<0.01 significance level. Therefore, it is seen that the significant and positive effect of the positive psychological climate perceptions of the nurses participating in the research on their professionalism is partially mediated by their level of engagement in their work.

TABLE 3 ESTIMATION RESULTS FOR THE STRUCTURAL MODEL

Variables	Std. β	Std. Error	X² (C.R)	P
WE<--- PC	.533	.208	4.603	***
PRO <--- PC	.448	.118	3.849	***
PRO <--- WE	.294	.054	2.989	**
***p<0.001 **p<0.01 *p<0.05				

(PC: Psychological Climate, WE: Engagement, PRO: Professionalism)

FIGURE 1. THE REGRESSION LOADS BETWEEN THE VARIABLES OF THE RESEARCH MODEL
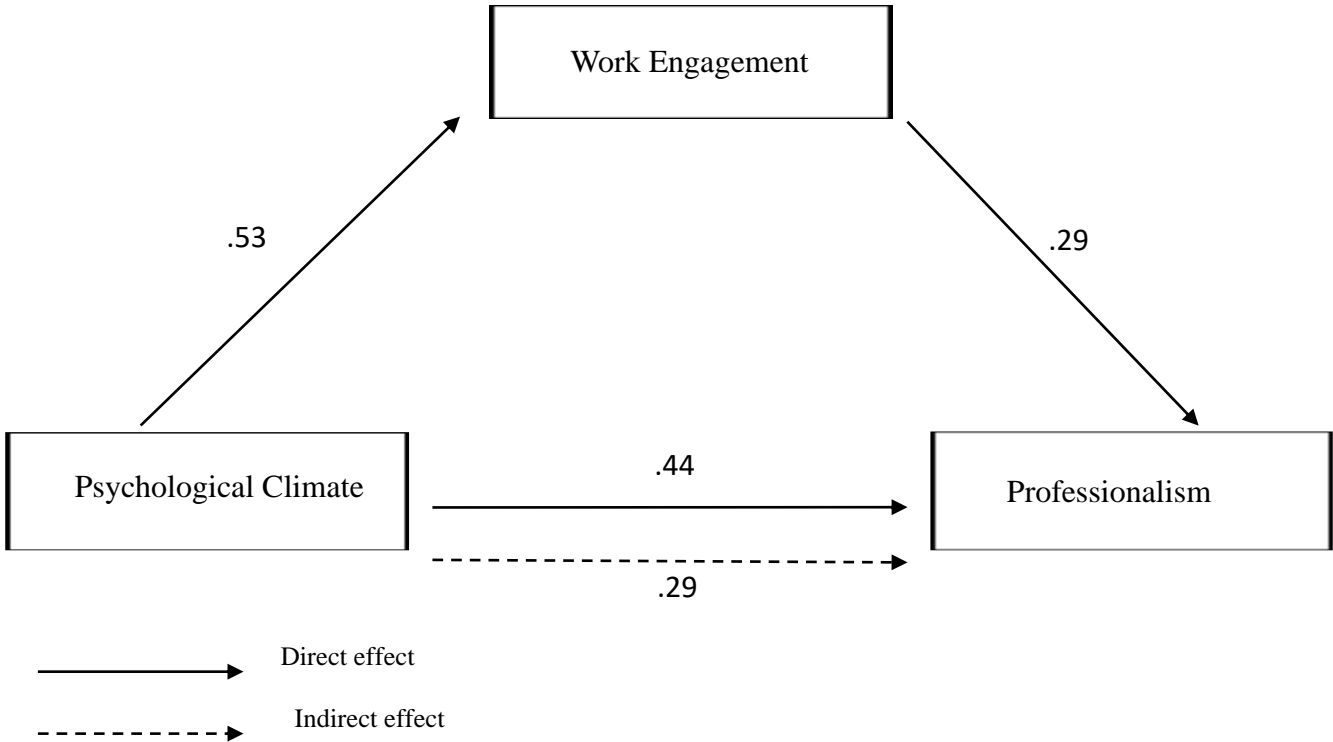
DISCUSSION

In this study, the effect of nurses' perceptions of psychological climate regarding their work environment on their professionalism through their level of work engagement was investigated. It has been determined that the nurses participating in the research have a positive perception about the psychological climate in general. It has been observed that this positive perception is an important factor for nurses to use all their resources energetically for their work, to devote themselves to their work, to adopt and internalize their work, and thus to engage in work. A similar effect plays a role in nurses' adoption of professional values and creating a professional identity. It shows that the level of work engagement has a partial mediation role in increasing the professionalism of the positive psychological climate perceived by the nurses constituting the research sample in the work environment. These findings obtained in the research are actually the results that can be predicted in line with the conceptual framework. In this respect, it can be said that the research questions about the research model were answered clearly.

According to the research model data, it was determined that the positive psychological climate perceptions of the nurses participating in the research have a positive effect

their work engagement levels (p<0.001) at significance level (.553). Based on this result, it can be said that the positive psychological climate they perceive in the work environment is effective in the full commitment of the nurses participating in the research to their work. These findings obtained; Gutierrez's research on service sector employees [26] and Lee and Ok's research on hotel employees show that it is consistent with the findings obtained from their research on hotel employees, and that employees' psychological climate perceptions are a determining factor on their level of work engagement [27]. The concept of work engagement emphasizes the psychological and emotional bond between the employee and his job. In this respect, this bond that the employee creates against his job will be affected by the psychological factors in the environment [28]. As a matter of fact, Kahn concluded that perceiving the organizational environment in a significant and secure way has a strong effect on the employees' giving all their energies to their roles in the workplace [29]. Brown and Leigh, on the other hand, found that if the employees think that their psychological needs are met by their organizations, they put all their time and energy into fulfilling their duties [30]. Uraon and Gupta also showed in their research that the positive psychological climate of employees is an important determinant of their task and contextual performance [31].

Considering the challenging and stressful conditions of the nursing profession, it can be stated in parallel with the above research results that the existence of a positive psychological climate in the work environment will be effective in overcoming the aforementioned difficult conditions and in developing a positive bond with the nurses' work.

Similarly, nurses' positive psychological climate perceptions positively affect their professionalism p<0.001 at significance level (.448). It can be said that positive psychological climate perceptions are effective for nurses participating in the research to define as professionals themselves. Professionalism requires the employee to act in accordance with moral and ethical rules, be aware of her responsibilities, always display a reliable stance, have professional sensitivities and altruism while performing her profession. These qualities may interact with different perceptual mechanisms in terms of attitudes and behaviors that emerge in line with the perceptions of the individual. Shao also emphasizes the importance of the attitude and behavior dimension of professionalism based on individual perception [32]. Similarly, Senapaty & Bhuyan state that professionalism is the behavioral aspect of the profession [33]. As a matter of fact, the results of the analysis show that the psychological climate, which is a perceptual process, may be related to the perceptions that form the source of nurses' attitudes and behaviors towards professionalism. Reaching of these values from a positive environment to the individual by positive ways will enable the individual to adopt these values and transform them into behaviors. If evaluated from this perspective, it can be emphasized will be affect the positive management style, culture and climate of organization on the source of the professional attitudes and behaviors of the nurses participating in the research. When the participants' work engagement levels are included in the research model, there is a decrease in the effect of psychological climate on professionalism (p<0.001 (.448); p<0.01 (.285)). Therefore, it is seen that work engagement has a partial mediating role in the effect of psychological climate on professionalism. In this respect, it can be said that the positive psychological climate perceptions of the nurses participating in the research also increase their level of work engagement and thus enable them to have a professional identity. In other words, although the positive psychological climate perceptions of aforementioned nurses' strongly increase their professionalism levels, it is seen that being engaged in the work partially renders this effect meaningless because it is a strong determinant on professionalism. For this reason, it can be stated that the effect of being engaged in work on professionalism is so effective that it can reduce the effect of the psychological climate.

CONCLUSION

The development of professionalism has an important role in determining the standards for any profession and in the satisfaction of service recipients. Otherwise, it will not be possible for the person to demonstrate his professionalism and the institution to achieve positive results. The scope of professionalism and its differences in practice will be shaped according to the qualifications of the profession whose professionalism is evaluated. In this respect, the concept of professionalism has been examined in line with the professionalism qualifications of the nurses, who constitute the sample of our research. Participants' perceptions of professionalism; moral and ethical behavior are discussed in terms of emotional and cognitive dimensions such as responsibility, trust, professional sensitivity and altruism. Due to this feature of the dimensions, it was examined the concept of professionalism within the framework of the concepts of psychological climate and work engagement in this study, considering that different psychological phenomena can strengthen it.

Nursing is one of the important occupational groups that require professionalism because it serves an important purpose such as human health. However, the professionalism expected from nurses does not only include the technical knowledge and equipment of the work they do, but also includes the attitudes and behaviors to be exhibited in line with the values of the profession. In this respect, a positive psychological climate that will be a source for the professional attitudes and behaviors expected from nurses should be created by the organization.

A supportive management of the organization, clearly revealing their job roles, making employees feel free to express themselves, and most importantly, making them feel that they are making a meaningful contribution to the hospital they work will enable nurses to engage in their work and act professionally through this situation.

As a result, the management's creation of a positive climate in the work environment will positively guide nurses' perceptions of the organization, and eventually these

perceptions will turn into attitudes and behaviors that the organization expects them to exhibit.

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RESEARCH ARTICLE

ACCESS TO ESSENTIAL MEDICINES IN INDIA: THE ROLE OF INNOVATIONS, PATENTS, AND INTELLECTUAL PROPERTY RIGHTS

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ABSTRACT

The role of essential medicines is to smoothen life and overall improvement of health in the society. However, increased demand for medications and the role of patent rights are forcing a lack of access to essential medicines. Innovations in crucial times helped solve many population issues. Despite the availability of medication technology, there is a shortage or non-availability of essential medicines in various parts of the world. This is indirectly attributed to the existing patent laws and intellectual property rights. This paper argues in favour of and against the pharmaceutical sector's patent laws in the context of access to medicines. Further, access to medicine is discussed in the context of the non-availability of medications among the vulnerable population in India and the world. The Indian setup helps in acquiring world technologies in various business negotiations. There is also a need for support in terms of resources and ecosystems in India for further development. Given that multi-national companies are interested in the Indian market, many things can be done quickly. However, the gain in the patent rights may not help solve the issues of access to essential medicines. Public financing for research can be much more useful for access to medicine. Overall, patent rights must not be a hurdle for addressing public health issues in the process of increasing access to medicines.

KEYWORDS

Pharmaceutical Industry, Food and Drug Administration, Access to Medicine, Patent exploitation, Research and Development, Vulnerable population, Generic drugs

INTRODUCTION

Essential medicines are used to treat "diseases that destroy human lives" [1]. The diseases that require essential medicines include cancer, HIV/AIDS, malaria, tuberculosis, and many more in human history. The present paper highlights the impact of patents and Intellectual Property Rights (IPRs) in accessing essential medicines irrespective of the disease. The price of individual essential medicines is not a matter of concern for patients or the government. A basket of essential medicines' price, availability, and affordability is measured on an authentic scale to know the accessibility [2]. Millions of lives can be saved if access to essential medicine becomes a reality. The essential medicines are distinguished from medicines for hair loss, acne, impotence, and many more diseases. To be precise, the smoothening of life is not a big concern for improving health in society. However, increased demand for medical sciences forces the research and innovation to develop many medications used for overall well-being. World Health Organization (WHO) recognises essential medicines with features like population priority, healthcare needs,

relevance, efficacy, safety, and cost-effectiveness [1]. Hence, essential medicines are socially valuable goods, and they should not be obstructed from access for vulnerable people due to patent protection laws; every individual should get essential medicine irrespective of his social or economic status.

Before we get into the unequal accessibility to essential medicines and consider patent laws as one of the most decisive factors affecting access, it is necessary to discuss the rationality of the law. Overall, in a nation, patents are granted as an exception to reward hard-earned discoveries and inventions in lieu of complete disclosure of the entire process for the benefit of further development in the domain of knowledge. That means if all patents are granted, the objective stands for the clear benefit of society in the long run. However, scientific innovation is often hampered due to the high level of commercialisation in the world. The fruits of research must reach many people, especially those suffering from illness. Many intellectual circles discuss public health issues that must be out of the ambit of dirty patent protection to save millions of lives. The innovators, governments, multilateral bodies, and other stakeholders must solve the problem of access to medicine across the globe. The sharing of knowledge for a disease-free society is in the interest of the entire population. The high-income countries seldom face problems accessing essential medicines due to their high-paying capacity. On the other hand, low and middle-income countries (LMIC) have suffered heavy losses due to a lack of financial provision and regulatory challenges. Public health laws across the world have to serve the vulnerable population to bring goodwill rather than hurdles for most of the world's population.

LITERATURE REVIEW

This paper tries to determine the impact of IPRs in modern-day pharmaceutical industries and the provision of essential medicines to the Indian population. Further, the roles of the Indian government in ensuring the provision of medications to vulnerable people have been discussed. The study critically reviewed various positive and negative aspects of IPRs from relevant authoritative literature curated from Scopus, WoS, J store, Proquest, PubMed, and Embase. The following thematic areas are highlighted with logical arguments in the Indian context of IPR issues and access to essential medicines. This paper is a commentary on an important issue that is leading to inaccessibility to essential medicines, which is patenting on drugs. Critical inferences are drawn from research papers published across the aforementioned reputed databases.

ARGUMENTS IN FAVOR OF THE PHARMACEUTICALS PATENTING

Despite the constant need for new medicines to combat emerging diseases and health challenges, drug development is costly, risky, and challenging. Scherer [3] writes a pharmaceutical producer wants a patent to protect his market interests for a product that has survived rigorous scrutiny from regulatory authorities. A pharmaceutical producer faces costs, risks, and challenges that should be compensated with patent protection rights. The pharmaceutical industry is a field that thrives on innovations [4], which provides the industry with optimal sales and profits [5]. Pharmaceutical firms are driven by innovation competition [6, 7]. The companies that innovate more and more can gain and sustain themselves in the pharmaceutical market competition. The competitive environment keeps the industry moving and transforming itself with positive changes [8].

Growth in the Indian Pharmaceutical Industry (IPI)

Due to affordable patent regime, the Indian pharmaceutical industry grew by leaps and bounds over several decades. Indian government vehemently tried to protect the access to medicine by Indians initially, but in the latter part, it also succumbed to the pressure of world trade-related laws, which served the interest of the Western world. Sethi et al. [5] and Kamiike [9] analysed that in the post-TRIPs agreement, Indian pharmaceutical companies have grown faster than ever, and due to other conducive environments, the industry has attracted Western pharmaceutical companies to establish in India. India has quickly recorded its presence in the global pharmaceutical sector. Now, India is a leading manufacturer and supplier of drugs, active pharmaceutical ingredients, and vaccines [5, 9].

Global vaccine demand met by IPI	50%
Global pharmaceutical production by volume	Rank 3rd
Global pharmaceutical production by value	Rank 14th
The expected growth by 2030	$130 billion
Generic export contribution globally	20%

Source: (India Brand Equity Foundation, 2021)

Although IPI is not a patented drug hub but is well-grown in the generic pharmaceuticals market, the patented pharmaceutical market has yet to be developed in India. The large pharma companies that have generic drug manufacturing units has to increase their investment in R&D in India to compete in the international patented pharmaceutical competition [10]. Few pharma companies are engaged in R&D, but the industry has to go a long way to be called innovation driven [11].

The case of the U.S. pharmaceutical industry and rationale behind IPRs

Taking the U.S. as an example, Scherer [3] defined the innovation and market strategy situation for pharmaceutical firms. Pharmaceutical R&D/sales ratios were nearly five times those of their all-manufacturing counterparts in other sectors (1999-2003). Despite expedited timetables, time lags in various phases of research to produce new pharmaceutical products for rare and incurable diseases is a matter of concern for producers. Despite significant advances in computer-aided drug design, low-cost molecular manipulations, and screening, the expected pace of drug discovery was not realised. It either stagnated or declined between 1990 and the early twenty-first century. The reason for this stagnation was identified as inventory costs of long-established pharma products. The new drug must prove safer and more efficacious than the earlier established drug. The process of identifying new drugs has become lengthy and elusive in recent decades [3].

The drug companies highly favoured product patents because the involvement of patents gives them the right to regulate the prices of their products. Price regulation is a right of pharmaceutical companies because they invest hugely in drug development. The time lag in finding a new product, clearing all clinical trials, and assuring FDA regulations makes them eligible for patented earnings of several years. In the absence of patent laws, imitators can immediately erode the quasi-rent of the R&D process [3]. The environment of innovation directly benefits

the consumers, whereas no patent regime negatively affects the interests of innovators and discourages innovations [5].

Pharma companies were ranked as the highest margin earning industry. They were allegedly flourishing on consumer expenses. However, as argued by pharma companies, there is a methodological error in calculating the margin. The evaluations are done using the current year's expenditure and sales outlay, while the costs are almost a decade-long investment [3]. Due to high failure rates, repeated clinical trials, and lags in administrative processes to carry forward the research, ensuring the safety and efficacy of medicines causes the final product price to go up incessantly [12]. Hence, drug companies do not earn supranormal profits, but they try to compensate for the expenses incurred in the long run [3].

Developing new drugs and vaccines for third-world diseases is left unanswered in the patent regime. Only a few relaxations and subsidies were agreed upon, but no sustainable solution was provided. "Rich consumers in developed countries are able and willing to pay, either directly or through taxes and transfers, for an ample array of drugs to combat the diseases and debility affecting them" [3]. However, some diseases are common in developing or low-income countries but not in developed countries. Drug companies are interested in developing medicines for diseases prevalent in low-income countries [3]. People can hardly afford to pay for patented medicines [13]. Drug producers see a meagre chance of getting a positive return [3]. The question arises: who will pay for the impoverished citizens of low-income countries on the discretionary prices set by pharma companies? Developed countries invest in research and development (R&D) of essential medicines while developing and least-developed countries (LDCs) lack the resources to invest in R&D [3]. LDCs are recognised as needy of essential medicines, but developed nations still allow pharmaceutical companies to take advantage of patents

to ensure profits [1]. For example, the demand for essential medicines in African countries was so high that only 30% of the population had access to these medicines, combining private and public health facilities [14]. Also, the share of medicine cost to total healthcare spending is around 61.83% and 72.7% in rural and urban areas, respectively, in India [15].

Dropping pharmaceutical prices and improving medication accessibility could have both positive and negative financial implications for pharmaceutical companies, impacting their revenue, market demand, supply chain costs, profit margins, competitive landscape, and relationship with government policies [16].

ARGUMENTS AGAINST THE PHARMACEUTICALS PATENTING

IPRs were adopted in the World Trade Organization's (WTO) Trade-Related Aspects of Intellectual Property Rights (TRIPs) agreements in 1995 [13]. Although, from 1990 onwards, developed countries have started introducing IPRs in their economies. World Trade Organization (WTO) made it mandatory for all the members and those interested in being member countries to accept all the provisions in the TRIPs agreement. The member countries were obliged to ensure patent protection on every invention, which applies to products and processes for a minimum duration of twenty years. Developing countries were given a transition period relaxation to implement the patent protection laws by 2005, while least developed countries (LDCs) were provided patent protection relaxation till 2033 [13]. Despite these relaxations, low-income countries still lack essential medicines. The inaccessibility in LDCs was not a new phenomenon post-TRIPs compliance. Other factors, such as poverty, small market size, the absence of generic substitution regulations, and low local production capacity, were older issues affecting accessibility [13, 17]. Nevertheless, TRIP compliance was stringent enough to aggravate the inaccessibility issue further. In a non-patent regime, the poor can afford generic medicines, but they are left under-treated or untreated in the patent regime [13].

Government intervention to reduce pharmaceutical prices can have significant financial implications for pharmaceutical companies, affecting their profitability, R&D capabilities, market position, and global operations [16]. Further, a country may face international sanctions if that country acts against international agreements like TRIPs of 1995 [18].

To tackle the problem of providing essential medicines at an affordable price, countries (Australia, Japan, and the Republic of Korea) have implemented measures such as tax exemptions, reference pricing policies, and regulatory interventions in the pharmaceutical supply chain [19]. These steps aim to improve access to essential medicines while ensuring affordability for the population. However, the other side of this is the loss of revenue for national governments; therefore, these measures are not sustainable for low-income countries [16].

The flaw in the idea of IPR

The intellectual property rights of drug innovators go against the logic of owning physical property rights [12]. For example, if somebody owns a piece of land, he decides to make a house with an entrance in the north direction. Another owner with another part of the land wishes to make the same house with access facing north. Then, the earlier landowner should not enforce or threaten another landowner of the legal suit. Principles of physical property rights can be contradictory to intellectual property rights. It raises a valid question: Why should an owner of a particular asset not be free from disposing of his asset as he wishes? There could be several chemical owners that produce a specific medicine molecule, so why should only one owner be entitled to make that molecule? In contrast, others are debarred from making that molecule.

Flaws in the arguments of R&D

It is argued that patent protection will help pharmaceutical companies to invest in R&D [13]. The TRIPs patent protection was granted on both compound and process. The first originator firm will get primary patent protection. Later, when R&D progresses, and other medicines develop using the same compound, they will be granted secondary patents based on forms, dosages, and formulations. Reverse engineering was prohibited in the patent regime to protect the interest of innovators [13]. Over the years, R&D has favoured the least important health issues against several severe illnesses and diseases prevalent in developing countries in the patent regime [13]. Pharmaceutical firms avoid investments in primary patenting to create new molecules to treat serious health problems because it involves uncertainties and risks. Despite that, they prefer to invest in secondary patenting of low-risk and high-profit R&D [20].

Failing the generic medicine market

In the patent protection environment, generic medicine manufacturers were ruled out to ensure the profit of

innovator firms [13]. Generic pharmaceutical manufacturers were blamed for maximising their profits by expanding their market by lowering the prices of medicines; in reality, it is a healthy competition that protects the interests of consumers [13]. Large pharmaceutical companies limit the availability of patented drugs. They practice the power of a monopolist by holding patent rights. Large firms with patents do not wish to enter patent-free markets due to low prices set by generic competition [21, 22].

Positive discrimination against the majority population

The availability of new innovative drugs is not a function of supply and demand in a patented regime. New drug availability becomes subject to price control policies, firm characteristics, and the regulatory environment. If drug prices are high, firms are profit-oriented, and they have the autonomy to decide their production level. There is a very high chance that low- and middle-income countries face the unavailability of new medicines [23]. The positive discrimination of firms operating under a patent regime was evident in a study undertaken by Cockburn et al. [24]. Taking into consideration the various income levels in deciles for the year 2005, Pogge [12] had shown that the wealthiest twenty percent of the world population accounted for 87.4% of total earnings, and the patent holders target to serve only those twenty percent population while neglecting the remaining eighty percent. Although there is the capacity to produce large-scale essential medicines, the patent holders had to reduce the prices drastically, but they lacked motivation [12]. The TRIPs agreement has enhanced the profit-seeking nature of pharmaceutical R&D. The income inequalities have led pharmaceutical innovators to prioritise the health problems of the affluent class. Minor issues such as hair loss, erectile dysfunction, and minor skin problems attract most of the R&D resources because there are higher margins in profit. In contrast to minor ailments, serious diseases such as dengue, malaria, and tuberculosis receive the least R&D resources [3, 12]. Pharmaceutical innovators are incentivised to smaller volumes over smaller markups [12].

In the TRIPs agreement, developed nations lobbied to pressure the developing countries to open their markets for global trade. The market's opening had never helped the poorest people access their needed medicines. The market opening helped originator drug developers maximise their customer base and profiteering by serving the rich everywhere, including developing countries [12].

Tier or differential pricing

The R&D-based firms can tier the prices of products based on local income distributions. However, originator firms lack interest in the tier pricing scheme in countries with high-income inequality. Instead, they sell lesser quantities, serving only a tiny population with high incomes [25, 26]. Differential pricing was suggested to promote availability and accessibility across the countries under the patent regime. Differential or tiered pricing systems allow firms to sell their products at different prices in different markets. For example, firms can sell their patented product at lower prices in lower- and middle-income countries while charging a higher fee in high-income countries [27]. This mechanism demands income homogeneity or marginal income inequality within the country where the drug is introduced. However, low-income countries show high income inequalities. In that case, when a drug innovator launches a product, he sets a price based on the average per-capita income. Although average per-capita income is misleading in the high-income inequality case, it will exclude many people from access to essential medicine [12, 26].

However, originator drug price differentiation has shown minor adjustments to local income levels, while generic drugs have higher price differentiation to local income levels. Therefore, generic price differentiation is better than originator drug price differentiation [13]. The provision of generic medicines for infectious diseases (i.e., HIV/AIDS, malaria, and tuberculosis) is much more adjustable to local income levels. Low- and middle-income countries have extensively benefitted from infectious disease generic medicine [13].

Also, the affordability of essential drugs for people living in LMICs is often measured in terms of the number of days' wages needed to purchase the medication. In the context of China, the affordability of essential medicines was measured in terms of the number of days' wages of the lowest-paid unskilled government worker. It was found that the median affordability of essential medicines in China was equal to 0.88 day's wage for the lowest-paid unskilled government worker. This suggests that essential medicines would become unaffordable if they cost more than the equivalent of one day's wage for the lowest-paid unskilled government worker [28].

PATENT REGIME AND ITS IMPACT ON DRUG MANUFACTURING

In independent India, the first formal patent act was introduced in 1972. This law allowed patents on the process and not on the product. However, in 1995, with the introduction of Trade-Related Intellectual Property Rights (TRIPs), patented drugs were protected by both process and product [29, 30]. In the pre-TRIPs era, generic manufacturers benefitted from a flaw in the patent law. Generic manufacturers produced large-scale generic drugs by reverse-engineering the patented process. The reverse engineering included the alternate manufacturing method by adding or subtracting some molecules, ensuring that the generic medicine should maintain safety and efficacy same as the patented drugs [31]. The capital expenditure of producing a drug is lower than the capital cost of discovering a new molecule [5, 12]. Generic brands established in India highly benefitted from the Patent Act 1972. Pharmaceutical firms in India quickly developed an alternate patent process for new drug manufacturing and enjoyed higher revenue without investing in R&D [5].

Being a member of WTO, India had to sign and accept the TRIPs agreement. The TRIPs agreement was detrimental to the capacity of domestic generic brands and, hence, the availability of affordable drugs in the country. India was provided ten years to become TRIPs compliant [32]. The pre-TRIP patent rights provision was extended from seven to twenty years [12, 33]. Domestic generic drug manufacturers were forced to invest in R&D as they could not pursue different processes or reverse engineering to make a similar drug as patented [5].

There is no large-scale research on increased R&D and its impact on India's patenting and profitability [5]. However, there are sufficient studies on trends in R&D activity, the effect of innovation on export, and patenting activity in India [34–36]. The positive impacts of R&D on India's drug manufacturers are yet to be researched and documented in the research sphere.

THE RATIONALE BEHIND THE IPR TRADE REGIME

The economic problem of knowledge generation is that it is non-rivalrous and easy to replicate and reproduce [21, 22, 37]. The innovator cannot control the accessibility of their invention after the knowledge comes into the public domain. The innovator may seek benefit or reward in return for his knowledge creation. There is a social need to reward inventions by providing economic and social incentives for innovations. The case is valid for essential drugs when innovators were left with the option to collect their rewards directly from the users of their products in international trade negotiations. Essential goods like life-saving drugs are desired and sought for the public interest. If essential drug inventions are treated the same as other non-essential inventions, i.e., malaria treatment equal to a hair transplant procedure, significant losses of lives would be inevitable. People suffer physically for a longer time and die despite a cure because they cannot pay for the cost of R&D involved in the needed treatment [38]. Duplication and the problem of free riding can be applied to non-essential and luxurious inventions, but providing essential drugs promptly is a social right of all human beings across the globe. However, the economic incentives for innovators remain unanswered within the 'essential drugs provision to all' argument, i.e., who will pay for those who cannot afford it? The role of governments becomes pivotal in ensuring the balance between innovators' economic rights (rewards) and individuals' social ownership [38]. The early IPR policies of the industrialising countries in the nineteenth century were such that governments mediated in solving the economic problem of innovators while keeping the greater public interest for essential goods easily accessible (the active social welfare policy). That led to the technological and economic progress of the Global North [37].

However, developing countries resist the stringent IPR regime called TRIPs [39]. The burden of IPR provisions was such that governments in developing countries could not pay for the discretionary prices set by innovator firms. Brazil and India led anti-TRIP lobbying in international trade negotiations of the last Uruguay round (1995). However, they failed to make necessary changes in the statute [39].

CONCLUSION

The paper clearly shows evidence regarding the lack of access to essential medicines due to various aspects of the patent regime. Providing patent rights needs to be relooked to facilitate access to medicines, especially in LMIC. The support for innovation must be there from the government to take new initiatives to discover drugs, assuming that someday, the drug innovators would serve humanity better through their new molecules. Being heavily relied upon by Western countries for technology, India has to augment research and development. Public funding for research can help bridge the inconvenience in access to medicine. Despite patent rights, some public health arrangements must exist to increase access.

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CONFLICT OF INTEREST:

None

ETHICAL APPROVAL:

Was obtained from institute's ethical clearance committee.

CONSENT TO PARTICIPATE:

A written consent was obtained from participants before beginning the study.

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MEDIATING ROLE OF THE PSYCHOLOGICAL CONTRACT BETWEEN INERTIA AND ORGANIZATIONAL PERFORMANCE OF HEALTHCARE PROFESSIONALS IN RADIATION FIELDS

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ABSTRACT

BACKGROUND/AIM:

This study aims to reveal the mediating role of the psychological contract with regard to the effect of inertia on the organizational performance of healthcare workers in radiation.

MATERIALS AND METHODS:

The data were collected by using a survey. The questionnaire form consists of four parts. The first part included the "Inertia Scale" second, the "Psychological Contract Scale", third part "Organization Performance Scale,", fourth, questions regarding the socio-demographic characteristics of the participants were included. The target population was the 745 healthcare professionals working in the field of radiation from hospitals in the city of Konya, Turkey; thus, no sampling method was selected and an attempt was made to cover the entire population. A total of 419 healthcare professionals agreed to participate in the study. Process Macro Model 4 structural equation model were used in the analyses of data, descriptive statistics, validity and reliability, and correlation.

RESULTS:

Inertia has a negative effect on the psychological contract (β = - 0.455). The psychological contract has a positive effect on organizational performance (β = 0.823). In addition, inertia has a negative effect on organizational performance (β = - 0.311). This effect increases (β = - 0.143) with the addition of the mediating role of psychological contract.

CONCLUSION:

The psychological contract loses its effect and reduces organizational performance due to inertia. Therefore, inertia is one of the issues that merits research to increase organizational performance.

KEYWORDS

radiation fields, healthcare professionals, inertia, psychological contract, organizational performance

("This study was produced from Halil TÜRKTEMİZ's PhD thesis")

Mediating Role of the Psychological Contract between Inertia and Organizational Performance of Healthcare Professionals in Radiation Fields   1

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INTRODUCTION

Nowadays, new information constantly emerges because of rapidly advancing technology and science. To ensure their survival, institutions must stay abreast of scientific advancements, prioritize innovation, and continuously update themselves. However, institutional inertia can hinder their ability to stay up to date. Inertia may lead to inaction, stagnation, laziness, passivity and, thereby, cause adverse effects on productivity [1]. Inertia, can be defined as a situation that reduces individual productivity, prevents timely update, causes resistance to learning new things, and leads to delayed actions.

Employees commonly cope with problems by referring to existing knowledge and experience. This strategy, namely, "information inertia" [2], is defined as individuals learning information from the same source. In other words, employees receive information from individuals that closely relate to themselves rather than the best performers in organizations [3]. Moreover, information inertia may be divided into two types, namely, learning and experience inertia [2, 4, 5].

Organizational performance expresses whether the company effectively carries out administrative and operational functions and produces actions and outputs in accordance with its mission [6]. Organizational performance is defined as the output of the company activities or the achievement of its goals [7, 8]. A focus on the elements that can increase the individual employee performance is necessary to improve the organizational performance. In addition, if organizations wish to create a competitive structure to maintain their survival, the removal of managerial and organizational inertia is inevitable [9]. Otherwise, organizations that show inertia in thinking and policy making may face loss and failure [4].

The psychological contract is commonly defined as the beliefs regarding the mutual obligations between employees and their organization [10, 11]. The primary focus of the psychological contract is the individual-level relationship between the employer and employee [12]. Given that these mutual expectations are not limited to the conditions in the formal contracts, several psychological contracts may have emerged [13] that are subjective and not legally binding for the parties. Yet, these contracts have a strong influence on behavior, with their general basis on the beliefs of the involved parties

and especially the views of the employees regarding the nature of the employment relationship under which they work [14]. In addition, psychological contracts are generally considered as transactional and relational [15]. The psychological contract is an important factor in closing the lack of agreement between organizations and employees. Therefore, satisfying the psychological contract for both parties can positively affect the performance of the organization. For managers, psychological contracts are critical because of their potential to be one of the strongest practical drivers of business success [17].

Healthcare professionals working in radiation fields have fewer working hours and longer vacation periods compared to other healthcare professionals. This situation differentiates healthcare workers in radiation fields from other healthcare professionals in terms of their working conditions. Considering that these healthcare professionals working in radiation fields have distinct organizational behavior practices, studies targeting this group become necessary. In fact, it is possible that the psychological contract is more evident in the relationship between inertia and organizational performance of people working in the field of radiation. Furthermore, there is limited research on organizational behavior specifically focused on this group. Inertia is one of the main problems that causes difficulties for organizations to adapt to changes and reduces their performance and efficiency [20]. The psychological contract can help increase job satisfaction and performance [21]. From this perspective, this study aims to reveal the mediating role of the psychological contract in the effect of inertia behaviors on organizational performance of healthcare workers in the field of radiation.

THEORETICAL BACKGROUND AND HYPOTHESES OF THE STUDY

One of the factors that increases employee performance in business is employees finishing their work on time and not delaying it. However, inertial workers "…act as if dead soil has been sprinkled on them" and usually take action when their work deadline approaches [22]. Çankaya and Demirtaş [23] declared that inertia negatively affects performance. Based on this information, the H1 hypothesis was established as follows:

H1: Inertia behaviors affect organizational performance.

Individual inertia is defined as the lethargy, sluggishness, slow movement, and reluctance observed in individuals, and their not taking action to achieve the goals [24]. In the relationship between the employer and employee, mutual obligations are partially recorded in the written and official employment contract but are mostly implicit, confidential, and rarely discussed [25]. When a person joins an institution, opportunities for advancement, salary, status, office space and decor, amount of hard and tedious work etc. expectations are formed. The institution is also from that person; technical skills, time and energy commitment, communication ability, supervisory skills, loyalty etc. expects it to work [11]. Given the thought that inertia may be an obstacle to meeting employer expectations, H2 hypothesis is proposed as follows:

H2: Inertia behavior affects the perception of psychological contract.

Within the scope of the psychological contract, expectation theory demonstrates that making an effort

reveals the performance, which in turn will provide the reward [26]. Employees' thoughts, perceptions, beliefs, chance and probability estimates, and other similar factors strongly affect their motivation, performance and behavior [27]. Therefore, based on the idea that the psychological contract affects performance, H3 hypothesis is proposed as follows:

H3: Psychological contract perception affects organizational performance.

Based on H1, H2, and H3 hypotheses, the H4 hypothesis is proposed to reveal how psychological contracts can affect the possible effect of inertia on organizational performance as follows:

H4: Psychological contract perception has a mediating role in the effect of inertia behaviors on organizational performance.

Considering the above hypotheses, the model was established as shown in Figure 1.

FIGURE 1. GENERAL VIEW OF THE STUDY MODEL
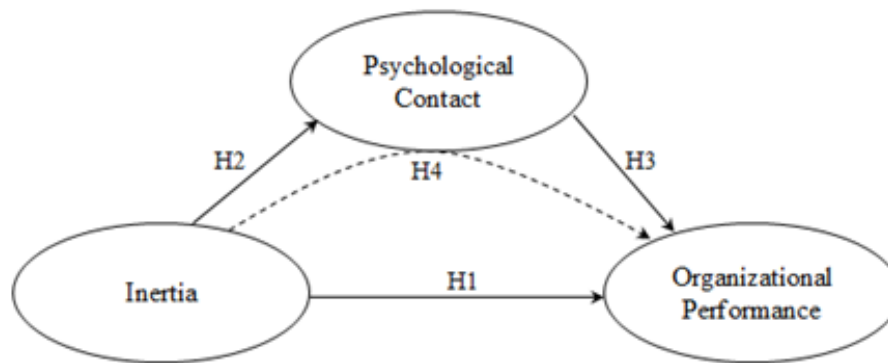
METHOD

The data were collected by using a survey. The questionnaire form consists of four parts. The first part included the "Inertia Scale" developed by Liao et al. [4] and adapted into Turkish by Çankaya and Demirtaş [1] for the learning inertia sub-dimension and Çankaya [23] for the experience inertia sub-dimension. Secondly, the "Psychological Contract Scale" developed by Millward and Hopkins [28], adapted into Turkish by İyigün and Çetin [29], was used. The third part included the "Organization Performance Scale," which was validated as reliable by Karabetyan [30]. Fourthly, questions regarding the socio-demographic characteristics of the participants were included.

Among healthcare workers, those in the field of radiation have less shifts and more leave and thus differ from their peers in terms of working conditions. Therefore, the present study examines the population of 745 healthcare professionals in the field of radiation 4 state, 2 university and 7 private hospitals in the city center of Konya in Turkey. No specific sampling method was employed; instead, attempts were made to reach the entire population through a combination of face-to-face and online survey methods. A total of 419 (56.24%) people accepted the study invitation and returned the questionnaires in accordance with the set evaluation.

In addition to Amos and Lisrel, SPSS Process Macro was used for mediation analysis. SPSS Process Macro is a logistic regression path analysis modeling tool that is widely used in social, business, and health sciences to predict direct and

indirect effects in single and multi-mediator models (parallel and series) [31]. For this reason, SPSS Process Macro Model 4 regression analysis was selected to test the hypotheses. The package program for SPSS 20.0 was used in the descriptive analysis.

Before the study, approvals were obtained from the Health Sciences Ethics Committee of the University of Süleyman Demirel (09/03/2020-40/2). In addition, permission was obtained from the hospitals for the study.

LIMITATIONS OF THE STUDY

The data were collected during the COVID-19 epidemic, which led to difficulties in reaching the entire target population. Three private hospitals in the city center of Konya did not allow research to be carried out, and thus were excluded from the survey. In line with the purpose of the study, the questionnaires were applied to health workers in the field of radiation and those carrying dosimeters. Other healthcare workers were excluded and can be examined in future study.

RESULTS

Among the participants, 60.1% were male and 70.9% were married. The average age was approximately 35. The majority had 16 years or more of work experience (30.3%), were associate degree graduates (39.1%), and worked in a university hospital (50.6%). In terms of field, 9.3% of the participants were physicians, 57.8% were radiology technicians/technicians, and 32.9% were other health workers (nurse, health physicist, operating room technician, health technician/technician, biologist, and support staff).

Table 1 shows the reliability analysis of the scales used in the study. The Cronbach's Alpha value should be between 0.70 and 0.95 for the scale to be considered reliable in social sciences [32]. Therefore, considering their Cronbach's Alpha values, the scales in this study were at an acceptable level.

TABLE 1. CRONBACH'S ALPHA VALUES

	Cronbach Alpha	Number of Items
Inertia	0,712	13
Psychological Contract	0,815	17
Organizational Performance	0,912	12

TABLE 2. EFFECT OF INERTIA ON ORGANIZATIONAL PERFORMANCE

Dependent Variable	Independent Variable	Regression						Model Summary		
		β	S.E.	t	p	LLCI	ULCI	R^2	F	p
OP*	**Constant**	4,520	0,258	17,500	0,000	4,012	5,027	0,072	32,321	0,000
	IN**	-0,455	0,080	-5,685	0,000	-0,612	-0,297			

*OP: Organizational Performance, **IN: Inertia.

Table 2 shows the results of the regression analysis regarding the effect of inertia on organizational performance. The model was statistically significant (F = 32.321, p = 0.000) and inertia negatively affected organizational performance (β = -0.455). In line with the findings, H1 was accepted.

Table 3 shows the results of the regression analysis on the effect of inertia on the psychological contract. The model was statistically significant (F = 8.068, p = 0.005), and inertia negatively affected the psychological contract (β = -0.174). In line with the findings, H2 was accepted.

Table 4 shows the results of multiple regression analysis regarding the effect of inertia and psychological contract on organizational performance. The model was statistically significant (F = 163.827, p = 0.000). In addition, inertia negatively affects organizational performance (β = -0.311) and the psychological contract positively affects organizational performance (β = 0.823). In line with the findings, H3 hypothesis accepted.

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TABLE 3. EFFECT OF INERTIA ON THE PSYCHOLOGICAL CONTRACT

Dependent Variable	Independent Variable	Regression						Model Summary		
		β	S.E.	t	p	LLCI	ULCI	R^2	F	p
PC*	Constant	3,742	0,198	18,918	0,000	3,353	4,130	0,019	8,068	0,005
	IN**	-0,174	0,061	-2,840	0,005	-0,294	-0,054			

*PC: Psychological Contract **IN: Inertia.

TABLE 4. EFFECT OF INERTIA AND THE PSYCHOLOGICAL CONTRACT ON ORGANIZATIONAL PERFORMANCE

Dependent Variable	Independent Variable	Regression						Model Summary		
		β	S.E.	t	p	LLCI	ULCI	R^2	F	p
OP*	Constant	1,440	0,274	5,263	0,000	0,902	1,978	0,441	163,827	0,000
	IN**	-0,311	0,063	-4,963	0,000	-0,435	-0,188			
	PC***	0,823	0,050	16,558	0,000	0,725	0,921			

*OP: Organizational Performance, **IN: Inertia, ***PC: Psychological Contract

TABLE 5. MEDIATOR ROLE OF PSYCHOLOGICAL CONTRACT IN THE EFFECT OF INERTIA ON ORGANIZATIONAL PERFORMANCE

Direct Effect			Effect	S.E.	t	p	LLCI	ULCI
IN		OP	-0,311	0,063	-4,963	0,000	-0,435	-0,188
Indirect Effect								
IN*	PC**	OP**	-0,143	0,052			-0,249	-0,043
Total Effect			-0,455	0,080	-5,685	0,000	-0,612	-0,297

*IN: Inertia, **PC: Psychological Contract ***OP: Organizational Performance

Table 5 shows the results of the analysis regarding the mediating role of the psychological contract in the effect of inertia on organizational performance. The inertia negatively affects organizational performance (β = -0.311) and the psychological contract exerts a mediating role in this effect (β = -0.143). According to the model, inertia has an overall negative effect on organizational performance (β = -0.455), both direct and indirect. In line with the findings, H4 hypothesis was accepted.

DISCUSSION

In this study, the results show that inertia has a negative effect on organizational performance, which is in agreement with the literature that reports that inertia negatively affects the performance, efficiency, and effectiveness of both individuals and organizations [33, 34, 23, 1, 20].

In a psychological contract, the trust develops from the belief of a relationship in which contributions are reciprocated and the actions of one party depend on those of the other [35]. When the conditions of a psychological contract are met, employees can exert greater effort than normal to fulfill their responsibilities. In this study, inertia has a negative effect on psychological contract. Therefore, inertia among employees may cause lack of effort and reduce the perceptions of psychological contracts.

In addition, the psychological contract has a positive effect on organizational performance, which is in agreement with the previous literature. Üçler and Bal Taştan [36] found a positive relationship between the psychological contract and employee performance behaviors. Acaray [13] demonstrated that the violation of the psychological contract has a negative effect on task performance. Elden [37] reported a negative relationship between the psychological contract violation and job performance. Thus, performance increases with an increase in the perception of psychological contract, and violation of the psychological contract decreases performance.

While inertia negatively affects organizational performance, the psychological contract positively affects

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organizational performance [38, 39]. In this study, the negative effect of inertia on organizational performance increases when the mediating role of the psychological contract is added. The possible reason for this could be the negative effect of inertia on the psychological contract. Therefore, the inertia behaviors of the employees must be reduced to increase the effect of the psychological contract perceptions on organizational performance.

CONCLUSION

This study shows that inertia reduces organizational performance, indicating that inertia is one of the important problems in business. Health professionals in the field of radiation assist physicians in the diagnosis and treatment of health services. Therefore, their inertial behavior and poor performance hinders the efficient diagnostic and treatment for patients. In addition, the psychological contract increases organizational performance. However, previous results show that the psychological contract decreases in effect and reduces organizational performance due to inertia. Therefore, research aimed at increasing organizational performance must pay attention on issues concerning inertia.

Especially for those working in the radiation field, being separated from the workplace compared to other employees due to the risky area where they work may cause them to move away. This can be a significant threat to employees' alienation from their work. The psychological contract can positively affect this alienation. Therefore, managers need to be much more careful when making promises to employees. This situation should be reflected especially in human resources policies.

In order to increase organizational performance, managers need to constantly communicate with radiation employees. During the communication process, motivating words should be spoken to eliminate organizational inertia and meetings should be held with this focus. Priorities should always be clearly explained to employees in the organization. If there is a contract violation, organizations should make sure that they treat employees fairly, and traces of injustice perception in the employee's mind should be erased through open communication.

The inertia of health workers in the field of radiation plays a key role in realizing corporate goals. For this reason, strategies must be developed to overcome such inertia.

Joint meetings of minds, where employees at least once a year will share their knowledge and experience with each other regarding business processes, can prevent inertia. Managers may attach importance to the psychological contract after taking precautions against inertia to realize the organizational goals and increase their performance. In this context, future studies can determine and develop strategies to meet the mutual expectations of employees and managers, providing a fair and rewarding working environment for both parties.

In order to bring a new perspective in future studies related to this research, it is important to examine whether the effects of psychological contracts on the variables of job satisfaction, organizational commitment, perception of injustice, organizational citizenship and intention to leave are marginal in order to reach different results.

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RESEARCH ARTICLE

DEVELOPMENT AND VALIDATION OF A QUESTIONNAIRE ASSESSING CHALLENGES AND COMPETENCIES OF CRISIS LEADERSHIP IN THE PUBLIC HEALTHCARE SYSTEM

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ABSTRACT

INTRODUCTION:

During the pandemic, crisis leadership is being tested in ways the world hasn't seen in generations, and leading through it has become a severe challenge for leadership in public health organisation. Therefore, this study aims to develop and validate a self-administered questionnaire (Crisis Leadership Questionnaire, CLQ) to assess the challenges and competencies faced and needed in crisis leadership.

METHODS:

The questionnaire describes the general sociodemographic data of the participant, assesses challenges in the organisation in the categories of structural (4 domain), political (3 domain), and cultural (3 domain), and also on the nine (9) competencies needed in crisis leadership. Ten (10) sociodemographic data-related questions with 90 questions (53 on the challenges and 37 on competencies) were reviewed by two experts for face validity, and exploratory factor analysis was performed, using principal axis factoring with Promax rotation, to establish the construct validity of the questionnaire. The internal consistency of the questionnaire was tested using Cronbach's a coefficient.

RESULTS:

The final CLQ contained ten (10) sociodemographic questions, thirty-three (33) items focus on challenges categorized into structural (3 domains), political (2 domains), and cultural (3 domains) aspects, and twenty-two (22) items assess five key competencies required for crisis leadership. The content validity index (CVI) value is 0.96 for the challenges construct and 1.0 for the competencies construct, respectively, while the internal consistency reliability analysis (Cronbach's alpha => 0.6) is for all the domains.

CONCLUSION:

The developed questionnaire will help better understand the challenges and competencies of crisis leadership for current and future preparedness.

KEYWORDS

COVID-19, crisis, leadership, crisis leadership, crisis leadership questionnaire

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INTRODUCTION

Crisis leadership entails more than just guiding an organisation through the crisis response. It is a method by which leaders address unforeseeable circumstances that could jeopardise the public health organisational structure [1]. When a crisis arises, it can impede the growth and development opportunities that require a well-organised and methodical approach. Managing the crisis involves mitigating organisational losses and discovering inventive methods to maintain a motivated and productive workforce [2].

The crumbling of our established world views regarding the order of things poses a challenge that could either collapse or transform our organisations, entities, and systems. The outcome will ultimately depend on the effectiveness and guidance provided by our leaders [3]. Therefore, understanding the obstacles is vital because it assists leaders in gauging the potential outcomes and effects that may arise. Furthermore, it enables leaders to proactively prepare a response and empower others to implement solutions aligned with the identified priorities [4].

Leadership competency is a composite of knowledge, skills, and abilities required to perform effectively in a leadership role [5]. In the face of significant catastrophic or interconnected incidents, standard continuity, safety, and emergency response plans may prove insufficient. Instead, resolving such situations often requires exceptional leadership competencies [6]. Hence, the most notable accomplishment is to become a leader capable of effectively guiding the organisation through any situation or crisis [7].

Despite numerous disasters and the resolution of daily crises, there is a lack of documentation or records that detail the challenges faced or the necessary competencies required. Furthermore, there is a dearth of shared experiences regarding the processes involved in managing these situations. With these concerns in mind, this study aims to develop and validate a self-administered questionnaire, the Crisis Leadership Questionnaire (CLQ), to assess the challenges and competencies needed in crisis leadership. The questionnaire is designed to identify the challenges and competencies that leaders apply during crises, ultimately ensuring better management of catastrophic situations in the future.

METHODOLOGY

The developed questionnaire will be called the Crisis Leadership Questionnaire (CLQ). We included questions regarding challenges of structural, political, and cultural constructs and the competencies needed in crisis leadership. A standardised methodology was followed in developing and validating the questionnaire, including steps such as literature review, expert evaluation, pilot study, and questionnaire validation [8].

ETHICAL APPROVAL

This study was registered with the National Medical Research Register Malaysia and received its ethical approval (NMRR ID-23-00465-DVV). The study also received ethical approval from the Medical Research Ethic Committee of Universiti Malaysia Sabah (JKEtika 1/21(53)). All the participants in this survey gave their informed consent before participating.

DEVELOPMENT OF THE QUESTIONNAIRE

The questionnaire development consisted of the steps in Table 1.

DEVELOPMENT OF CONSTRUCT & ITEM GENERATION

A comprehensive literature review was done to look for the challenges and competencies of crisis leadership, although this topic has limited reference. The challenges during crisis leadership were adapted from the framework for crisis leadership during a pandemic as a guide that describes the enablers and barriers factors from the main three contexts – structural, political, and cultural [9]. Moreover, other references were used to identify challenges faced by health leadership and workforce management. These challenges are determined by deriving factors that help recognise the obstacles, facilitators, and barriers encountered during the COVID-19 pandemic. The competencies during crisis leadership are adapted from the crisis leadership competency model [10] and supported by other references.

TABLE 1: STEPS INVOLVED IN QUESTIONNAIRE DEVELOPMENT

Phases	Nature of activity	Methods	Domains	Construct	Number of constructs	Number of items	Response range	Addition or subtraction
I	Development of construct	Literature review	-	-	-	-	-	-
II	Item generation	Development of construct and item	A. Sociodemographic B. Challenges	B1. structural B2. Political B3. Cultural	10 10	10 53	-	-
			C. Competencies		9	31		
III	Establishment of face validity and content validity	Expert validation	A. Sociodemographic B. Challenges	B1. structural B2. Political B3. Cultural	10 10	10 53	5-point Likert scale	-
			C. Competencies		9	37		
IV	Cognitive interviewing	Pretesting	A. Sociodemographic B. Challenges	B1. structural B2. Political B3. Cultural	10 10	10 53	5-point Likert scale	-
			C. Competencies		9	37		
V	Establishment of construct validity	Item analysis and factor analysis	A. Sociodemographic B. Challenges	B1. structural B2. Political B3. Cultural	10 8	10 33	5-point Likert scale	Removal of 35 items
			C. Competencies		5	22		

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EXPERT EVALUATION

After the literature review, the developed questionnaire was subjected to expert validation by a team of two experts (from the Department of Public Health Medicine in a university and a Hospital Director from Ministry of Health) for critical appraisals, inputs, and content validity. Based on their feedback, some items were adjusted and arranged in the questionnaire based on their suggestion and validated by the expert.

PRETESTING

The final draft of the questionnaire was pretested on eight (8) participants from a hospital and health district office background. It was done to understand if there was any ambiguity in the participant's interpretation of the developed questions. These participants completed the questionnaire and commented on its clarity, construction, and relevance. Minor changes were made to the questionnaire as per their comments.

VALIDATION OF QUESTIONNAIRE

Participant and procedure

A survey was conducted to validate the questionnaire from 1st June to 14th June 2023. A total of fifty-three (53) participants, aged 28-64, who work in hospitals and health district offices, participated in the study. The participants involved in the survey must fulfil the current inclusions and exclusion criteria such as:

- Healthcare middle managers (sister, matron, head of a technical support team, chief of medical assistant, health inspector, laboratory and radiology assistant, medical officers (team leaders), and specialist)

- Working under the Ministry of Health facilities

- Involved in administrative or management with or without clinical involvement during the COVID-19 pandemic

- In charge of the unit and team of healthcare workers

- Work a minimum of three months in pandemic occurrence in the respective department

The survey participants utilised a specially designed online platform or website (https://clc-q.com/) to answer the questionnaire. They accessed the survey through this dedicated online platform and submitted their responses electronically. The platform was created to host the questionnaire, providing participants a convenient and secure way to participate remotely.

STATISTICAL ANALYSIS

Face validity, content validity, and construct validity of the developed questionnaire were examined. Face validity and content validity were established by expert evaluation. Construct validity was established by exploratory factor analysis using principal axis factoring with Promax rotation to test the hypothesised domain structure and examine its substructure [11]. Items with a correlation coefficient >0.5 were accepted and were omitted if >0.9 [12]. Internal consistency was examined by understanding the homogeneity of the question items in each domain using Cronbach's a coefficient. A coefficient of 0.6 or higher is preferred for a questionnaire to be internally consistent [13, 14].

INTERPRETABILITY

The score resulting from the CLQ can be used as a continuous variable to analyse the mean value from each. As the questionnaire used the Likert scale to determine and measure the opinions and preferences of the participants, the range of interpreting the Likert scale mean score was given as follows: 1.00-2.33 (low), 2.34-3.67 (moderate), 3.68-5.00 (high) to represent the level of challenges and competencies needed in the organisation [15]. A low mean value indicates more challenges, while a high mean value indicates fewer challenges in the organisation.

RESULTS

DEVELOPMENT OF THE QUESTIONNAIRE

Based on the literature review, a relevant paper was identified and studied, and 31 constructs with 91 items were generated for the questionnaire. After the expert validation (from the Department of Public Health Medicine in a university and a Hospital Director from Ministry of Health), some items were adjusted, and a new item was added to the questionnaire based on their suggestion and validated by the expert accordingly. Subsequently, a total of 49 items were removed, leaving 55 items in the final version of the questionnaire.

FACE VALIDITY AND CONTENT VALIDITY

Face validity pertains to the outward appearance of a measure or procedure and its alignment with the intended construct it aims to assess. Evaluating face validity relies on the subjective judgments of individuals to determine whether the measure being employed is suitable for the specific clinical question being addressed [16]. For this questionnaire, the expert (from the Department of Public

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Health Medicine in a university and a Hospital Director from Ministry of Health) evaluated it. They determined that the items were appropriate for inclusion in the instrument, and they found the language used to be easily comprehensible.

Content validity pertains to how an assessment instrument accurately captures and represents the intended construct it is created to evaluate [17]. As a result, the instrument scores can be effectively utilised for drawing relevant and suitable conclusions or decisions in line with the assessment's intended purpose [18]. For this questionnaire, the expert valued the content validity index (CVI) value for the section of challenges to be 0.98 while competencies to be 1.0.

VALIDATION

A cross-sectional survey of 53 participants was conducted to validate this tool. The general sociodemographic characteristics of participants are included in Table 2.

TABLE 2: SOCIODEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

Variables	N = 53	Mean±SD
Age (years)		40.6 ± 9.0
Gender		
Male	24	
Female	29	
Ethnic		
Malay	11	
Chinese	6	
Indian	6	
Sabah Native	30	
Education level		
STPM	1	
Diploma	19	
Degree	30	
Master/PhD	3	
Marital status		
Single	6	
Married	45	
Divorce	1	
widow	1	
Organisational position		
Sister	11	
Matron	4	
Technical support team	6	
Chief of medical assistant	6	
Chief of laboratory assistant	2	
Chief of radiology officer	2	
Medical officers	20	
Specialist	2	
Years of working as a healthcare worker		
Less than 5 years	4	
5-10 years	17	
11-15 years	7	
16-20 years	3	
21-25 years	9	
More than 25 years	13	

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Comorbidity

No	41
Yes	12
Diabetes mellitus	2
Hypertension	7
Dyslipidemia	4
CVD	-
Others	3

Attendance to leadership course

No	37
Yes	16

Number of subordinates

10 and below	24
11-20	7
21-30	9
31-40	3
41-50	4
>50	6

Factor analysis was employed to establish construct validity. The completed questionnaires underwent item analysis to ascertain the structure of the tool. A correlation matrix was created to assess the degree of correlation. Sampling adequacy was confirmed through a Kaiser-Meyer-Olkin value above 0.6 for all domains, while Bartlett's test concluded that the sphericity hypothesis could be rejected ($p < 0.001$). Subsequently, factor analysis was conducted using principal axis factoring and Promax rotation to examine the domain structure. Following this analysis, a total of 28 constructs – sociodemographic [14], challenges [9], and competencies [5] were identified. The independent Cronbach's a for all the domains were >0.6, respectively, and values indicate good internal consistency. The exploratory factor analysis (EFA) results for the challenge domain are summarised in Table 3 – 5, while Table 6 explains the competencies domain.

TABLE 3: CHALLENGES IN STRUCTURAL (N = 53)

Item	KMO value	Factor			Cronbach's a
		1	2	3	
SQ1	0.761	0.821			0.760
SQ2		0.795			
SQ3		0.787			
SQ7		0.554			
SQ14			0.814		0.887
SQ15			0.805		
SQ17			0.856		
SQ18			0.891		

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SQ6				0.720	0.811
SQ10				0.728	
SQ20				0.887	
SQ22				0.613	
SQ25				0.747	

TABLE 4: CHALLENGES IN POLITICAL (N = 53)

Item	KMO value	Factor		Cronbach's a
		1	2	
PQ1	0.644	0.620		0.783
PQ2		0.499		
PQ3		0.836		
PQ4		0.674		
PQ6		0.632		
PQ8			0.612	0.616
PQ9			0.480	
PQ10			0.514	
PQ11			0.682	

TABLE 5: CHALLENGES IN CULTURAL (N = 53)

Item	KMO value	Factor			Cronbach's a
		1	2	3	
CQ1	0.644	0.814			0.85
CQ2		0.787			
CQ3		0.784			
CQ4		0.683			
CQ5			0.585		0.832
CQ6			0.765		
CQ7			0.797		
CQ8			0.870		
CQ9				0.623	0.6

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| CQ10 | | | | | 0.471 | |
| CQ11 | | | | | 0.721 | |

TABLE 6: COMPETENCIES OF CRISIS LEADERSHIP (N = 53)

Item	KMO value	Factor					Cronbach's a
		1	2	3	4	5	
CoQ1	0.749	0.508					0.70
CoQ2		0.754					
CoQ3		0.419					
CoQ4			0.671				0.863
CoQ5			0.766				
CoQ6			0.475				
CoQ7			0.900				
CoQ8			0.611				
CoQ9				0.453			0.831
CoQ10				0.952			
CoQ11				0.714			
CoQ12				0.402			
CoQ13				0.406			
CoQ14					0.836		0.892
CoQ15					0.902		
CoQ16					0.967		
CoQ17					0.75		
CoQ18						0.996	0.878
CoQ19						0.534	
CoQ20						0.680	
CoQ21						0.858	
CoQ22						0.625	

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DISCUSSION

To our knowledge, the CLQ is the first validated, self-administered scoring tool designed to assess the challenges and competencies of crisis leadership in the public healthcare system. The public healthcare system faces numerous daily challenges worldwide, especially in a crisis or pandemic. Thus, understanding the challenges and competencies applied during a crisis is essential for enhancing crisis preparedness, improving leadership effectiveness, and ensuring the long-term resilience of organisations in an increasingly complex and interconnected world [19, 20].

The CLQ plays a unique role as it could be used pre or post-crisis incidence as a tool to evaluate the situation and collect evidence based on the experience of the healthcare workers to document their feedback that can be used for the improvement and betterment of the healthcare organisation. As other studies generally used a qualitative approach to understand the challenges faced by healthcare workers [21, 22], the items derived in our questionnaire are based on the vast literature review and references that focus and describe the important or vital aspect of challenges faced by the workers. Therefore, with the findings from our study, the organisation can look back on its capacity and work forward on the specific area for improvement.

Healthcare workers' challenges and competencies are generally discussed as a compilation of reviews in general situations [23, 24]. Our study selected the final construct and subconstruct based on the local population's opinions and feedback on the issues discussed. Most of the literature review references describe the topic based on the views from many other situations and locations, while the challenges and issues in every healthcare organisation are different. In our study, the challenges and the competencies tested can be applied to healthcare organisations from developing countries, which may have different hurdles than developed countries [25].

In this questionnaire, the focus is given to the main three domains, which are sociodemographic, challenges, and the competencies of crisis leadership. Understanding sociodemographic information is fundamental as it ensures that healthcare and public policies are equitable, effective, and responsive to the diverse needs and characteristics of the population [26]. In the sociodemographic section, there are two important factors assessed which are related to individual factors – gender, ethnicity, marital status, education level, years of working, comorbidity, attendance to a leadership course, and organisational factors such as organisational position, type of facilities and the number of subordinates. Both factors are important in determining and influencing an organisation's leadership role [27].

The challenges domain is divided into three constructs: structural, political, and cultural, and each construct has its sub-construct. With eight sub-constructs, the challenges part of the questionnaire has 33 items. The structural construct assesses the structural challenges in the organisation, defined as the framework of the relations on jobs, systems, operating processes, people, and groups trying to achieve the goals [28]. Three sub-constructs assessed are the organisation's human resources, bureaucracy, and infrastructure.

Political construct assesses the political influence that manages government institutions and resources to operationalise strategy decisions, mobilise action outside the government, and inform and inspire people through mass communication [23]. Two sub-constructs assessed are budget allocation and adaptivity to changes. Lastly, the cultural construct assesses the "organisational culture" that refers to the organisation's long-standing beliefs and values, the staff's views, and the anticipated value of their job, which will affect their attitudes and behaviour [29, 30]. Three sub-constructs evaluated are employee growth, environment orientation, and emphasising responsibility.

Competencies are underlying characteristics of people that indicate a way of behaving or thinking that is generalisable across situations and enduring over time [31]. These include observable knowledge, skills, and abilities that translate to behavior and, as a result, predict job performance [10]. Crisis leadership competencies play a vital role in ensuring the optimal performance of leaders during public health emergencies. For the competencies, the final version has 22 items under five essential competencies – team leadership, credibility, integrative thinking, emotional effectiveness, courage and perseverance to be focus as important value to be implemented during the crisis. The final developed questionnaire will take 15 minutes to administer by the participant.

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Nevertheless, it is essential to acknowledge that in this research, the questions and items developed are influenced by the challenges in regional context. Since our study was done in Sabah, the responses are affected by the experience of the local participants, who may have faced more complex and arduous challenges than in West Malaysia. However, the questions in the questionnaire are still applicable and relevant to be tested and understand the challenges and competencies in other organisations. Another limitation is that despite our effort to balance understandability, clarity, simplicity, and response bias, some questions are still lengthy and could affect the participant's attention span [32].

CONCLUSION

We have developed and validated a self-administered questionnaire that provides a comprehensive understanding of sociodemographics, challenges, and competencies of crisis leadership in a healthcare organization. As a novel tool, the CLQ contributes to the leadership field by offering insights into the difficulties of managing crises and providing valuable feedback from healthcare workers for urgent and future improvement in crisis management within healthcare organizations.
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CONFLICTS OF INTEREST

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

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KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG THE HEALTH CARE WORKERS IN HOSPITALS OF BIKANER, RAJASTHAN, INDIA

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ABSTRACT

OBJECTIVE:

To estimate the Knowledge, Attitude and Practice (KAP) with regarding to bio-medical waste management among the healthcare workers in hospitals of Bikaner district.

PLACE AND DURATION OF STUDY:

The study was carried out at the affiliated hospitals of S. P. Medical College, Bikaner and at the hospitals under C.M.H.O., Bikaner from October 2022 to December 2022.

METHOD:

The study employed a quantitative research methodology, specifically utilizing a descriptive research design and simple random sampling technique to evaluate the levels of knowledge, attitude, and practice (KAP). A self-designed questionnaire and checklist were created to gather data before and after the trial. A preliminary study was carried out to assess the knowledge, attitude and practice level of 120 healthcare professionals working in hospitals in the Bikaner district regarding the management of biomedical waste. Subsequently, they were educated on this topic using a self-instructional module. A follow-up study was then conducted to measure the improvement in their knowledge, attitude and practice level regarding biomedical waste management.

RESULT:

After providing healthcare personnel at Bikaner district hospitals with a Self-Instructional Module, it was noted that their knowledge and level of practice regarding biomedical waste management improved.

CONCLUSION:

The study's findings indicate that strict compliance with regulations and the implementation of an enhanced environmental management system are necessary for the proper handling, sorting, transportation, storage, and disposal of biomedical waste. Additionally, training is essential for garbage handlers, scavengers, sweepers, as well as higher authorities and nursing staff.

KEYWORDS

bio-medical waste, knowledge, attitude and practice, healthcare workers, common biomedical waste treatment facility, WHO, COVID-19.

Knowledge, Attitude and Practice Regarding Biomedical Waste Management Among The Health Care Workers In Hospitals Of Bikaner, Rajasthan, India   **1**

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INTRODUCTION

As per the regulations outlined in the Bio-Medical Waste (Management & Handling) Rules 2016, Bio-Medical Waste refers to any waste that is produced during the process of diagnosing, treating, or immunizing humans or animals, conducting research activities, or manufacturing and testing biological products in health camps. This waste falls into the categories mentioned in Schedule - I.[1] Efficient management of biomedical waste is crucial in the healthcare industry. The lack of proper waste management, limited awareness about the health risks associated with biomedical waste, inadequate financial and human resources, and ineffective waste disposal control pose significant challenges in healthcare waste management. [2]

India generates approximately 2 kg of biomedical waste per bed per day. This type of waste includes anatomical waste, cytotoxic waste, and sharps. Improper segregation of these wastes can lead to the spread of deadly infectious diseases such as HIV, Hepatitis C and B infections. It can also have negative effects on the environment and disrupt the ecological balance. [5, 6] Having a thorough understanding of the rules and regulations surrounding biomedical waste management is crucial for healthcare employees. This knowledge will enable them to effectively dispose of waste in their organizations.[7] Effective management of biomedical waste starts with proper waste generation, segregation, storage, disinfection, and transfer to the disposal site. These steps are crucial in ensuring the safe and appropriate disposal of waste. Therefore, the expertise, professionalism, and dedication of the staff at healthcare institutes are crucial. [8, 4, 9]

The classification of hazardous waste has been established by the World Health Organization (WHO) into the following categories: waste that may contain pathogens, such as lab cultures, swabs, and excreta, is considered infectious waste. Human tissues, including body parts, blood, and foetuses, fall under the category of pathological waste. Another type of waste to be cautious of is sharps. Medical supplies such as needles, infusion sets, scalpels, knives, blades, and broken glass; Pharmaceutical waste includes expired drugs. Genotoxic waste consists of cytotoxic drugs commonly used in cancer therapy. Chemical waste encompasses lab reagents, film developer, and disinfectants. Wastes with a high content of heavy metals include batteries, broken thermometers, and BP apparatus.

Pressurized containers are also considered waste. Lastly, radioactive waste includes unused liquids from radiotherapy and excreta from patients treated with radionuclides.[10]

Biomedical waste is generated by a wide range of establishments, including hospitals, nursing homes, clinics, labs, physicians' offices, dentists and veterinary practices, home health care facilities, and funeral homes. [11]

Being exposed to hazardous health-care waste can result in the acquisition of diseases or physical injuries. The potential risks associated with health-care waste can be attributed to several factors. These include the presence of infectious agents, genotoxic properties, toxic or hazardous substances, pharmaceuticals, radioactive materials, and sharp objects. [12] Poor management of healthcare waste can put healthcare workers, waste handlers, patients, and the broader community at risk of infection, harm, and injuries. In addition, it poses a risk to environmental pollution. It is crucial to ensure the correct segregation, treatment, and safe disposal of medical waste products. [13]

Proper management of infectious waste is crucial to mitigate the potential health risks associated with hazardous pathogens. These risks can arise from different transmission routes, such as needle stick injuries. Effective management of medical waste is crucial in reducing the risk of blood-borne infections, particularly hepatitis B which poses a significant occupational hazard. Improper handling of chemical and pharmaceutical waste can have serious consequences for both human health and the environment, including the development of antibiotic resistance. Genotoxic waste, like cytotoxic drugs, carries significant risks through inhalation, skin absorption, and environmental contamination, which can have severe consequences for human health and aquatic ecosystems. Proper handling of radioactive waste is crucial to prevent serious health consequences, such as genetic damage and, in the worst scenarios, loss of life.[14]

Given the high stakes involved, it is crucial for MW management to maintain a high level of organization to avoid any potential errors with significant consequences. For biomedical waste (BMW), we adhere to the fundamental principle of implementing the 3Rs: Reduce, Reuse, and Recycle. BMW's management process consists of six steps: Surveying the waste produced; Segregating the waste; Collecting & categorizing the waste; Storing the waste; Transporting the waste; and treating the waste. [15]

Hospitals require waste management for various reasons. One of these reasons is the presence of biomedical waste, which, although it only makes up a small percentage of the overall waste, is considered one of the most hazardous types. Medical facility waste poses a significant risk due to its radioactive nature, the presence of hazardous medications, and the potential for harmful germs [16]. The adoption of protective gear like masks, gloves, goggles, boots, rubber long jackets, head coverings, PPE kits, etc. has seen a substantial increase due to the COVID-19 pandemic, leading to a rise in the generation of biological waste; There have been reports of certain hospitals in the Bikaner district engaging in improper practices due to a lack of awareness, for instance, saline bottles, which are mistakenly considered non-hazardous, are being sold to recycling agencies without being properly cleaned. There is a potential for air, water, and soil contamination due to waste, along with the risk of ash and emissions resulting from improper incineration. [17]

Certain hospitals in the Bikaner district may be engaging in incorrect practices due to a lack of awareness. To best of our knowledge no previous study has been conducted to assess the management of biomedical waste in the hospitals located in Bikaner, Rajasthan, India. Thus, the current study aimed to evaluate the knowledge, practice, and attitude towards bio-medical waste management among healthcare workers in hospitals located in the Bikaner district.

METHODOLOGY

PLACE AND DURATION OF STUDY:

The study was carried out at the affiliated hospitals of S. P. Medical College, Bikaner and at the hospitals under C.M.H.O., Bikaner from October 2022 to December 2022.

ETHICAL CONSIDERATIONS:

Permission was obtained from the Principal & Controller of S. P. Medical College & PBM AGH, Bikaner, Rajasthan to conduct a research study at the affiliated hospitals of S. P. Medical College, Bikaner. Approval was granted by the Chief Medical & Health Officer, Bikaner, Rajasthan to conduct a research study at the hospitals under C.M.H.O., Bikaner. Written consent was obtained from the study subjects and the data collection was kept confidential. The study subject was assured that the anonymity of each individual would be maintained.

PARTICIPANTS:

A sample of 120 healthcare personnel from various wards, including doctors, nursing staff, pharmacists, lab technicians, radiographers, and waste handlers, who met the criteria, were selected. A quantitative research approach was utilized to estimate the Knowledge, Attitude, and Practice (KAP) using a descriptive research design and Simple random sampling. A well-designed questionnaire and checklist were created to gather information before and after the study. The participants' details are provided in table 1.

DATA COLLECTION:

The data were collected at the hospitals affiliated with S. P. Medical College, Bikaner and the hospitals under C.M.H.O., Bikaner. Prior to the interview, the interviewer provided a clear explanation of the interview's purpose to all healthcare personnel, along with a brief self-introduction. Data were collected through interviews using a semi-structured questionnaire consisting of 40 questions. The questionnaire covered various aspects including knowledge, attitude, and practice related to biomedical waste management. Additionally, a checklist was used to assess the participants' knowledge, attitude, and practice in this area.

In the initial phase, a comprehensive assessment was carried out to evaluate the proficiency and implementation of biomedical waste management among healthcare professionals in hospitals situated in the Bikaner district. Healthcare personnel in hospitals located in Bikaner district received education on biomedical waste management through a self-instructional module prepared by the researcher. A post-study was conducted to assess the knowledge and practice of healthcare personnel in relation to biomedical waste management.

DATA ANALYSIS:

Collected data is tabulated and calculated using Microsoft excel. The data based on the objectives frequencies and percentage were computed for describing the samples characteristics. Karl Pearson's coefficient of correlation 'r' was computed to find out the relationship between knowledge and practice as well as between knowledge and attitude among healthcare personnel those who are working in hospitals of Bikaner district.

Knowledge, Attitude and Practice Regarding Biomedical Waste Management Among The Health Care Workers In Hospitals Of Bikaner, Rajasthan, India   **3**

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RESULT

Frequency and percentage distribution of the samples according to their selected demographic variables

TABLE 1: FREQUENCY AND PERCENTAGE DISTRIBUTION OF THE SAMPLES ACCORDING TO THEIR SELECTED DEMOGRAPHIC VARIABLES

S. No.	Demographic variable	Doctor	Nurse	Pharmacist	Radiographer	Lab Technician	Waste Handlers	Total f	Total %
1.	*Age*								
	20 – Below 25 years	3	0	0	4	2	3	**12**	**10%**
	25 – 29 years	6	0	0	8	3	2	**19**	**15.83%**
	30 – 35 years	9	11	13	1	2	7	**43**	**35.83%**
	Above 35 years	2	9	7	7	13	8	**46**	**38.33%**
2.	*Gender*								
	Male	10	10	10	10	10	12	**62**	**51.66%**
	Female	10	10	10	10	10	8	**58**	**48.33%**
3.	*Professional qualification*								
	Diploma	0	16	3	16	15	0	**50**	**41.66%**
	Bachelor	9	2	15	3	4	1	**34**	**28.33%**
	Master	11	2	2	1	1	0	**17**	**14.16%**
	Doctorate	0	0	0	0	0	0	**0**	**0%**
	Others	0	0	0	0	0	19	**19**	**15.83%**
4.	*Professional Experience*								
	Below 6 years	15	1	3	14	7	10	**50**	**41.66%**
	6 – 10 years	4	11	17	0	0	6	**38**	**31.66%**
	11 – 15 years	1	6	0	2	1	2	**12**	**10%**
	Above 15 years	0	2	0	4	12	2	**20**	**16.66%**

Source: Researcher's calculation on primary data

First of all, a pre-study was conducted to test the knowledge, attitude and practice of healthcare personnel working in hospitals located in Bikaner district regarding biomedical waste management. Then the healthcare personnel working in hospitals located in Bikaner district were educated about biomedical waste management through a self-instructional module prepared by the researcher. After this, post-study was conducted to know the changes in the knowledge, attitude and practice of healthcare personnel regarding biomedical waste management.

Knowledge regarding Biomedical Waste Management

TABLE 2: KNOWLEDGE REGARDING BIOMEDICAL WASTE MANAGEMENT

Knowledge regarding Biomedical Waste Management	Pre-study f (%)	Post-study f (%)
Awareness about bags used for segregation of bio-medical waste	81 (67.5%)	98.4 (82%)
Awareness about disposal of Human Anatomical Waste	62 (51.66%)	96 (80%)
Awareness about disposal of Bandages, Dressing and cotton stained with blood or body fluids	69 (57.5%)	100 (83.33%)
Awareness about disposal of Used Personal protective equipment (PPE) and Masks	56 (46.66%)	83 (69.16%)
Awareness about disposal of Waste sharps such as Scalpels, Blades	56 (46.66%)	88 (73.33%)
Awareness about disposal of Disposable gloves, Goggles and Face shields	58 (48.33%)	87 (72.5%)
Awareness about Expired or discarded cytotoxic drugs	64 (53.33%)	96 (80%)
Awareness about disposal of Broken or Discarded Glass vials and Ampoules	55 (45.83%)	92 (76.66%)
Awareness about treatment of waste collected in yellow-colored bags at the plant	49 (40.83%)	80 (66.66%)
Awareness about treatment of waste collected in red colored bags at the plant	57 (47.5%)	80 (66.66%)
Awareness about biohazard symbol	84 (70%)	108 (90%)
Awareness about separate storage of Non-infectious waste and Infectious waste	78 (65%)	95 (79.16%)
Awareness and use of Common Waste Treatment Facility (CWTF) for Biomedical waste	53 (44.16%)	73 (60.83%)
Awareness about use of Personal Protective Equipment (PPE) and Clothing	70 (58.33%)	86.67 (72.22%)
Awareness about Immunisation (Hepatitis B Vaccination)	85 (70.83%)	114 (95%)
Awareness about any legislation applicable to bio-medical waste management	58 (48.33%)	114 (95%)
Awareness about maintaining waste-record	64 (53.33%)	88 (73.33%)

From the Comparative study of table 2, it is concluded that after educating the healthcare professionals working in the hospitals at Bikaner district through Self Instructional Module, their awareness about bags used for segregation of bio-medical waste increased from 67.5% to 82%; Awareness about disposal of Human Anatomical Waste increased from 51.66% to 80%; Awareness about disposal of Bandages, Dressing and cotton stained with blood or body fluids increased from 57.5% to 83.33%; Awareness about

disposal of Used Personal protective equipment (PPE) and Masks increased from 46.66% to 69.16%; Awareness about disposal of Waste sharps such as Scalpels, Blades increased from 46.66% to 73.33%; Awareness about disposal of Disposable gloves, Goggles and Face shields increased from 48.33% to 72.5%; Awareness about Expired or discarded cytotoxic drugs increased from 53.33% to 80%; Awareness about disposal of Broken or Discarded Glass vials and Ampoules increased from 45.83% to 76.66%;

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Awareness about treatment of waste collected in yellow colored bags at the plant increased from 40.83% to 66.66%; Awareness about treatment of waste collected in red colored bags at the plant increased from 47.5% to 66.66%; Awareness about bio hazard symbol increased from 70% to 90%; Awareness about separate storage of Non-infectious waste and Infectious waste increased from 65% to 79.16%; Awareness and use of Common Waste Treatment Facility (CWTF) for Biomedical waste increased from 44.16% to 60.83%; Awareness about use of Personal Protective Equipment (PPE) and Clothing increased from 58.33% to 72.22%; Awareness about Immunization (Hepatitis B Vaccination) increased from 70.83% to 95%; Awareness about any legislation applicable to bio-medical waste management increased from 48.33% to 95%; and Awareness about maintaining waste-record increased from 53.33% to 73.33%.

Distribution of samples based on level of knowledge regarding BMWM

TABLE 3: DISTRIBUTION OF SAMPLES BASED ON LEVEL OF KNOWLEDGE REGARDING BMWM

S. No.	Level of Knowledge	Pre-study f (%)	Post-study f (%)
1	Adequate level of knowledge above 75%	15 (12.50%)	68 (56.66%)
2	Moderately level of knowledge 50 -75%	48 (40%)	45 (37.50%)
3	Inadequate level of knowledge Below 50%	57 (47.50%)	7 (5.83%)

The data presented in table 3 provides information on the frequency and percentage distribution of samples based on the knowledge score of healthcare professionals working in hospitals in the Bikaner district, specifically regarding biomedical waste management. It is evident that a portion of healthcare workers possessed a satisfactory level of knowledge (12.5%), while a larger percentage had a moderate level of knowledge (40%). Unfortunately, a significant portion of healthcare professionals (47.5%) demonstrated an insufficient level of knowledge. After receiving education in this area through Self-Instructional Module it is evident that after the study, healthcare professionals working in hospitals at Bikaner district have shown an improvement in their knowledge score regarding biomedical waste management. According to the data collected after the study, a majority (56.66%) of healthcare professionals demonstrated a satisfactory level of knowledge, while a significant portion (37.5%) had a moderate level of knowledge. A small percentage (5.83%) of professionals, however, were found to have an insufficient level of knowledge.

Attitude regarding Biomedical Waste Management

TABLE 4: ATTITUDE REGARDING BIOMEDICAL WASTE MANAGEMENT

Attitude regarding Biomedical Waste Management	Pre-study f (%)	Post-study f (%)
Do you think segregation is important and it is not just a waste of time?	112 (93.33%)	120 (100%)
Do you think that emptying waste daily is important?	108 (90%)	114 (95%)
Do you feel that paramedical workers need more information regarding Biomedical Waste Management?	110 (91.67%)	112 (93.33%)
Do you monitor the Biomedical Waste Management regularly?	63 (52.50%)	88 (73.33%)

Do you conduct monthly meeting with staff to discuss the issues and best practices in Biomedical Waste?	42 (35%)	77 (64.17%)
Are there any audits with surprise checks?	68 (56.67%)	82 (68.33%)
Are the injuries due to improper disposal of hospital waste reported?	80 (66.67%)	101 (84.17%)

Table 4 shows that the healthcare professionals employed by the hospitals in the Bikaner district now have a more positive attitude toward a variety of aspects of biomedical waste management, such as the value placed on segregation. This is due to the education provided by the Self-Instructional Module grew from 93.33% to 100%, with daily waste removal: grew from 90% to 95%, need for more knowledge about biomedical waste management among paramedical staff grew from 91.67% to 93.33%, with frequent monitoring of the Biomedical Waste Management: grew from 52.50% to 73.33%, holding monthly staff meetings to address the issues: went from 35% to 64.17%; the attitude toward participating in audits with surprise inspections went from 56.67% to 68.33%; and the percentage of injuries reported as a result of inappropriate hospital waste disposal went from 66.67% to 84.17%. [Do not delete section break]

TABLE 5: DISTRIBUTION OF SAMPLES BASED ON LEVEL OF ATTITUDE REGARDING BIOMEDICAL WASTE MANAGEMENT

S. No.	Level of Attitude	Pre-study f (%)	Post-study f (%)
1	Satisfied level of attitude above 75%	47 (39.16%)	76 (63.33%)
2	Moderate level of attitude 50-75%	50 (41.66%)	41 (34.16%)
3	Inadequate level of attitude Below 50%	23 (19.16%)	03 (2.50%)

Distribution of samples based on Attitude regarding biomedical waste management

Pre-study data mentioned in table 5 shows the frequency and percentage distribution of samples according to the attitude score of healthcare professionals working in hospitals at Bikaner district regarding biomedical waste management. It reveals that 39.16% of healthcare professionals had Satisfied level of attitude, 41.66% of healthcare professionals had Moderate level of attitude and 19.16% of healthcare professionals had inadequate level of attitude. After education through self-instructional Module and post-study was done it is evident, there is an increase in the attitude score of healthcare professionals working in hospitals at Bikaner district regarding biomedical waste management. Post-study data reveals that 63.33% of healthcare professionals had Satisfied level of attitude, 34.16% of healthcare professionals had Moderate level of attitude and 2.5% of healthcare professionals had inadequate level of attitude.

Practice regarding Biomedical Waste Management

TABLE 6: PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT

Practice regarding Biomedical Waste Management	Pre-study f (%)	Post-study f (%)
Disposal of anatomical waste in Yellow Bin	62 (51.67%)	96 (80%)
Disposal of plastic waste in Red Bin	58 (48.33%)	87 (72.50%)
Disposal of sharp material in White Container	56 (46.67%)	88 (73.33%)
Disposal of broken glass vials in Blue Container	55	92

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	(45.83%)	(76.67%)
Wearing the Gloves while transporting the Biomedical Waste	98 (81.67%)	115 (95.83%)
Weighing the Biomedical Waste at the point of collection	57 (47.50%)	85 (70.83%)
Sealing the waste bag after collection of Biomedical Waste	75 (62.50%)	98 (81.67%)
Taking first-aid immediately after contact with hospital waste	101 (84.17%)	115 (95.83%)

From the Comparative study of table 6, it is observed that after educating the healthcare professionals, their level of practice on various aspects of Biomedical Waste Management is increased like practice of disposal of anatomical waste in Yellow Bin : increased from 51.67% to 80%, practice of disposal of plastic waste in Red Bin : increased from 48.33% to 72.50%, practice of disposal of sharp material in White Container : increased from 46.67% to 73.33%, practice of disposal of broken glass vials in Blue Container : increased from 45.83% to 76.67%, practice of wearing the Gloves while transporting the Biomedical Waste : increased from 81.67% to 95.83%, practice of weighing the Biomedical Waste at the point of collection : increased from 47.50% to 70.83%, practice of sealing the waste bag after collection of Biomedical Waste : increased from 62.50% to 81.67%, practice of taking first-aid immediately after contact with hospital waste : increased from 84.17% to 95.83%.

Distribution of samples based on level of practice regarding biomedical waste management

TABLE 7: DISTRIBUTION OF SAMPLES BASED ON LEVEL OF PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT

S. No.	Level of Practice	Pre-study f (%)	Post-study f (%)
1	Satisfied level of practice above 75%	22 (18.33%)	67 (55.83%)
2	Moderate level of practice 50-75%	69 (57.50%)	49 (40.83%)
3	Inadequate level of practice Below 50%	29 (24.16%)	04 (3.33%)

Pre-study data mentioned in table 7 shows the frequency and percentage distribution of samples according to the practice score of healthcare professionals working in hospitals at Bikaner district regarding biomedical waste management. It reveals that 18.33% of healthcare professionals had satisfied level of practice, 57.50% of healthcare professionals had moderate level of practice and 24.16% of healthcare professionals had inadequate level of practice. After the educational intervention it is clear that there was an increase in the practice score of healthcare professionals working in hospitals at Bikaner district regarding biomedical waste management. Post-study data reveals that 55.83% of healthcare professionals had satisfied level of practice, 40.83% of healthcare professionals had moderate level of practice and 3.33% of healthcare professionals had inadequate level of practice.

Correlation co-efficient of Knowledge and practice regarding biomedical waste management among paramedical workers healthcare professionals working in hospitals at Bikaner district

TABLE 8: CORRELATION CO-EFFICIENT OF KNOWLEDGE AND PRACTICE; KNOWLEDGE AND ATTITUDE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG HEALTHCARE PROFESSIONALS WORKING IN HOSPITALS AT BIKANER DISTRICT

S. No.	Category	Correlation co-efficient 'r'
1.	Knowledge and practice	0.84
2.	Knowledge and Attitude	

To find out the relation between knowledge and practice, correlation was used. The computed 'r' value was found to be + 0.84, which reveals that there is a high positive correlation between knowledge and practice, knowledge and attitude. Hence, it was interpreted that the healthcare professionals who had adequate level of knowledge followed Satisfied level of attitude and practice.

DISCUSSION

Despite the efforts made by the government, there are still some areas of concern regarding the internal management of biomedical waste in healthcare facilities in Bikaner district. Therefore, it is essential to strictly follow legal regulations and implement an enhanced environmental management system for the proper handling of biomedical waste, including its collection, segregation, transportation, storage, and disposal. There is a noticeable absence of proper segregation of biomedical waste in hospitals of Bikaner. The waste from wards, which includes used cotton, dressing materials, blood, bottles, PVC drip sets, needles, syringes, and their covers, is not disposed of in the appropriate bin/box according to the Biomedical Waste Rules 2016.

KAP surveys have a long history, dating back to the 1950s, when they were first used in the areas of family planning and population research. Commonly referred to as knowledge, attitude, behavior, and practice surveys, these have gained significant recognition for studying health-related behaviors and health-seeking practices. A KAP survey is designed to be a comprehensive survey of a target population, aiming to gather information about their knowledge, attitudes, and practices related to the topic of interest. Data is gathered through the use of structured or semi-structured questionnaires, which can be self-administered or administered by interviewers. This allows for the collection of both qualitative and quantitative data. [18]

Medical waste management is a significant concern for healthcare facilities globally. The issue may be exacerbated by the absence of sufficient knowledge, attitudes, and practices, as well as inadequate waste management facilities. Healthcare workers, especially waste handlers, play a crucial role in managing waste and face potential risks in the process. [19]

Understanding is the ability to gain, retain, and apply knowledge; a blend of comprehension, expertise, perception, and proficiency [20] Having a strong foundation of knowledge is crucial in health science education. Without it, there is a risk of misapplying knowledge, which can have negative consequences for healthcare organizations. [21, 22, 23]

Our study found a notable improvement in knowledge following the intervention on the proper handling and disposal of various types of waste, including bio-medical waste, human anatomical waste, bandages, dressing and cotton stained with blood or body fluids, personal protective equipment (PPE) and masks, disposable gloves, goggles and face shields, expired or discarded cytotoxic drugs, broken or discarded glass vials and ampoules, treatment of waste collected in red coloured bags at the plant, and separate storage of non-infectious waste and infectious waste. This aligns with findings from similar studies. [24-28]

Attitude encompasses the inclination to respond in a specific manner to various situations, the ability to perceive and interpret events based on personal predispositions, and the capacity to organize opinions into cohesive and interconnected frameworks. [20]

Our study found that the healthcare professionals' attitude towards BMWM was moderate, and the intervention helped to improve it towards a more positive direction. Through practice, we refer to the implementation of rules and knowledge that results in taking action. Excellence in practice is intricately tied to the advancement of knowledge and technology, and it is crucial to uphold ethical standards. [20]

The practice score of participants improved significantly after the intervention. A majority of 55.83% demonstrated a satisfactory level of practice, while 40.33% showed a moderate level. Only a small percentage of 3.33% of healthcare professionals had an inadequate level of practice.

This research study aims to enhance the understanding and implementation of bio-medical waste management among healthcare providers, ultimately improving the overall practices in this area. This research study aims to enhance the knowledge, attitude and practice of healthcare professionals involved in biomedical waste

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management in the hospitals of Bikaner district. It will assess their current knowledge, attitude and practice in this area and provide education through a self-Instructional module.

CONCLUSION

Several knowledge gaps were identified among different categories of hospital employees. It was observed that the doctors' theoretical knowledge surpassed their practical understanding of BMW management. The nurses and paramedical personnel had a different perspective on BMW management compared to doctors. Although their theoretical knowledge might be less, their practical experience was exceptional. Healthcare professionals, including nurses and paramedical personnel, approach BMW management with a high level of thoroughness and attention to detail. Despite the nurses' exemplary attitudes and practice patterns, their knowledge regarding recent amendments in biomedical waste management rules, 2019, was unsatisfactory. It is important to focus on regular assessment, instruction, and practical training programs that highlight recent changes in regulations in order to effectively bridge the gap between knowledge, attitude, and practices. Effective biomedical waste management relies on healthcare professionals prioritizing the correct segregation, collection, treatment, and disposal of biomedical waste, as well as raising public awareness about these practices. Thus, to improve waste management practices in healthcare units of the Bikaner district, it is crucial to implement an effective bio-medical waste management strategy in the hospitals of Bikaner district.

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RESEARCH ARTICLE

INVESTIGATING THE IMPACT OF PHYSICIANS' ATTITUDES TOWARDS DEATH AND THEIR DEMOGRAPHIC FACTORS ON DISCLOSURE OF BAD NEWS TO CANCER PATIENTS

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ABSTRACT

BACKGROUND:

This study aimed to investigate the attitudes of physicians towards death and cancer patients as well as to examine the relationship between physicians' demographic variables, their death anxiety, their attitudes and avoidance behavior towards informing patients about their diagnoses, and physicians' opinions about the necessity of education on how to approach patients with terminal illness.

METHODS:

The study involved 90 physicians calculated with Cochrane sample size formula who completed a questionnaire on sociodemographic information, the Death Anxiety Scale, and a 21-item questionnaire prepared by the authors to evaluate physicians' attitudes. The proposed questionnaire is designed in such a way that contains 45 questions, questions are related to demographic characteristics, including age, gender, specialized field, place of study, workplace, work experience, marriage, and having children. following questions about physicians' opinions the need for medical ethics training and death and giving bad news, about end-stage patients, good death and the availability of training on giving bad news for physicians. Death fear was evaluated by Templer questionnaire. Data were analysed with chisquere test with SPSS 26 software.

RESULTS:

The results showed that 87.8% of the physicians believed that patients had the right to be informed of their diagnoses and disease condition completely. However, only 52.2% of the physicians accepted that the diagnosis should be announced. Moreover, when the patient was a physician themselves with cancer, 94.4% of the physicians agreed that they prefer to be informed about the diagnosis and survival. This ratio decreased to 56.7% when the patient was a physician's relative. Additionally, 94.4% of the physicians (n=287) agreed that education on how to approach death and cancer patients should be given during or after medical education. The responses to the questionnaire differed according to the variables of death anxiety, practice area, gender, and marital status.

Investigating The Impact Of Physicians' Attitudes Towards Death And Their Demographic Factors On Disclosure Of Bad News To Cancer Patients   1

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CONCLUSION:

According to the results, this paper shows the importance of the socio-demographic factors and the physician's attitude toward dealing with patients and giving bad news, and try to unify it by using a written training program in dealing with patients and giving bad news and reducing the effect of individual factors of physicians in dealing with Patients.

KEYWORDS

death, anxiety, physician, cancer, socio-demographic factors

INTRODUCTION

Giving bad news is an inevitable and unpleasant part of the career of physicians and medical students. It is a difficult task for both the speaker and the recipient [1]. Even small language variations in delivering bad news can significantly affect the health message, physician evaluation, and medical goals [2]. In Western countries, the main concern is choosing the best way for the healthcare team to break the news to patients. However, in many Asian countries, giving bad news faces several challenges, and there is no consensus on whether patients should be informed of their diagnosis or not [3]. The prognosis of the disease is one of the most challenging cases in the relationship between the doctor and the patient, as it can affect the acceptance of the disease, treatment decisions, and care measures [4,5]. There are cultural, professional and emotional challenges to revealing the truth to cancer patients. In Iran, patients with cancer do not have enough information about their disease and treatment choices. It is evidence that cancer is considered as bad news because Bad news" has been defined as "any information likely to alter drastically a patient's view of his or her future.

Some studies on this topic showed that final year medical students, who were about to enter the medical profession, felt incapacitated, unprepared, and unsuccessful when faced with the task of breaking bad news. Additionally, some physicians in the same situation felt guilty, as if they were responsible for the patient's condition [6-8]. A survey shows that 40% of Iranian cancer patients are not aware of their disease, but they prefer to know more about their diagnosis. Those who are aware of their diagnosis prefer to receive more details directly from their physician [9].

In Eastern countries, establishing a balance between independence and the obvious influence of families is an important factor in giving information to patients with a cancer diagnosis. A considerable number of patients do not receive a cancer diagnosis directly from their physician. Some studies showed that in countries like Japan, Saudi Arabia, and Iran, cancer patients and even physicians confirm that the physician should inform the family first and let them give the news to the patient. Requesting not to be informed is the patient's right, but if the family is informed by the physician without the patient's permission, this would be against the patient's autonomy [10]. Even families prefer to know first most of the time, and they should be informed about the patient's autonomy [11].

The importance of physician communication skills for bad news is increasingly recognized and there is evidence that this skill has improved, but giving bad news is still challenging and physicians lack the necessary clinical skills. Although there are a number of guidelines for communicating bad news to help doctors disclose the diagnosis and prognosis of the disease, a high proportion of cancer patients still receive insufficient information about their disease [12].

When searching for studies done in Iran on this subject, it is evident that studies evaluating the approaches and attitudes to breaking bad news make up the majority of them [11-13]. In the era of compiling instructions for giving bad news, there is little data in many countries about the attitudes and expectations of doctors and the demographic characteristics of doctors and their impact on their relationship with patients in giving bad news. But emotional situation, beliefs and attitude toward death, marital status or having children, place that they work because of different culture of population and its interaction with physicians, place of study according to different teaching strategy that may also be influenced with cultural atmosphere and also work experience according to receiving feedback from patients and maturity of physicians, may all change the dealing of physicians with patients. Newer investigations insist on physician's readiness for giving bad news compared to just patient preparation and information giving space [14].

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Unfortunately, we did a study on how the personal attitude of doctors toward death may affect their relationship with patients that have higher death risk accept. Therefore, we were interested to investigate the physician's opinion toward death and their fear of death and its effect on disclosure with patients in higher risk of death and this shows that we should have educational programs to reduce the effect of characters that may influence the physician patient relationship in giving bad news.

One of the goals in giving bad news is to minimize the discomfort of professionals. This discomfort may be caused by fear of the patients' reactions, their own feelings, their incompetence, or their fear of being blamed. Minimizing such distress to the extent that it may affect professionals' own health affects their satisfaction and competence in delivering bad news [15]. Nowadays malpractice is more because of poor patient-physician relationship especially in effective communication than quality of treatments. The impact of this phenomenon increases the risk of suing phycians and doctors are increasingly view patients as potential adversaries and this may result practice defensive medicine, which more and more eroded their relationships. Studies have demonstrated that the practice styles of not sued physicians do not differ in technical aspects of clinical care. Nearly one-third of complaints are related to communication [16]. this will result in patient safety issues, adverse effects on the public opinion, reduced empathy between the physician-patient, and challenges of medical professionalism and Lack of optimal treatment increases the complaints from the physicians [17] all this will affect healthcare system. On the other hand, general belief about cancer despite advanced therapy methods and better survival compared to previous decades is still associated with fear and hearing word cancer is still horrible for many patients and even physicians are affected with this belief and many may try to reduce the difficulty of this situation by involving family members rather than the patient [18].

Knowing that which characteristic may influence physicians encounter with patients and to program for correcting and decreasing effect of personal characteristic encountering patients with cancer and giving bad news is required .on the other hand death anxiety also may influence physicians encounter with patient with diseases that may result in dead so we should know the effect of death anxiety on dealing with cancer patients, it should be managed and educated during learning years. Doctors' perception is often conflicted with

patient's preferences and for each region, the unique model of the region should be designed according to the existing cultural differences, so we conducted the present study to evaluate the skills of doctors in breaking bad news. to cancer patients that may lead to clinical guidance on how to deliver bad news to patients in Iran regarding between their demographic characteristics, their view of death, and its impact on giving bad news.

METHODS

According to the latest statistics from the medical system website, the total number of specialists in Iran, including all relevant subspecialty branches in the fields of general surgery, internal medicine, radiotherapy, and radiology, is estimated to be around 13,476 people. Considering the population above 10%, i.e., 1,347 people, were considered as the population of the society. Extreme case sampling involves selecting a sample of individuals or units that are considered extreme or unusual in terms of the characteristics or characteristics the researcher is interested in investigating. This type of sampling is used to understand unusual or exceptional experiences or characteristics in society. Therefore, considering the judgment of researchers and less access to the general community of specialist doctors, this number was considered.

Cochran's formula was used to estimate the required sample size in this research. According to Cochran's formula, N is the population size, and n is the sample size. The allowable error value, which is usually considered equal to 0.05, is represented by d. The ratio of possessing the desired trait is represented by p, and the ratio of not having the desired attribute, which is usually considered equal to 0.5, is represented by q. Based on Cochran's formula, with confidence level of 95%, margin of error 10, population proportion 50, the estimated sample size is at least 90 people and at most 299 people. Our study is a pilot study of the population because of large number of population and also Difficulty in reaching the people of the target society and that this group of doctors are less willing to participate in filling out the questionnaires due to their busy schedule, we selected 90 sample size.

In this research, the questionnaire method was used to collect information. Before distributing the questionnaire, the plan, the purpose of the questionnaire, the way of answering, the confidentiality of the information, and also

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their non-traceability were explained to the target population. The questionnaire was established based on the literature review and after examining its content validity by a number of psychiatrists. Patients' view and variables affecting how to break the bad news was discussed in the questionnaire. This questionnaire contains 45 questions, of which the first 8 questions are related to demographic characteristics, including age, gender, specialized field, place of study, workplace, work experience, marriage, and having children. One of these characteristics is type of university of study. The ranking or in better words the classification of medical sciences universities of Iran is based on The factors that determine the names of type 1 universities of medical sciences, including the axes of science production such as articles published in ISI, Scopus, the ratio of the total number of articles to the number of academic staff, etc. and the axis of structure such as human resources, student research, research infrastructure, etc. It has been announced. The names of medical sciences category 1 universities include the following, which you can see in the order and points they have earned. Tehran University of Medical Sciences Shahid Beheshti University of Medical Sciences, Isfahan University of Medical Sciences, Shiraz university of medical sciences, Tabriz University of Medical Sciences, Mashhad University of Medical Sciences, Ahvaz University of Medical Sciences, Kerman University of Medical Sciences.

From questions 9 to 30, physicians' opinions were examined in the field of evaluating the need for medical ethics training and physicians' attitude toward death and giving bad news, physician's feelings and thoughts about end-stage patients, opinions, and attitudes about good death and the availability of training on giving bad news for physicians. At the end of the questionnaire, the physicians' comments about telling the diagnosis of the disease when the physician himself/herself or one of his relatives is diagnosed with cancer were collected.

In designing the final 15 questions, Templer's fear of death scale, which was designed in 1970 and examined in various studies in Iranian society, was used [19]. The questionnaire was designed by a specialized team, including one psychologist, three radio-oncotherapy specialists, two general surgeons, and one onco-surgeon, who reviewed previous studies conducted in this field [6]. After completing the questionnaire by the target group, the data were extracted from the questionnaire and entered into the SPSS software 26, and the variables were measured using Chi square test.

RESULTS

Out of the 90 questionnaires in this study, 50 (55.6%) were completed by women and the remaining were completed by men. The majority of participants were married (80%) and had children (66.7%). The average age of participants was 42.76 ± 9.53 years. 41.1 % of study subjects had more than ten years of work experience. The specialties of the participants in this survey were internal medicine (33.3%), surgery (30%), radio-oncology (26.7%), and radiology (10%), and the majority of them were from first-class medical sciences universities (71.1%). The city where more than half of the participants (68.9%) worked had a population of under 500 thousand people (Table 1). The average death anxiety score was 6.88 ± 3.27, and the lowest score was 1, while the highest was 15. More than half of the participants (73.3%) had a death anxiety score of less than or equal to 8, and 24 of them (26.7%) had a death anxiety score greater than 8.

The results of the statistical tests in Table 2 showed a statistically significant difference between the average death anxiety score and variables such as gender (p=0.002) and specialty (p=0.009). Male physicians had a higher percentage of death anxiety score. Surgeons and radio oncologists had lower death anxiety scores than internal medicine specialists and radiologists. However, the average death anxiety score did not show a significant relationship with variables such as age, marital status, having children, city of work, city of education, or work experience (p>0.05)., as it is shown in Table2.

TABLE 1. DEMOGRAPHIC CHARACTERISTICS

Demographic characteristics		Frequency	Percent
Age	Under 40	42	46.7
	40 and above	48	53.3
Gender	Female	50	55.6
	Male	40	44.4
Marital status	Single	18	20

	Married	72	80
Children	Have	60	66.7
	Don't have	30	33.3
Specialty	Internal medicine	30	33.3
	Surgery	27	30
	Radiology	9	10
	Radio-oncology	24	26.7
Population of the city of work	Under 500,000	62	68.9
	500,000 and above	28	31.1
University class of the residency 2	1	64	71.1
	2	24	26.7
Work experience	5 and under5 years	33	36.7
	5 to 10 years	20	22.2
	Above 10 years	37	41.1

TABLE 2. THE RELATIONSHIP BETWEEN SOME DEMOGRAPHIC CHARACTERISTICS OF DOCTORS AND THEIR LEVEL OF DEATH ANXIETY

Variable		Death anxiety score			
		Under and equal 8		Above 8	
		Number	Percent	Number	Percent
Gender	Female	43	65.2	7	29.2
	Male	23	34.8	17	70.8
	0.002 =P value			$\gamma^2 = 6.825$ Chi squere	
Speciality	Internal medicine	22	33.3	8	33.3
	Surgery	22	33.3	5	20.8
	Radiology	3	4.5	7	29.2
	Radio oncology	19	28.8	4	16.7
	0.009 =P value			$\gamma^2 = 11.531$	
Do you think that even if you don't tell the patient about his/her condition, he/she will know about his/her condition unconsciously?	Yes	17	25.8	12	50
	NO	40	60.6	12	50
	No opinion	9	13.6	0	0
	0.033 =P value			Chi squere $\gamma^2 = 6.825$	
If I have cancer, I would like to know completely about my disease and its survival	Yes	65	98.5	20	83.3
	No	0	0	3	12.5
	No opinion	1	1.5	1	4.2
	0.012 =P value			Fisher's test	

Physicians with a higher level of death anxiety had a higher level of emotional difficulty in giving bad news. Regarding the question "Do you think that even if you don't tell the patient about the condition of the disease, he/she will be

informed about his/her condition unconsciously?", physicians with a higher level of death anxiety believed that patients would understand even if they were not given a complete explanation. Patients who are aware of their disease like to talk about their condition and death.

DEFINING THE DEMOGRAPHIC VARIABLES

Sociodemographic variables including age, gender, marital status, having or not having children, specialty field, the amount of population of city of work and study and years of work experience are socio demographic characters that are evaluated in our study and distribution is demonstrated in Tables 4 and 5. Besides, Table 3 shows that all physicians agreed that a patient's awareness of their cancer diagnosis and prognosis affects their treatment choices. The majority (94.4%) of physicians agreed with the need for a professional team to help them inform cancer patients. 94.4% of physicians answered positively to the question "If I have end-stage cancer, I would like to know everything about my disease and its prognosis."

TABLE 3. ABSOLUTE FREQUENCY DISTRIBUTION OF THE RESPONSES OF THE STUDIED SUBJECTS

Objects	Yes	No	No Opinion
	Number(percent)	Number(percen)(	Number(percen)(
1.Is breaking the news of impending death difficult for you emotionally?	(87.8)9	(10)9	(2.2)2
3. Do you think that even if you don't tell the patient about his/her condition, he/she will know about his/her condition unconsciously?	(32.2)29	(57.8)52	(10)9
4.Is there a need for education about end-of-life palliative care and available supports	(84.4)76	(11.1)10	(4.4)4
5.Have you been trained to talk to the patient about cancer conditions?	(17.8)16	(76.7)69	(5.6)5
6.Is the help of a professional team needed in informing patients with cancer?	(94.4)85	(2.2)2	(3.3)3
9.In your opinion, does the patient's awareness of the cancer diagnosis and survival of the disease have an effect on the patient's choice of treatment method?	(100)90	0	0
10. Should the patient be told the approximate length of time he/she will be alive?	(47.8)43	(37.8)34	(14.4)13
11.All information must be given to the patient completely?	(52.2)47	(43.3)39	(4.4)4
14.If I have cancer (end stage), I would like to know completely about my disease diagnosis and its survival.	(94.4)85	(3.3)3	(2.2)2
15.If my loved ones are suffering from cancer, they should know fully about the diagnosis of the disease and its survival.	(56.7)51	(34.4)31	(8.9)8
16.In my opinion, telling patients about advanced cancer conditions has no effect on survival.	(37.8)34	(40)36	(22.2)20
17. Patients have the right to know their cancer diagnosis and the full extent of the disease's condition.	(87.8)89	(5.6)5	(6.7)6
18. Does informing patients about the condition of their disease lead to increased trust in their doctor?	(82.2)74	(7.8)7	(10)9

19.Do you ask the patient's permission to inform their family about their cancer diagnosis?	(56.7)51	(34.4)31	(8.9)8
20.Do you entrust the family to inform the patient about their cancer condition?	(26.7)24	(61.1)55	(12.2)11
21. If one of your loved ones has cancer, do you expect information about their disease to be given to you without their knowledge?	(51.1)46	(42.2)38	(6.7)6
Patients who are aware of their disease like to talk about their condition and death.	(71.1)64	(16.7)15	(12.2)11

TABLE 4. THE ABSOLUTE FREQUENCY OF MULTIPLE-CHOICE QUESTIONS

Objects		Number	Percent
2. How do you feel when you give the news of cancer?	Feel guilty	3	3.3
	Absurdity	11	12.2
	Sadness	66	73.3
	Anxiety	29	32.2
	Fear	6	6.7
	No special feeling	9	10
7. If you need the help of a professional team in informing cancer patients about their disease, which one would you prefer?	Oncologist	54	60
	Patients surgeon	24	26.7
	Psychologist	51	56.7
	Psychiatrist	37	41.1
	Religious advisor	6	6.7
	To several items at the same time	25	27.8
	None of them	3	3.3
8. Giving information about disease diagnosis and situation to the patient depends on what factors?	Patients religious beliefs	23	25.6
	Economic level	27	30
	Social level	26	40
	Level of education	37	14.1
	All items	56	62.2
	None	4	4.4
12. Which option do you choose regarding the giving diagnose and information method?	The patient should be told first, and if the patient allows it, the family should be told	20	22.2
	The information must be given to the patient first	9	10
	The information should be told to the patient's family first	13	14.4
	It depends on the condition of the patient	48	53.3
13. If you do not agree to give complete information to the patient, what is the reason?	Emotional reactions of the patient	42	46.7
	It is difficult for me	17	18.9
	Worried about being blamed	3	3.3
	Worry about patients going to another physician	0	0

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	Worrying that the patient will refuse treatment due to disappointment	47	52.2

TABLE 5. THE RELATIONSHIP BETWEEN QUESTIONNAIRE QUESTIONS AND DEMOGRAPHIC VARIABLES

Variables (Age, marital state, speciality, City of work, class of university of studying residency)		Yes Number(percent)	No Number(percent)	No idea Number(percent)
Do physicians deal with patient as the deal with their relatives (if they have learned standard dealing manner. Age and if one of your loved ones has cancer, do you expect information about the diagnose and disease to be given to you without your loved one's knowledge?	Under 40	(%17.8)16	(%26.7)24	(%2.2)2
	40 and above	(%33.3)30	(%15.6)14	(%4.4)4
	P value =0.027		$\gamma^2 = 7.191$ Chi squere	
dose marital status changes information giving concept of physicians All information must be given to the patient completely?	Married	(%40)36	(35.5%)32	(%4.4)4
	Single	(%12.2)11	(%7.8)7	0
	P value =0.020		$\gamma^2 = 11.735$ Chi squere	
Dose Marital status change the concept of physicians on respecting patients right to keep the disease information secret: Do you ask for the patient's permission to inform their family about	Married	(%42.2)38	(%28.9)26	(8.9%)8
	Single	(%14.4)13	(%5.6)5	0
	P value<0.0001		$\gamma^2 = 22.467$ Chi squere	

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their disease condition?				
Dose the Specialty change the: If I have end-stage cancer, I would like to know everything about my disease and its prognosis.	Internal Medicine	(% 32.2)29	(1.1%)1	0
	Surgery	(30%)27	0	0
	Radiologist	(8.9%)8	(2.2%)2	0
	Radio-oncologist	(23.3%)21	0	(2.2%)2
		P value=0.016	Fisher's test	
Which Specialties feel more need for end life palliative education: Is there a need for education on end-of-life palliative care and available support?	Internal Medicine	(25.6%)23	(5.6%)5	(% 2.2)2
	Surgery	(% 24.4)22	(5.6%)5	0
	Radiology	(% 8.9)8	0	(% 2.2)2
	Radio-oncologist	(% 25.6)23	0	0
		P value=0.026	Fisher's test	
Dose giving bad news is more difficult for physicians working in lower populated cities: Is breaking the news of impending death emotionally difficult for you?	Under 500,000	(63.3%)57	(3.3%)3	(2.2%)2
	and above 500,000	(24.4%)22	(6.7%)6	0
		P value=0.04	Fisher's test	
Dose physicians working in lower populated cities feel more need for training to discuss cancer patients : Have you been trained to discuss cancer conditions with patients?	Under 500,000	(8.9%)8	(58.9%)53	(1.1%)1
	and above 500,000	(8.9%)8	(17.8%)16	(4.4%)4
		P value=0.006	$\gamma^2 = 10.260$ Chi squere	
does physicians working in lower populated cities prefer to have a team to inform patients: Is the help of a professional	Under 500,000	(67.8%)61	0	(1.1%)1
	and above 500,000	(26.7%)24	(2.2%)2	(2.2%)2
		P value=0.034	Fisher's test	

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team needed to inform patients with cancer?				
Dose physicians working in lower populated cities prefer to inform family rather than patients: Do you rely on the family to inform the patient about their condition?	Under 500,000	(23.3%)21	(36.7%)33	(8.9%)8
	and above 500,000	(3.3%)3	(24.4%)22	(3.3%)3
	P value=0.05		$\gamma^2 = 5.982$ Chi squere	
Dose physicians working in lower populated cities believe that they should be informed more than patients as family member : If one of your loved ones has cancer, do you expect to be informed about their disease without their knowledge?	Under 500,000	(% 42.2)38	(24.4%)22	(2.2%)2
	and above 500,000	(8.9%)8	(17.8 %)16	(4.4%)4
	P value=0.008		$\gamma^2 = 9.722$ Chi squere	
Dose the educational system of cities with lower population encourage physicians to give more information to the patients: All information must be provided to the patient completely.	First class*	(31.8%)28	(39.8%)35	(1.1%)1
	Second class	(19.3%)17	(4.5%)4	(3.4%)3
	P value=0.003		Fisher's test	
Dose the higher work experience result in giving more information to the patient? : Does informing the patient about their disease	5 and under 5	(32.2%)29	(1.1%)1	(3.3%)3
	Above 5 to 10 years	(15.6%)14	(5.6%)5	(1.1%)1
	Above 10 years	(34.4%)31	(1.1%)1	(5.6%)5
	P value=0.026		Fisher's test	

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condition increase their trust in the doctor?		

Most physicians (87.8%) believed that patients have the right to know the full extent of their disease's condition. 87.8% of physicians answered positively to the question "Is it emotionally difficult for you to give the news of impending death?" More than half (76.7%) of physicians have not received training to talk to patients about their cancer condition and how to deliver bad news.

84.4% of participants chose the positive answer to the question "Is there a need for education about end-of-life palliative care and available supports?" The majority (73.3%) of the participants chose sadness when asked how they feel upon receiving news of cancer, but death anxiety did not have an effect on their response. 56.7% of the participants would refer cancer patients to a psychologist for help. Regarding the factors that influence giving information about the disease to the patient, 37 (41.1%) chose level of education, 36 (40%) chose social level, 27 (30%) chose economic level, 23 (25.6%) chose religious beliefs, 56 (62.2%) chose all the items, and 3 (3.3%) chose none. The majority of physicians believe that the educational, social, economic, and religious condition of the patient should be taken into account altogether. Regarding the method of giving information to the patient, 48 (53.3%) chose the option "depends on the patient's condition," which demonstrates that most physicians do not have a strict method for giving information to patients and may easily decide to give the diagnosis and information to the family first.

47 (52.2%) of the physicians stated that the reason why they did not agree to give complete information to the patient was the fear that the patient would refuse treatment due to disappointment, 42 (46.7%) chose emotional reactions of the patient, 3 (3.3%) worried about being blamed, and 17 (18.9%) chose "it is difficult for me." None of them chose "being worried about patients going to another doctor" (Table 5).

When examining the effect of demographic factors on questionnaire responses, it was found that physicians over the age of 40 significantly indicated their preference to know all the details of the disease if their family members were diagnosed with cancer, even without their family members' knowledge. Married doctors significantly

believed that complete information about the disease should be given to the patient, but they also believed that permission should always be obtained from the patient to provide information about their illness to family members. All internists, radiologists, and surgeons preferred to know all the details of their own cancer diagnosis, which was statistically significant.

All specialties, including surgeons, radiologists, radio-oncologists, and internal medicine physicians, felt a greater need for education on end-of-life care. Physicians who worked in cities with populations under 500,000 faced more difficulty in delivering bad news to patients and expressed more frequently that they had not been trained to talk about cancer with patients. They also expressed a need for a professional team to deliver bad news to patients.

Physicians who worked in cities with populations over 500,000 disclosed less information about the disease to the patient's family. In contrast, physicians in small towns expected that, in the event of a family member's involvement with cancer, they would be aware of all the details of the disease without the patient's knowledge. Physicians who had received education in universities ranked as class 2 were more likely to believe that complete information about the disease should be given to the patient. Physicians with more than 10 years of work experience believed more strongly that providing complete information increased patient trust in the physician.

DISCUSSION

In our study, all doctors responded positively when asked whether a patient's awareness of their diagnosis and survival affects their treatment choices. and also However, majority of doctors believed that patients have the right to know the full extent of their illness and 71 believed that patients who are aware of their disease like to talk about their condition and death. Furthermore, only 43% believed that the approximate time of survival should be disclosed to the patient, and 52.2% believed that all information about the illness should be disclosed to the patient. Despite the physicians' belief in a patient's right to know everything about their cancer and survival, a lower percentage

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prefers to divulge the details of the diagnosis and survival due to concerns about the patient's emotional reactions or refusal of treatment. The physicians believed that the extent of information given to the patient mostly depends on social and educational levels, followed by economic and religious levels.

In a similar study by Arbabi et al. [20], the emotional reactions of the patient and concern about their inability to control their reactions were mentioned as the primary reasons for withholding complete information from the patients. In that study, only 14% of doctors believed that the time of survival should be disclosed to the patient, whereas in our study, 43% believed that the approximate time of survival should be disclosed to the patient. In the study by Kaplowitz et al. [21], none of the doctors were willing to disclose information about the approximate time of survival to the patient, which may be due to the increased tendency of doctors towards transparency with patients in recent decades.

Although studies conducted in Iran on patients' opinions about receiving information about their illness, such as the study by Managheb et al. [22], have shown that more than 90% of patients prefer to receive all details and information about their illness, our study found that only 52.2% of participating physicians believed that all details should be explained to the patient. Higher agreement was found among individuals who had received education at type 2 universities. The reasons for this difference may be due to the low number of participants or the type of education provided in these universities, which needs to be investigated and compared with a larger number of participants from different universities.

The majority of physicians, about 79%, experienced emotional difficulty when giving bad news of impending death, and about 66% of physicians experienced emotional sadness when delivering such news. Additionally, about 76% of physicians expressed the need for training in end-of-life care. However, only 16% of them had received training on how to talk to cancer patients and deliver bad news. Similarly, in a study by Arababi and colleagues, 94% of physicians reported that they had not received any training on how to deliver bad news during their education or career. Only 22% rated their own experiences of delivering bad news as good or very good. In the study by Biazar et al. [11], only 13.6% of physicians had received training on how to deliver bad news, while 83% felt the need for training courses. In our study, 94.4% of

physicians stated that they needed a professional team to inform cancer patients about their condition. The majority preferred that the diagnosis and information about the disease be provided by an oncologist and a psychologist in the second stage. In the study by Paul et al. [23], oncologists were recommended to deliver bad news due to their higher experience in dealing with cancer patients. This demonstrates that physicians feel the need for educational courses on delivering bad news.

In a study by Ozkiris et al. [6], 95% of doctors expressed a desire to know the details of their own illness if they were diagnosed with cancer, while 84.1% said they would want to know the details if a family member had cancer. Similarly, in our study, 94.14% of respondents said they would want to know the details of their own illness if they were diagnosed with cancer. However, if a family member was affected, only 56.7% of respondents would prefer the patient to know the details. This is similar to the percentage of doctors who would allow the patient's family members to be informed about the illness, which was 56.7%.

Cancer diagnosis is not routinely disclosed to patients in several cultures of Africa, East and South Europe, and Middle Asia. The reasons for this situation include physicians' desire to protect patients from psychological stress after learning their diagnosis, families' reluctance to have the diagnosis disclosed due to the synonymous perception of cancer and death, and patients' unwillingness to know their diagnosis. While family members are reluctant to have the diagnosis disclosed, physicians typically discuss the diagnosis with family members before the patient.

Patients who wish to be informed are not satisfied when deprived of this information, which can lead to negative consequences. In our study, only 56.7% of participants ask for the patient's permission to disclose their disease details to family members. Additionally, 61.0% of respondents in our study said they would entrust family members to provide information about the disease to the patient. However, they expect to be aware of the details of a family member's diagnosis and details, particularly in cities with populations under 500,000, if the family member was affected by cancer.

Khalili et al. [24 reviewed 55 journals, including those from Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Palestine, Pakistan, Saudi Arabia, Turkey, and the United Arab Emirates. Based on Khalili et al. [24] summary, the diagnosis of cancer is still associated with social stigma and

misconceptions about incurability in the Middle East region. Physicians maintain a policy of disclosure, where they respect certain historical and cultural misconceptions about cancer and, therefore, disclose the truth about cancer to a family member while acknowledging the patient's right to know the truth. They would prefer to disclose it to the patient (or family member) if possible. It appears that the attitude, perceptions, and beliefs of family members and caregivers about telling the truth to the patient favor concealment. There are conflicting results on the assessment of physicians and patients about the quality of truth disclosure in the literature. Many countries lack educational programs for disseminating bad news. Finally, the most important and common problem affecting truth disclosure for cancer patients is the lack of codes and laws related to patients' rights in informed consent. Studies, laws, and educational programs in this area are needed in Middle Eastern societies [24].

The results of our study in cities with populations under 500,000 are presented below. Giving bad news emotionally was found to be more difficult, and there was a greater need for professional team support. Participants expected to receive information about their loved one's disease without their knowledge. This could be due to cultural differences and the types of relationships found in smaller population cities. We also studied death anxiety and its relationship with physicians' willingness to inform patients. Death anxiety was higher in men, and the fields of oncology and surgery had the lowest death anxiety. Individuals with higher death anxiety had less desire to know complete disease information if they were to become ill.

They also experienced higher emotional difficulties when encountering patients with cancer. The study by Ozkiris et al. [6] reported a higher level of death anxiety in women. Ozkiris et al. [6] study also found that death anxiety resulted in more emotional difficulty when informing patients and their families. This may suggest that a physician's attitude towards death can affect how they interact with cancer patients and the information they give to them. A questionnaire with a larger number of physicians should be conducted.

The difference in the approach of physicians in less populous cities may be due to cultural differences, greater familiarity among individuals, or communication limitations in such cities. This requires further investigation with a greater number of physicians from different cities.

Limitation: our limitation was small number of physicians taking part in the study from different specialty groups, and also having no assess to other individual factors affecting the physicians' attitude toward cancer patients such as personality type, their familial culture.

CONCLUSION

Our study highlights the need for training courses during education and work to help physicians deliver bad news to patients. On the other hand, the perspective of physicians in their city of work and city of study due to cultural environment or other interfering factors and sociodemographic characteristics may also affect their views on giving bad news. Standardization methods and educational methods according to spatiality and interfering factors during education can minimize these differences. The weakness of our study is the small number of participating patients. There are guidelines available which guide to how give unfavorable news. But in countries like Iran, cancer is still considered the biggest taboo, reactions while giving bad news of cancer can be very unpredictable both for the patient and their families so we decided to investigate on disclosure of bad news in cancer patients. In future studies, larger number of participants from different characteristics that were studied here can provide more precise sight on finding all characteristics that may affect optimal patient physician relationship in poor prognosis disease.

ETHICS APPROVAL
The Babol University of Medical Sciences approved the ethic and content of this paper under the code of #B01267747.

DATA AVAILABILITY STATEMENT
The data are available from the corresponding author upon the reasonable request.

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Investigating The Impact Of Physicians' Attitudes Towards Death And Their Demographic Factors On Disclosure Of Bad News To Cancer Patients   **15**

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ANTECEDENTS FOR THE ADOPTION OF TELEMEDICINE IN INDIA: SCALE DEVELOPMENT AND VALIDATION

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ABSTRACT

BACKGROUND:

Telemedicine is increasingly recognized as a promising solution to healthcare challenges in India, particularly in remote areas. However, the country's vast population and geographic diversity present significant obstacles to providing accessible and high-quality healthcare services to all citizens. By leveraging technology, telemedicine has the potential to bridge this gap and enable remote delivery of medical services.

OBJECTIVE:

This study aims to develop and validate a scale that assesses the factors influencing the adoption of telemedicine in the Indian context. Understanding these factors is crucial for identifying key drivers and barriers to telemedicine adoption in India.

DESIGN:

Quantitative methods were employed for scale development. The instrument development process involved several stages: factor identification, item generation, pre-testing, pilot testing, and scale validation. A structured questionnaire was administered to healthcare professionals, industry experts, and patients who have used or intend to use telemedicine.

SETTING:

Confirmatory factor analysis and subsequent tests, such as reliability and validity tests were conducted to establish the internal consistency of the scales. These statistical analyses aimed to identify underlying factors and ensure accurate measurement of latent variables that affect the adoption of telemedicine.

RESULTS:

The study established a robust scale to assess the five key factors, which are the vital explanatory variables in telemedicine adoption in India. These meticulously validated scales, encompassing technology, government policy, user attitudes, societal demand, and healthcare professional perspectives, demonstrate high reliability and validity in understanding the adoption dynamics of telemedicine in the context of India.

CONCLUSION:

This research offers a validated scale for assessing telemedicine adoption in India, crucial for healthcare service providers, policy makers, and researchers in this field. It enables informed decisions in implementing telemedicine, addressing unique

challenges and opportunities, and significantly contributing to optimizing healthcare delivery across India's diverse socio-economic and geographical landscape.

INTRODUCTION

Telemedicine, a healthcare service for remote diagnosis and treatment of patients through telecommunications technology, has become increasingly essential in contemporary healthcare, as the global response to the COVID-19 pandemic and thereafter.

As telemedicine continues to expand, there is a critical need for reliable and valid scales to measure various aspects such as user attitude, effectiveness, and technology usability. These measurements are vital for improving service quality and patient outcomes. The development of our scale is grounded in one key theoretical framework, the technology acceptance model (TAM) by Davis (1989) which provides insights into how users come to accept and use technology for service effectiveness [1].

Existing scales such as the telehealth usability questionnaire (TUQ) and the service user technology acceptability questionnaire (SUTAQ) provide valuable insights, but they often lack comprehensive coverage of user experience, the role of practitioners, the role of policymakers, and effective clinical outcomes in diverse telemedicine settings. This gap underscores the need for a more holistic and robust scale [2, 3]. Given the limitations of existing measurement tools, our study aims to develop a comprehensive scale that addresses these gaps. By incorporating elements from the existing theoretical models, our scale will provide a practically more useful and effective measure of telemedicine services.

This research aims to answer the following questions: 1) what are the key dimensions of effective telemedicine adoption and 2) how can these dimensions be reliably and validly measured? The primary objective is to develop and validate a scale that accurately captures these dimensions, ensuring it is both practical for healthcare providers and meaningful for patients.

BACKGROUND

This research is rooted in the pressing healthcare challenges faced in India. India, renowned for its vastness and diversity, is home to over a billion people. This immense population faces significant challenges in delivering equitable healthcare, particularly in remote and underserved regions. These challenges include inadequate healthcare infrastructure, a scarcity of healthcare professionals, geographical barriers, and socioeconomic disparities. These issues contribute to limited access to both quantum and quality healthcare services, especially in rural and remote areas [4]. In this complex landscape, telemedicine emerges as a promising and transformative solution. By leveraging technology, telemedicine bridges the gap between healthcare providers and patients, irrespective of their physical locations, by offering remote consultations, diagnosis, treatment, and health monitoring. This innovation not only addresses the pressing need for healthcare accessibility but also paves the way for a more inclusive and efficient healthcare system [5]. However, there is a significant gap in understanding the factors influencing the successful adoption of telemedicine in India.

This study aims to address this gap by developing and validating a scale that assesses the factors influencing the adoption of telemedicine in the country. This study builds on prior research in e-health management, telemedicine's practical implications, healthcare emergencies, and the role of technology-based healthcare management.

LITERATURE REVIEW

Some previous research studies have outlined the processes of scale development and validation. The studies utilized guidelines proposed by Churchill in 1979 and Hensley in 1999 for scale development and validation, specifically in telemedicine [6, 7]. Shaarani, in 2023, developed a telemedicine acceptance model based on TAM during the Pandemic (TeAM) [8]. The model was developed considering the associations between

constructs affecting the physicians' attitudes about telemedicine use. TeAM is a tool assessing telemedicine acceptance based on the TAM. It has additional constructs covering the perceived risks of telemedicine use, the perceived need for policies, the perceived need for training, and the perceived usefulness of telemedicine during a pandemic. The adoption and acceptance of telemedicine require the application of a technology acceptance model which could be used to predict patient behaviour [9]. Validated telehealth surveys have proven useful tools for measuring patient satisfaction with telehealth services [10]. Such surveys generate valuable information on patient's experience with telehealth services, which could also be used to predict patient's behaviour.

A literature review of some recent articles was conducted to analyze the findings and identify the gaps, which led to the identification of five independent variables that may impact the adoption of telemedicine in India. These variables include 'societal factors,' 'government policies,' 'perception of patients/users,' 'perception of doctors', and 'technology availability.' The study measures the impact of these independent variables on the adoption of telemedicine through research outcomes identified in the literature survey.

TECHNOLOGY FACTORS

In India, the success of telemedicine hinges on robust technology infrastructure, essential for facilitating remote healthcare interactions. Despite urban advancements, rural areas face significant disparities in accessing this technology [11]. Telemedicine, supplementing rather than replacing face-to-face care, demands video-enabled, user-friendly platforms accessible across locations [12]. Key to its implementation is the availability of compatible, secure, and interoperable systems, addressing challenges like the digital divide, technological literacy, and maintaining patient confidentiality [13].

SOCIETAL FACTORS

Societal factors refer to the influence of social norms, beliefs, attitudes, and expectations of members of society toward adopting telemedicine [14]. Social factors can impact the willingness of individuals and communities to adopt telemedicine due to their longstanding preference for face-to-face consultations [15]. Some patients, particularly females, may feel embarrassed to disclose personal details to unknown people on the other end. Moreover, a perception that telemedicine is less effective and offers lower quality care than traditional healthcare may discourage patients and doctors from using it. Despite these challenges, societal factors can also facilitate technology adoption, especially after pandemics like COVID-19 [16].

USER ATTITUDE TOWARDS THE ADOPTION OF TELEMEDICINE

The user's attitude influences the degree of positive or negative feelings toward using telemedicine. Individual beliefs on the positive and negative consequences influence telemedicine usage. The COVID-19 pandemic has increased the awareness and demand for telemedicine services in India and opportunities for its adoption. The pandemic has also exposed the lacunae and barriers in India's telemedicine infrastructure, policy, regulation, and education [17].

IDENTIFICATION OF CONSTRUCTS

The constructs or factors have been identified based on the literature review. As mentioned above, stakeholders' theory and technology adoption theories were used, a new framework was created, and five independent factors were determined. While the contexts are based on the technology adoption and stakeholder's framework, many of the factors are different when compared to past literature on technology adoption, and they are specific to the needs of the adoption of telemedicine in India. The following factors have been determined based on past research on telemedicine adoption in India and feedback from industry experts, doctors, and users [18].

SOCIETAL ACCEPTANCE (SA)

In India, societal and cultural factors critically influence telemedicine's adoption. While telemedicine's potential to revolutionize healthcare in underserved areas is significant, it faces barriers like cultural beliefs, which may view physical presence as essential in healing [19]. Awareness and trust issues also hinder acceptance; many are unaware of telemedicine's workings, leading to scepticism [20]. Building trust is essential, as physical absence in consultations raises concerns. Addressing these challenges is key to unleashing telemedicine's transformative potential, particularly in rural regions [21]

TECHNOLOGY AVAILABILITY (TA)

Technology availability influences the implementation of telemedicine in India, implying that the access and quality of the telecommunication and information technology infrastructure affect the adoption and effectiveness of telemedicine services in the country. Technology availability is a major challenge and opportunity for telemedicine in India, a large and diverse country with a huge population and a wide gap between urban and rural areas regarding healthcare resources and outcomes. According to some studies, technology availability is a key factor that affects the intention to use telemedicine among doctors and patients in India, as well as the quality and satisfaction of telemedicine services [22]. Some aspects of technology that influence telemedicine implementation are the availability of telecommunication bandwidth, which enables medical expertise to reach underserved rural markets through telemedicine and teleconsulting programs delivered over mobile phones. Reliable and affordable internet connectivity facilitates the transmission of data, images, and videos between remote locations

and healthcare centres, which is crucial to telemedicine implementation [17].

GOVERNMENT POLICIES ON TELEMEDICINE (GP)

Telemedicine delivers health care services using information and communication technologies (ICT) such as telephone, mobile, internet, etc., to provide remote consultation, diagnosis, treatment, and follow-up. The Ministry of Health and Family Welfare (MHFW) issued the first guidelines for telemedicine practice in India on March 25, 2020. The guidelines provide information on various aspects of telemedicine practice, such as definitions, types, modalities, processes, technology platforms, ethical principles, fees, data privacy and security, documentation and record keeping, etc. The guidelines also specify the roles and responsibilities of registered medical practitioners (RMPs) who provide telemedicine services, such as obtaining consent, verifying identity, establishing rapport, maintaining confidentiality, prescribing medicines, and issuing digital certificates. The guidelines apply to all RMPs enrolled in the State Medical Register or the Indian Medical Register under the Indian Medical Council Act 1956 [23].

TABLE 1. LATENT CONSTRUCTS (FACTORS) AND THEIR DESCRIPTION

Factor Name	Description
Societal Acceptance (SA)	The influence of societal acceptance on telemedicine adoption.
Technology availability (TA)	The influence of technology availability on telemedicine adoption.
Govt. policies and guidelines (GP)	The extent of influence of clear policies and guidelines on the use of telemedicine in India
User's behavior and attitude (UB)	The extent of influence of patients' attitudes and behavior on the use of telemedicine in India,
Doctor's role (DR)	The extent of influence of doctors' acceptance on the use of telemedicine in India,

PATIENT/USER'S ATTITUDE TO USE TELEMEDICINE IN INDIA (UB)

Telemedicine is revolutionizing Indian healthcare, offering patients the ease of consulting with doctors remotely, and reducing the need for long travels and clinic waits, a significant benefit in a country where distances and traffic often impede medical access [24]. Especially beneficial for remote areas with limited medical facilities, telemedicine connects residents to urban specialists, ensuring quicker, more effective treatment options [25].

DOCTOR'S ROLE IN TELEMEDICINE USAGE (DR)

The importance of telemedicine in India is evident because it can help address some of the major challenges faced by the Indian healthcare system. It can mitigate the high burden of communicable and non-communicable diseases like COVID-19. Doctors must address the need for more awareness and education among patients and providers about preventive and primary health care [26]. Doctors' endorsement of telemedicine has helped build trust and acceptance among patients. As doctors have

advocated for telemedicine's safety, reliability, and convenience, patients have become more receptive to virtual consultations. Doctors' positive patient experiences have further encouraged patients to seek telemedicine services. [27]

The latent constructs (factors) and their descriptions are summarised in Table 1.

GENERATION OF ITEMS

While studies on the adoption of telemedicine in India are limited, items have been adopted from the sources mentioned in the Table 2. The items are suitably adapted and contextualized for the adoption of telemedicine from validated instruments across areas, such as mHealth, telehealth, remote health, and online health consultation, supported by a literature review.

In the context of telemedicine, technology availability is a well-established factor in adoption studies and has primarily been measured using reflective indicators in past research [27]. A new factor, societal acceptance, has been modelled with reflective items within this context. Additionally, factors related to government policy have been developed as reflective indicators [28]. From the doctor's perspective, factors such as the doctor's role, and from the patient's perspective, factors like patient behavior and attitude, have been historically measured in the literature through reflective items.

TABLE 2. PUBLICATION REFERENCE

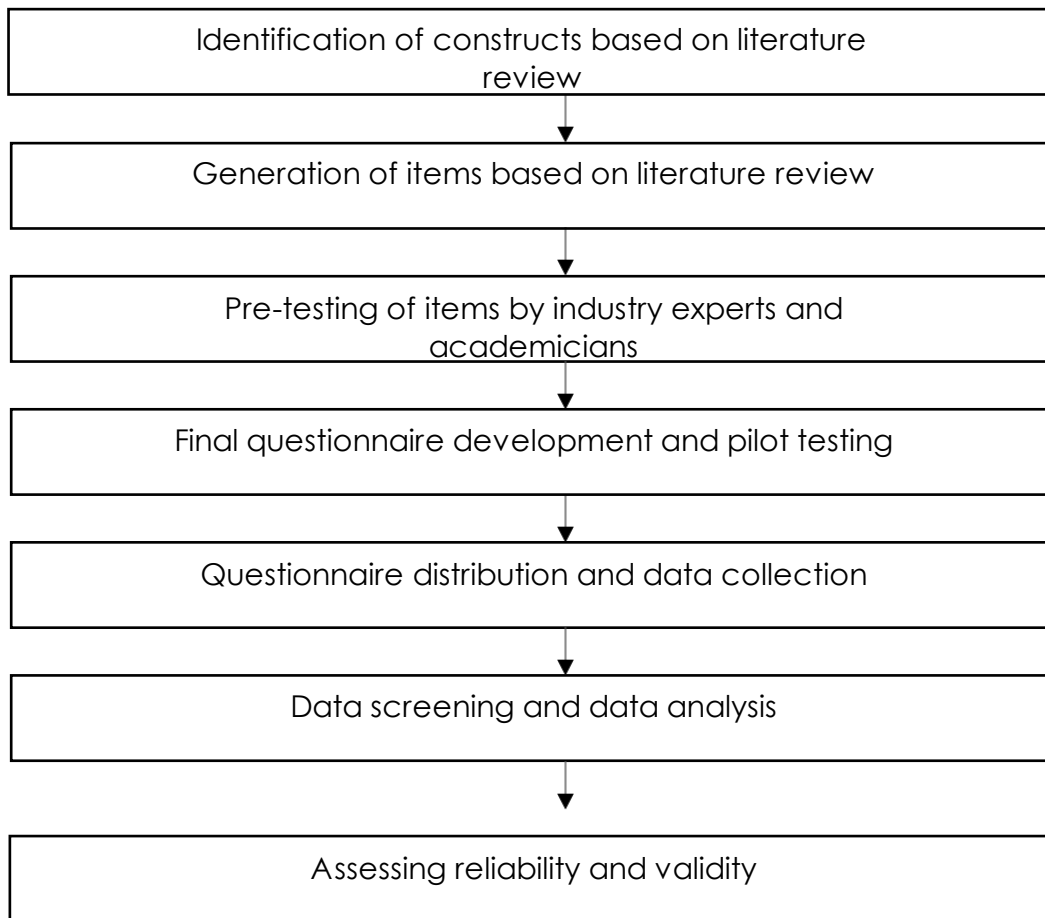| Factor Name	Items	Item Reference
Technology availability (TA)	Improved internet speed and access, along with the widespread availability of connected devices, are key for effective telemedicine.	[11, 12, 13, 17, 22]
	Incorporating AI, ML, VR, Blockchain, and IoT into telemedicine can significantly improve its adoption and effectiveness.	
	Seamlessly combining existing patient data with new technological methods is crucial for comprehensive and efficient telemedicine.	
	Utilizing Blockchain and Cloud computing to secure patient records ensures privacy and data integrity in telemedicine.	
	Leveraging platforms like Zoom, Google Meet, and WhatsApp video enhances doctor-patient interactions, boosting satisfaction in telemedicine.	
	Tailored applications developed by clinics and hospitals can significantly enhance telemedicine services and user experience.	
	Providing diverse online payment methods enhances convenience for telemedicine users.	
Societal acceptance (SA)	Societal pressure to provide healthcare to every citizen in India has intensified, especially following the heightened awareness and urgency due to emergencies and pandemics.	[14, 16, 19, 20, 21]
	There is a societal expectation for the cost of medical treatment to be reduced, making it affordable for the average person.	
	Societal pressure plays a crucial role in urging policymakers in the Health Ministry to establish and maintain a robust healthcare data security system, ensuring patient privacy and trust.	
	Society recognizes the importance of insurance in alleviating and supporting healthcare expenses, underlining its role in a comprehensive healthcare system.	
	How society views and manages its healthcare impacts the nation's image both domestically and internationally, influencing media portrayal and the perception of the international community towards the Indian Healthcare System.	

Government policies (GP)	Government mandates for remote working during the pandemic have significantly accelerated the adoption and usage of Telemedicine services as an essential healthcare tool.	[23, 26]
	Travel restrictions and lockdowns imposed by the government during the COVID-19 crisis led to an increased reliance on telemedicine as an alternative to traditional in-person medical consultations.	
	The Government has provided clear and supportive regulations regarding the use of Telemedicine, aiding in its effective implementation and public acceptance.	
User behaviour (UB)	Patients prioritize their medical needs, and doctors are professionally and morally obligated to provide the best care possible, adhering to their medical oath.	[17, 24, 25]
	In health-related emergencies, patients expect and require a prompt response from healthcare providers like doctors, emphasizing the need for efficient telemedicine services.	
	The cost of telemedicine consultations should be accessible and affordable for the average patient, making it a viable healthcare option for a broader population.	
	Patients expect their consultations and medical records to be kept confidential, underlining the importance of privacy in telemedicine services.	
	Telemedicine consultations should strive to provide an experience that closely resembles traditional in-person consultations, meeting patient expectations for quality and interaction.	
Doctor's role (DR)	Doctors must foster the same level of relationship and rapport in online consultations as they would in offline, face-to-face interactions to ensure continuity in patient care and trust.	[26, 27, 29]
	Doctors can leverage the advantage of prescribing medications online or through applications, offering a seamless, paperless experience for patients.	
	Doctors can use telemedicine platforms not just for consultations, but also for ongoing messaging and engagement with patients, enhancing the continuity of care.	
	With the availability of various online payment modes like Paytm, doctors can conduct their services without concerns about payment, ensuring a smooth financial transaction process.	
Successful adoption of telemedicine (SAT)	A key factor in the successful adoption of telemedicine is its ability to improve patient adherence to prescribed treatments, facilitated by ease of access and continuous engagement.	[4, 5, 9, 10]
	Telemedicine is expected to lead to cost efficiencies, reducing expenses for both patients and healthcare providers by minimizing the need for physical infrastructure and travel.	
	The transition to telemedicine includes the digitization of patient data, which enhances data security and maintenance, ensuring patient confidentiality and efficient health record management.	
	The successful implementation of telemedicine is anticipated to significantly improve healthcare delivery in India, positively influencing the nation's image in terms of healthcare innovation and accessibility.	

METHODOLOGY

This study aims to develop and test a measurement scale to study the adoption of telemedicine in India. The development of the scale has been done in stages, covering factor identification, item generation, pre-testing, pilot testing, and scale validation [30, 31] as shown in Figure 1.

FIGURE 1. RESEARCH METHOD

Identification of constructs based on literature review

↓

Generation of items based on literature review

↓

Pre-testing of items by industry experts and academicians

↓

Final questionnaire development and pilot testing

↓

Questionnaire distribution and data collection

↓

Data screening and data analysis

↓

Assessing reliability and validity

PRE-TESTING

Pre-testing covers the items, sentence construction, question quality, and identifying biases and errors [32]. The pilot study involved pre-testing the questionnaire on a select pilot sample of 40+ individuals, a small subset of the target population, who fulfilled the demographic criteria for potential respondents in the main survey. These individuals, who were experts in academia and technology, were contacted through the author's personal networks.

QUESTIONNAIRE DESIGN

This study used a structured questionnaire, validated by existing research, to gather first-hand data to test the conceptual model. The questionnaire, essential for both pilot and main studies, comprised four sections: introduction and rationale of the study, respondent demographics, crucial multi-segment questions on independent and dependent variables using a five-point Likert scale, and a closing thank-you note. Open-ended questions were included in the pilot but omitted in the main study for consistency. Google Forms was the chosen platform for its ease of use and effective data management, featuring 33 questions.

DATA COLLECTION

After integrating inputs from the pilot study, the final questionnaire was created for the survey. For the research survey, prospective respondents were selected using the purposive sampling method. Respondents were contacted via LinkedIn or email. The questionnaire was distributed through Google Forms. The survey questionnaire was shared with approximately 1,400 people who are users as well as probable users of telemedicine in India. These prospective respondents were found through purposive sampling (mainly through the professional and Linkedin connections of the first author. Some were also found through the Linkedin searches and recommendations by practitioners). The selection of 1,400 individuals were determined, keeping

in mind the required sample size by balancing the resource constraints and the need for a representative sample. From the responses received, 377 sample cases were found to be complete in all respects which also met the adequacy requirement for this research.

RESPONDENTS' PROFILE

The respondents comprised industry experts, CEOs and business heads, doctors, human resource professionals, and telemedicine users. Of all the survey respondents, 69.2% were males, and 30.8% were females. The survey saw respondents from all age groups. There was no upper limit on the age of the respondents. However, the minimum age limit was set at 18 years. As set out in Figure 2, the data distribution shows that the research survey saw responses from all educational backgrounds.

FIGURE 2. DISTRIBUTION OF RESPONDENTS AS PER EDUCATION
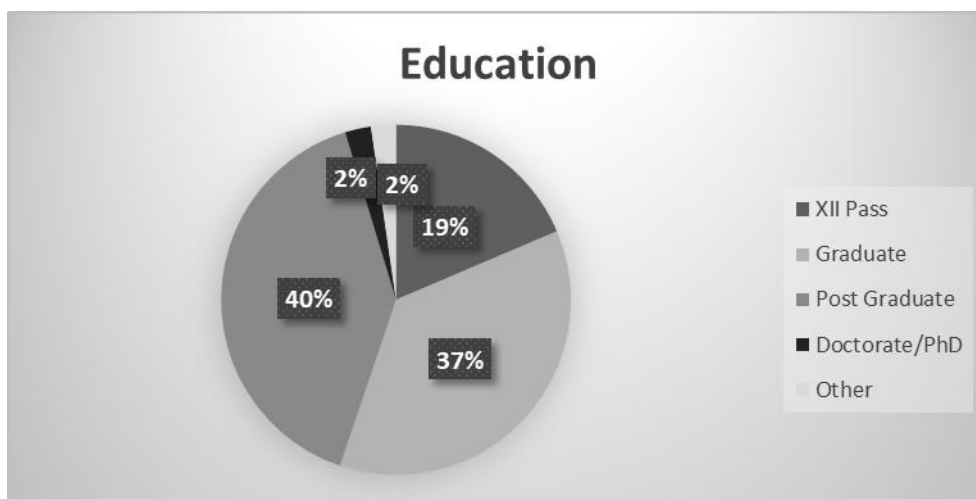
RESULTS AND DISCUSSION

The scale has been assessed for reliability and validity using the licensed version of ADANCO 2.3.2 software. The following statistical tests were done to examine the internal consistency of the scales.

TEST OF RELIABILITY

First, the construct's internal consistency/reliability was measured to test the scale's reliability. Cronbach's a-value and composite reliability (CR) were used to check the reliability. The values presented in Table 3 below reveal that all six constructs exhibit a Dijkstra-Henseler's rho exceeding 0.7, indicating excellent reliability. Furthermore, two constructs achieved a Jöreskog's rho score above 0.9, with another two nearing 0.9 and another surpassing 0.8. Hence, according to Jöreskog's rho, the reliability of the constructs can be considered above the threshold for good reliability. A minimum acceptable value for Cronbach's alpha is 0.60, while values exceeding 0.70 are considered highly reliable. Most of Cronbach's alpha (a) values are 0.7 or higher, with some approaching 0.9, which signifies good to excellent reliability. Based on the established criteria for Dijkstra-Henseler's rho (ρA), Jöreskog's rho (ρc), and Cronbach's alpha (a), it can be concluded that the reliability levels of the constructs in this study are generally classified as good or excellent. Reliability and validity results of the constructs, (defined in Table 1) are presented in Tables 3 and 4 below.

TABLE 3. CONSTRUCT RELIABILITY

Construct	Dijkstra– Henseler's rho (ρA)	Jöreskog's rho (ρc)	Cronbach's alpha (a)	Number of items
SA	0,7819	0.8502	0.7802	5
GP	0.7749	0.8380	0.7185	3
UB	0.8462	0.8876	0.8414	5
DR	0.8249	0.8832	0.8236	4

TA	0.9092	0.9267	0.9074	7
SAT	0.8572	0.9025	0.8560	4

Note: SA – Societal acceptance, GP – Government policy, UB – User behaviour, DR – Doctor's role, TA – Technology availability, SAT – Successful adoption of telemedicine

TEST OF VALIDITY

Discriminant validity serves as a parameter to determine the extent to which constructs that are expected to be unrelated demonstrate a lack of relationship. This implies that two conceptually distinct constructs must also exhibit statistical differences. According to this criterion, a construct's average variance extracted (AVE) should exceed the squared correlations it shares with all other constructs in the model, which are shown in Table 4 below.

TABLE 4. DISCRIMINANT VALIDITY

Construct	SA	GP	UB	DR	TA	SAT
SA	0.5317					
GP	0.3974	0.6365				
UB	0.3377	0.2656	0.6129			
DR	0.3106	0.2276	0.4752	0.6542		
TA	0.3804	0.3104	0.4846	0.5445	0.6441	
SAT	0.3455	0.3272	0.3517	0.3893	0.5562	0.6983

Note: Figures in cells are squared correlations; AVE values are in the main diagonal.

Discriminant validity is established when the highest absolute value in each column and row of the matrix is located on the main diagonal. In other words, the diagonal values (AVEs) should be greater than the non-diagonal values (squared correlations) in their respective rows and columns. This confirms the presence of discriminant validity in all the scales we have used.

COMMON METHOD VARIANCE

Common method variance (CMV) has been identified as a significant source of systematic error in survey research. As an ex-ante pre-cautionary measure, we employed the suggested approach proposed by Podsakoff et al. (2003), to minimize the potential for common method bias [32]. The questions related to the outcome variable were randomly placed in the questionnaire. Additionally, precautions were taken to ensure that respondents had no clue to identify which questions were assessing the outcomes. Besides this, procedural remedies, including the anonymization of responses and the clarity of questionnaire design, were incorporated to minimize response biases. All these suggest that CMV is unlikely to introduce bias in this study.

CONCLUSION

This research study delves into the determinants of telemedicine adoption in India, a country facing significant healthcare delivery challenges, particularly in underserved and remote areas. The core achievement of this study is the development and validation of a scale designed to accurately measure the factors influencing telemedicine adoption, offering valuable insights for healthcare executives, policymakers, and researchers.

Employing a robust quantitative methodology, the study involved several key stages: factor identification, item generation, pre-testing, pilot testing, and scale validation. A diverse group of healthcare professionals, industry experts, and telemedicine users were engaged through a structured questionnaire, contributing to a comprehensive understanding of the telemedicine landscape in India. The study utilized statistical analyses, including confirmatory factor analysis and reliability analysis, which confirmed the validity and reliability of the developed scale. This resulted in the identification of five latent variables as critical factors, significantly enriching the existing body of knowledge on telemedicine adoption in the Indian context.

The study's findings have substantial implications for health and aged care service managers and policymakers in India. The validated scale is a critical tool for understanding the nuances of telemedicine adoption, aiding in strategic decision-making, and policy formulation aimed at enhancing the accessibility and quality of healthcare services across India's diverse regions.

However, the study is not without limitations. Its primary focus on the Indian context and reliance on self-reported data may limit the generalizability of the findings. Future research should aim to expand the scope of this study, exploring the scalability and sustainability of telemedicine adoption in varied settings. Incorporating qualitative research methods could also provide a richer, more contextual understanding of the barriers and facilitators influencing telemedicine adoption. Such future endeavors could build upon the current study's foundation, further contributing to the optimization and customization of telemedicine services to meet the diverse healthcare needs of populations in other geographical regions, similar to India. This research, therefore, not only adds to the academic discourse but also serves as a practical guide for ongoing and future telemedicine initiatives in regions with similar healthcare challenges and demographics.

ETHICAL APPROVAL

The survey procedure conducted for the study involved human participants and conformed to ethical standards. The procedure was duly approved by the Research Ethics Committee of the S P Jain School of Global Management on 12 April 2022 (REC 03335G/202203) where the study was initiated.

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AUTHOR DISCLOSURE STATEMENT

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THE EFFECT OF ORGANIZATIONAL COMMITMENT ON INTENTION TO LEAVE AMONG NURSES: A QUANTITATIVE STUDY OF ABU DHABI HEALTH SERVICES COMPANY (SEHA)

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ABSTRACT

BACKGROUND:

Healthcare industry pursues in retaining customers to provide them with best health services and in return gained revenue through their staff support and exceptional performance, this created challenges for the organization due to demanding work schedule and emotional stress while delivering patient care, hence higher tendency levels to withdraw from the organization exist.

AIM:

The primary objective of this study is to investigate the relationship between organizational commitment (OC) and intention to leave (IL) in the health care sector, with the focus on how these factors affect employee retention and by influencing their job satisfaction. The focus of this study is to investigate the role of toxic work environment (TWE) as a potential mediator in the relationship between organizational commitment (OC) and intention to leave (IL).

METHODS:

A quantitative descriptive cross-sectional design was used targeting the largest healthcare company employees in United Arab Emirates (Abu Dhabi healthcare company –SEHA-), 367 participants responded to the questionnaire. SmartPLS version 4 and SPSS version 26 used to analyze the data.

RESULTS:

The statistical analysis of the study revealed significant findings, which showed that organizational commitment (OC) negatively influences intention to leave (IL) with a beta coefficient (β) of -0.545 and a p-value which is less than 0.05, and likewise affects a toxicity negatively -0.411, p factory (TWE) where β is < 0.05. Furthermore, TWE has been shown to significantly influence IL ($\beta = 0.529$, p < 0.05) and mediate the relationship between OC and IL.

CONCLUSION:

OC impacts the IL in different ways and at different levels. Yet, there needs to be more research investigating the correlation between these two variables in the health sector. The relationship between OC and IL requires further elucidation. This study evaluated the mediation influence of the TWE notion, which helps employees feel safe and comfortable.

KEYWORDS

Intention to leave (IL), Organizational commitment (OC), Social Exchange Theory (SET), Toxic work environment (TWE).

The Effect of Organizational Commitment on Intention to Leave among Nurses: A Quantitative Study of Abu Dhabi Health Services Company (SEHA) **1**

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INTRODUCTION

In the current, increasingly globalized competition in the healthcare industry, hospitals seek to acquire and retain loyal customers, achieve financial rewards by supporting their employees, and achieve exceptional performance results. In addition, healthcare organizations commonly perceive nurses as crucial components and indispensable participants in a dynamic healthcare environment with a substantial duty to provide patient care.

The job comes with many challenges, such as the schedules and emotional stress associated with patient care. These challenges increase job dissatisfaction and a tendency to leave the company or job. On the other hand, employees with quitting intentions voluntarily withdraw from the job and their jobs [1]. Companies may face many consequences due to change, including decreased nursing productivity, quality of nursing care, and increased financial burden [2]. However, organizations' personal commitment, psychological attachment to individuals, and loyalty to their abandoned employer all have an impact on employee emotional ties [3, 4].

In contrast, the perception of a toxic work environment, characterized by factors such as poor communication, lack of support, bullying, lack of salary increases, increased patient acuities and overwork, has been identified as an essential contributor to nurse turnover increases [5]. These environments reduce not only job satisfaction but also organizational commitment, increasing the intention to turnover [5].

The healthcare sector in the United Arab Emirates (UAE) faces significant challenges due to the increasing demand for qualified and licensed healthcare professionals, including nurses. This demand is driven by rising healthcare needs resulting from sociodemographic and epidemiological changes. These challenges are further compounded by high turnover rates and the tendency for specialists to leave the profession. However, various organizational and individual factors influence nurse retention, including organizational commitment, hostile environment, and poor working conditions [6]. It is therefore crucial for the Emirati healthcare sector to ensure the stability of the healthcare sector, including nursing staff retention and satisfaction; as the UAE continues to research healthcare, it will improve quality to ensure the quality of patient care and service delivery, organizational efficiency, productivity and performance, and a medical tourism centre.

The main objective of this study is to investigate the effect of organizational commitment on nurse's intention to leave within Abu Dhabi Health Services Company (SEHA). In addition, the nursing literature must thoroughly examine the mediating role of a TWE in the relationship between OC and IL. This study attempts to fill this gap by proposing that toxic workplaces act as essential mediators in this relationship. To examine this idea, we draw on the theoretical framework of the Job Demands-Resources (JD-R) model [7], which posits that job demands (e.g., toxic workplaces) have negative consequences, such as employee. Mental and physiological factors lead to the idea of giving up.

The study may provide valuable insights to hospital administrators, policymakers, and other relevant stakeholders and enable them to effectively implement measures that promote commitment and mitigate attrition rates within the nursing profession.

This research contributes to the literature on organizational commitment and intention to leave by providing quantitative evidence of the relationship between these variables in the context of the healthcare sector in Abu Dhabi. Additionally, the study enhances understanding of how organizational commitment can influence nurses' decisions to stay or leave their positions, offering valuable insights for stakeholders in developing strategies to improve job retention.

LITERTURE REVIEW

Nursing is a demanding career that is pivotal in all healthcare institutions. The highly selective work frequently leads to emotional, physical, and mental fatigue in professionals, resulting in decreased motivation, emotional exhaustion, frustration, strained relationships with colleagues, extended working hours, and limited autonomy.

The healthcare sector must enact reforms to establish an organizational culture that fosters a sense of ownership and close involvement among younger and freshly hired staff in the organization's vision and mission. The study suggests that policymakers should prioritize improving

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nurses' organizational commitment, requiring implementing methods to recruit, attract, and retain dedicated nurses.

THEORETICAL BACKGROUND

Social Exchange Theory

This study utilized social exchange theory (SET) to examine the relationship between the organization and its employees. The theory of social exchange is a sociological and psychological perspective that explains social change and stability as a process of interactional exchange between different aspects, derived from economic, psychological and social learning [8,9,10]. It emphasizes that through subjective value-benefit analysis and contrast of alternatives human relations [8]. SET is a foundational concept of organizational behavior and human resource management, assisting to give an explanation for how interactions among personnel and their groups have an effect on attitudes and behaviors along with commitment, delight, and turnover intentions [11]

Based on social exchange theory, the three variables organizational commitment, intention to leave, and toxic work environment are intriguingly associated through the scale of value-advantage appraisal and to each different self-efficacy organizational dedication displays the volume to which employees experience loyalty and duty to their organization [8]. In contrast, a toxic work environment, characterized by miscommunication, lack of support, and pervasive stress, increases perceived costs for employees, leading to dissatisfaction and the breakdown of the reciprocity expected in a healthy working relationship [11]. This imbalance greatly increases the intention to leave, as personnel try to escape unfavorable situations and are looking for higher alternatives wherein profits are greater favorable [9]. Thus, SET explain how the nature of workplace change directly affects employee behavior and decisions, where toxicity undermines commitment and increases turnover intentions [10].

Organizational Commitment

OC is an individual's psychological connection and loyalty to their workplace, is a crucial factor influencing such decisions [3]. OC refers to an individual employee's profound emotional attachment to the organization. It can be comprehended through three dimensions: affective, continuance, and normative. Affective commitment is the emotional attachment that employees have towards the organization. Continuity commitment is determined by the anticipated expenses linked to departing from the company. Normative commitment is influenced by a feeling of moral duty to stay in the group [1]. Commitment can reduce discontent and the need to leave, while its lack might worsen these feelings.

While it was anticipated that all three types of commitment would connect employees to the organization, each type was thought to have a distinct influence on employee work behavior [4,12]. Furthermore, each type of commitment was supposed to signify a different motivation for a specific result. In 1993, a quantitative correlational study examined the three-component commitment model and its impact on turnover intention and occupational commitment. Furthermore, the study reviews the literature regarding the tools researchers utilize to evaluate employee affective, continuance, normative commitment, and turnover intentions [4].

OC is considered a predictor of intention to depart. It is crucial to comprehend how nurses' leadership styles, work engagement, and organizational commitment are interconnected due to the rapidly evolving regulations, procedures, and work-life quality, which can substantially impact healthcare operations and service provision.

Intention To Leave

Intention to quit refers to an employee's voluntary wish to depart an organization [13]. Intention to leave refers to the desire to stop a current position and find a new one within the same organization (internal) or in a different organization (external), which could also involve leaving the profession entirely. This phenomenon is intricate, particularly in healthcare environments, and can be affected by several elements, such as motivational, cognitive, and behavioral factors [14]. While turnover intention has been extensively discussed in research, verifying turnover cognition measures is still necessary [15]. Previous research has shown that factors like work environment, emotional tiredness, practice safety, staff shortage, and professional characteristics such as age and education might lead to nurses wanting to quit their unit, department, or organization [16, 17, 18,19]. Insufficient staffing and poor work situations often prompt professionals to depart (leave) due to higher workloads that are not conducive to nursing practices. Professional development opportunities are a crucial component.

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Career stagnation is linked to organizational loyalty and the likelihood of leaving a job [20].

Toxic Work Enviroment

Many healthcare workers, particularly nurses and administrators, may face irritation and bewilderment when working in challenging circumstances. The nurse's duty has become more complex and demanding due to challenging work conditions and increased demands from the Health Ministry, healthcare organizations, patients, and relatives. The evolving duties of nurses significantly affect their working conditions and healthcare delivery. Several factors contribute to occupational stress in toxic work environments. The sources of toxic work environments differ in type and occurrence among various nursing specialities. Identifying the causes of job dissatisfaction and poor work and life quality among healthcare professionals and taking steps to resolve these issues could help reduce turnover rates and the intention of nursing staff to quit the hospital.

Some researchers have contended that toxic leaders' lasting adverse impact on an organization's culture and climate is a crucial factor in determining toxicity [21]. Toxic leaders were identified as a component of contaminated environments. Another study proposed bullying, stress, and emotional fatigue as examples of characteristics found in toxic companies [22]. Management by terror, a strategy linked to dictatorial regimes, was suggested to be a significant harmful influence. Managers' narcissistic behaviours were meant

To be inevitably dangerous. When narcissism reaches a level of disorder similar to alcoholism, drug addiction, and depression, it could negatively impact morale and group effectiveness and potentially result in disaster [23].

Overall, this study has two primary goals. The first objective is to analyze the correlation between OC and IL in the health sector. The second objective is to uncover the mediating influence of a TWE in this correlation. It will help policymakers improve retention methods and increase practice settings and job-related results.

HYPOTHESIS DEVOLPMENT

Organizational Commitment And Intention To Leave

The relationship between organizational commitment and intention to leave an important research area in organizational behavior, particularly the nursing profession.

Organizational commitment, defined as the psychological attachment an employee feels to their organizational feelings about [4,24]. High levels of organizational commitment are associated with low intentions to leave, which is important in nursing because of the high costs and negative consequences associated with nurse turnover [1]. Multiple studies consistently demonstrate that emotional commitment has the most robust inverse correlation with the desire to leave. This implies that nurses who experience a strong emotional bond with their organization are less inclined to contemplate leaving [24,25]. In contrast, higher levels of turnover are linked to lower levels of organizational commitment, as nurses seek to locate a work environment that is both fulfilling and supportive [26].

One study examined how work environment and nurse staffing influence organizational commitment and intention to leave in Portuguese hospitals, emphasizing the critical role of affective and continuance commitment in reducing turnover intentions [27]. Similarly, integrative research found that factors such as job satisfaction and leadership style significantly influence nurses' decisions to stay or leave [28]. Furthermore, research revealed a negative relationship between organizational commitment and turnover intentions, suggesting that congruence between individual and organizational values can increase commitment and reduce turnover [29].

Prior research has confirmed the correlation between OC and nurses' IL the organization and the profession. A significant connection was discovered between the affective aspect of work commitment and the intention to leave among Malaysian nurses [30]. Furthermore, a strong correlation was established between work quality, health perceptions, and normative organizational commitment [31]. A study conducted with nurses in Korea found that high levels of organizational commitment and job fatigue were strong indicators of a likelihood of turnover intentions. In China, nurses who expressed satisfaction and demonstrated a strong sense of job commitment were likelier to remain in their current roles [32].

A current look at across many sectors has uncovered a strong correlation among organizational commitment and the intention to leave, highlighting its significance outside the nursing discipline. A robust sense of organizational commitment, coupled with effective results such as increased productiveness, reduced turnover, and greater

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activity pride and emotional commitment, efficaciously diminishes employees' purpose to go away through fostering a more potent emotional reference to the business enterprise [33]. Both emotional and normative commitment play vital roles in mitigating turnover intentions through enhancing worker loyalty and fostering a sense of duty [34]. Teachers who own a robust experience of organizational commitment are less in all likelihood to have the preference to leave their career. This is in the main due to the fact they revel in more degrees of task pleasure and emotional properly-being [35]. Promotional dedication is a vast factor in worker retention, particularly while thinking about job balance and benefits [36].

The studies spotlight the importance of enhancing organizational commitment by supportive management, favorable running circumstances, and explicit career development opportunities with a purpose to decrease turnover intentions across diverse task settings [24]. Taking into account the results of earlier studies, the hypothesis is stated as follows:

H1: Organizational commitment is negatively related to intention to leave among nurses.

Organizational Commitment And Toxic Work Envirement

The correlation between organizational commitment and toxic work environment among nurses is an important region of studies. An evaluation of organizational behavior and HR practices includes the examination of a toxic work environment, which is characterized by using terrible behaviors which includes bullying, harassment, lack of aid, high degrees of pressure, and ineffective communiqué. Studies indicate that toxic work environments lessen organizational commitment by using amplifying process discontent, stress, and burnout, consequently elevating turnover intentions [37]. Nurses running in toxic environments demonstrate diminished emotional dedication because of emotional stress and a dearth of helping connections, each of which are vital for fostering loyalty and involvement [28]. Moreover, extended exposure to destructive operating situations would possibly erode normative dedication, for the reason that experience of responsibility to live within the company is diminished due to the continuing presence of terrible situations [38].

Studies have shown that besides stressors inherent to nursing, management attributes also impact adverse work-related outcomes such as stress, fatigue, health issues, burnout, and low performance among nursing staff [39,40]. The previous study proposed four poisonous behaviors: aggressiveness, narcissism, lack of trustworthiness, and passivity [41]. A low-trust environment, negative emotional contagion, high stress, and incivility are considered toxic environmental variables [42].

Recent research across various industries has illuminated the significant impact of a toxic work environment on organizational commitment, demonstrating that this relationship extends well beyond the nursing profession. Organizational commitment, which includes affective, continuance, and normative additives, is usually associated with high quality place of job outcomes consisting of multiplied activity performance and lower turnover quotes [4,24]. Workplace bullying and harassment notably reduce personnel' organizational commitment in various industries, main to multiplied turnover intentions [43]. High pressure and poor management are fundamental factors contributing to reduced organizational commitment and expanded turnover within the generation area [44]. A loss of assist and high-pressure ranges cause decrease organizational commitment amongst instructors, contributing to higher intentions to leave [38]. Furthermore, poisonous work environments characterized by means of terrible conversation and excessive stress erode affective dedication and growth turnover intentions inside the company area [45]. This literature underscores the significance of addressing toxic paintings environments to enhance organizational commitment and decrease turnover intentions among nurses. Drawing from previous research findings, the hypothesis is proposed as follows:

H2: Organizational commitment is negatively related to a toxic work environment among nurses.

Toxic Work Envirement And Intention To Leave

The correlation between toxic work environment and nurses' intention to leave has been a crucial subject of study in recent times, carrying substantial ramifications for the healthcare sector. Nurses' intents to leave their jobs are greatly heightened by workplace bullying and harassment, as these behaviors foster a hostile and stressful work environment [43]. The primary factors that prompt nurses to seek employment elsewhere include elevated levels of job stress and inadequate professional support [46]. Nurses working in settings characterized by insufficient support and elevated stress levels frequently

contemplate abandoning their profession, underscoring the significance of intervention to enhance workplace conditions [2]. A toxic work environment, characterized by deficient communication and absence of support, substantially heightens nurses' intents to resign, underscoring the significance of establishing a constructive and supportive work milieu [47].

Studies in the realm of technology suggest that elevated levels of stress in the workplace and inadequate support from supervisors are significant determinants in employees' choice to pursue other employment opportunities [36]. Furthermore, a study conducted in the healthcare industry revealed that a noxious work atmosphere substantially amplifies the likelihood of health workers wanting to leave their jobs, underscoring the significance of implementing measures to enhance the work environment [47]. These findings emphasize the influence of a harmful work environment on employees' inclination to resign. Based on the findings of prior research, the following hypothesis has been formulated:

H3: Toxic work environment is positively related to intention to leave among nurses.

Mediating Role Of Toxic Work Environment

The present literature has not adequately examined the effect of a toxic work environment in mediating the association between organizational commitment and intention to leave among nurses. Studies have demonstrated that workplace bullying and harassment have a direct impact on nurses' inclination to leave their jobs, indicating the detrimental consequences of a hostile work environment without explicitly examining its intermediate function [43]. A study discovered job stress and low supervisor support as significant factors contributing to intention to leave [48] . However, they did not investigate the mediation impacts of a toxic work environment.

In healthcare, the need for better workplace conditions to reduce turnover intentions has been emphasized without exploring the mediating role of toxic environments [45]. However, a toxic work environment can undermine the positive effects of organizational commitment by increasing job dissatisfaction, stress, and burnout, which in turn heighten the intention to leave [37].Studies have shown that even highly committed nurses are more likely to consider leaving if they perceive their work environment as toxic, as the negative aspects of their

workplace outweigh their attachment to the organization [50,37]. These findings underscore the significant impact of toxic work environments on turnover intentions and highlight the need for further research to explore their mediating role in the relationship between organizational commitment and intention to leave among nurses. The hypothesis is formulated as follows:

H4: Toxic work environment mediates the relationship between organizational commitment and intention to leave among nurses.

CONCEPTUAL FRAMEWORK

The conceptual framework of this study, depicted in Figure 1, is based on the connections identified among various factors in the literature review.

FIGURE 1 - CONCEPTUAL FRAMEWORK
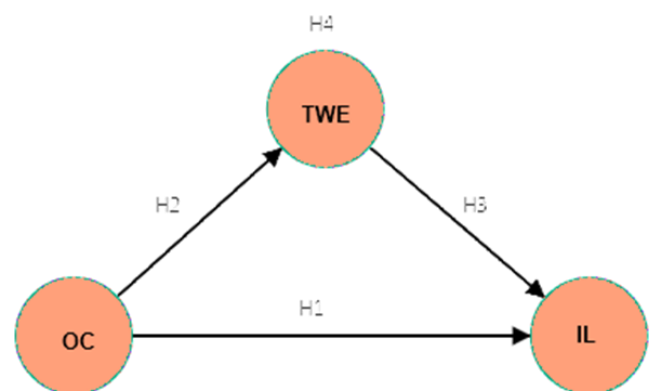
METHODS AND MATERILES

SAMPLING AND DATA COLLECTION

The study used a descriptive design, focusing on the objectives of the study. A cross-sectional approach was also used considering the data collected at this particular point in time. The sample of the study consisted of nurses working in the Abu Dhabi Healthcare Company (SEHA) in Abu Dhabi, United Arab Emirates (UAE).

The procedure was a comprehensive examination, and approval was obtained from the Research Ethics Committee of SEHA, with a decision number SEHA-IRB-487. The data were gathered from November to December 2023 through an online survey methodology.

The study used a disproportionate random sampling method to accurately describe conditions across hospitals, as the hospitals in the population varied significantly in terms of their people and other resources,

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making them non-homogeneous. To supplement this, the researchers employed convenience sampling to select a total sample of 367 staff nurses for an online survey. Convenience sampling was chosen for its practicality and efficiency in accessing participants. The inclusion criteria required all accessible staff nurses during the data collection period who were willing to participate, with no specific exclusion criteria applied.

The tools for data collection were meticulously developed based on a comprehensive literature review and guidance from esteemed professionals in research and nursing.

The study employed a four-part questionnaire form as a technique for collecting data. The initial section of the form comprises the "personal information form," which is used to gather descriptive details about the participants. The subsequent section encompasses the "organizational commitment scale," while the third section focuses on the "intention to leave." The final part of the form addresses the concept of a "toxic work environment."

The Organizational Commitment measure is presented in the scholarly realm [51]. This measure consists of 18 items rated on a five-point Likert scale. The Intention to Leave scale [52] has a five-point Likert format comprising 15 questions. It aims to evaluate an individual's inclination to depart from their organization. The Toxic Work Environment scale [53] assesses perceptions of negativity in the workplace. It comprises 11 items rated on a five-point Likert scale. Each scale measures complicated concepts in organizational behaviour research and helps enhance our understanding of workplace dynamics.

STATISTICAL ANALYSES

Survey data were analyzed using SmartPLS version 4 software. A "reliability analysis" was conducted to assess the reliability of the scale, while a "confirmatory factor analysis (CFA)" was conducted using the SmartPLS tool to assess the conceptual validity The model was evaluated using path analysis. For structural equation modeling, the data set must have a multivariate normal distribution. Descriptive statistics and correlation analyzes were performed using the SPSS 26 version.

DATA ANALYSIS

Descriptive Statistics

The demographic analysis of our sample, consisting of 367 participants, reveals a largely female workforce, with a representation of 81.2%. Additionally, a substantial number

(47.7%) of the participants belong to the age group of 30-39. The majority of individuals in the sample are married, accounting for 83.7% of the total. Additionally, the educational background of the sample is primarily at the Bachelor's level, making up 71.4% of the sample. Regarding professional experience, a significant 49.6% of individuals have worked for 16 years or longer, indicating a highly experienced group. The majority of workplace shifts, accounting for 62.4%, are a combination of day and night shifts. This indicates the ability to adjust and the possibility of being exposed to different work schedules. The statistics provide a comprehensive picture of the sample, which is crucial for placing the research findings in the larger context of workforce demographics and working conditions. Descriptive Statistics of the Demographic Factors of the Study are shown in Table 1.

INTERNAL CONSISTENCY OF THE MEASUREMENT SCALES

Six items were eliminated from the Intention to Leave (IL) scale. The items were removed due to their factor loadings falling below the minimum criteria of 0.50. The remaining components exhibit robust scale reliability, as evidenced in Table 2. All factors surpass the minimum threshold for factor loadings (>0.50), showing significant contributions from all observed variables, consistent with the findings of Anderson and Gerbing (1988).

After conducting a comprehensive psychometric evaluation of our measurement instrument, we found the results to be encouraging in terms of reliability and validity. The factor loadings for each construct—OC, IL, and TWE—consistently exceeded the minimum acceptable threshold of 0.4, indicating that the items and their constructs are intimately connected. The reliability metrics, measured by Cronbach's alpha and composite reliability values (rho_a and rho_c), all exceed the customary threshold of 0.7, confirming the strong internal consistency of the constructs. The constructs' Average Variance Extracted (AVE) values also exceed the standard of 0.5, ensuring robust convergent validity. The present results substantiate the dependability and accuracy of the measuring instrument. Generally, the survey instrument exhibits high reliability and significant information regarding conceptual and convergent validity. This framework will strengthen the impact of our research on existing knowledge and validate the findings from our study.

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CORRELATIONAL ANALYSIS OF VARIABLES

Prior to doing the correlation test, the normality test was executed. Table 3 displays the test results. The normal distribution of the data is contingent upon the skewness and kurtosis values falling within the range of ±3 . From this perspective, the results indicate that the data acquired from this investigation follows a normal distribution.

TABLE 1- DEMOGRAPHIC FACTORS RESULTS

Variables	Demographic Factors	Frequency	Percentage %
Gender	Male	69	18.8
	Female	298	81.2
Age	20-29 year	11	3.0
	30-39 years	175	47.7
	40-49 year	111	30.2
	50 years and above	70	19.1
Marital status	Single	48	13.1
	Married	307	83.7
	Widowed	6	1.6
	Divorced	6	1.6
Qualification	Diploma	48	13.1
	Bachelor	262	71.4
	Masters	55	15.0
	Doctorate	2	.5
Experience	1-5 years	13	3.5
	6-10 yrs	57	15.5
	11-15 yrs	115	31.3
	16 yrs and above	182	49.6
Workplace	Morning shift / Admin duty	126	34.3
	Evening shift	12	3.3
	Day-Night shift	229	62.4
	Total	367	100

(N= 367)

TABLE 2- RESULTS OF VALIDITY AND RELIABILITY ANALYSES

Variables	Num. of items	Factor loading intervals	Cronbach's alpha (a)	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Organizational commitment (OC)	18	0.415-0.825	0.946	0.963	0.951	0.530
Intention to leave (IL)	9	0.522-0.865	0.884	0.899	0.908	0.529
Toxic work environment (TWE)	11	0.747-0.919	0.963	0.968	0.968	0.734

TABLE 3- NORMALITY TEST OF THE SCALES

Variable	Skewness	Kurtosis	Result
Organizational commitment (OC)	-0.210	0.072	Normal
Intention to leave (IL)	-0.115	-0.260	Normal
Toxic work environment (TWE)	0.176	-0.346	Normal

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The study employed parametric tests due to the normal distribution of the data. Consequently, the Pearson correlation coefficient was utilized to examine the association between the scales employed in the investigation. The correlation coefficients are displayed in Table 4.

The data set indicates that participants demonstrate a moderate level of Organizational Commitment (OC), with an average value of 3.2578 and a standard deviation of 0.83163. This suggests a rather strong connection to their organizations, although there are noticeable variations across individuals. The Intention to Leave (IL) is moderately expressed, as indicated by a mean of 3.28 and a standard deviation of 0.8294. This shows that employees are considering the possibility of leaving their businesses, with noticeable diversity among the responses. The Toxic Work Environment (TWE) scores exhibit a mean of 2.9698, which is relatively low, and a standard deviation of 0.93132, which is the greatest among the scores. This suggests that there is a greater diversity in the sense of workplace toxicity.

Correlational analysis reveals a substantial negative correlation between organizational commitment (OC) and both intention to quit (IL) and perceptions of toxicity (TWE) (r = -0.492 and r = -0.372, respectively). This suggests that as organizational commitment increases, both the desire to leave and perceptions of toxicity diminish. On the other hand, there is a notable and positive relationship between IL and TWE (r = 0.661), indicating that a toxic work environment strongly predicts employees' plans to leave. The use of asterisks (**) as the significance level (p<0.01) implies that these correlations are strong and presumably represent a significant relationship within the population from which the sample was obtained. These findings enhance our comprehension of how workplace settings impact employee retention and commitment. They emphasize the significance of addressing toxicity in the workplace to reduce potential turnover.

HYPOTHESIS TESTING

H1-H3

The effects were examined in a mediator-free model. The findings indicate that the impact of Organizational commitment on Intention to leave (β = -0.545, p < .05) was statistically significant. Furthermore, the impact of Organizational commitment on Toxic work environment was shown to be statistically significant (β = -0.411, p < .05). Thus, the hypotheses were deemed valid and accepted. The statistical analysis revealed that the impact of a toxic work environment on the intention to leave was substantial (β = 0.529, p < .05). The resulting analysis findings are presented in Table 5 and Figure 2.

TABLE 4- CORRELATIONS RESULT

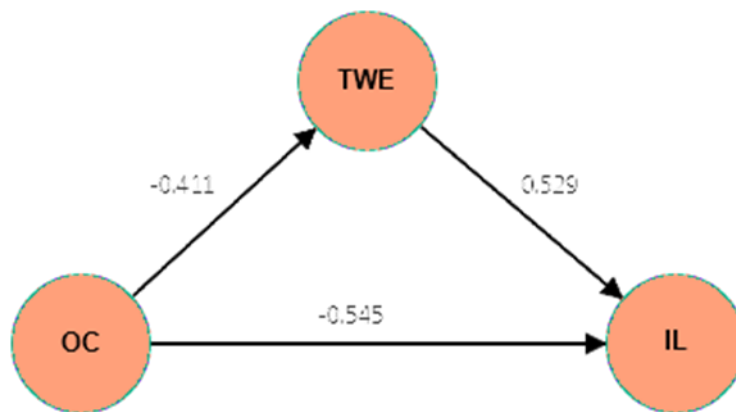| Variable		Mean	SD	1	2	3
1	**Organizational commitment** (OC)	3.2578	0.83163	1		
2	**Intention to leave** (IL)	3.2800	0.82940	-0.492**	1	
3	**Toxic work environment** (TWE)	2.9698	0.93132	-0.372**	0.661**	1

** p<0.01 (two-tailed)

TABLE 5- PATH MODEL

Path	β	SE	t-Value	p- Value
OC → IL	-0.545**	0.052	10.554	.000
OC → TWE	-0.411**	0.055	7.416	.000
TWE → IL	0.529**	0.053	10.070	.000

** p<0.01 (two-tailed)

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FIGURE 2- ANALYSIS RESULTS IN THE MODEL

MEDIATING ROLE OF TOXIC WORK ENVIRONMENT

H4: Toxic work environment mediates the relationship between Organizational Commitment and Intention to Leave

The statistical examination of the direct, indirect, and total effects of OC on IL demonstrates a substantial inverse correlation in all paths. The data indicates that stronger OC has a direct negative impact on the IL, as seen by a direct effect value of -0.328 and a significant p-value of 0.000. Additionally, OC indirectly reduces the Intention to Leave by enhancing views of the work environment, as indicated by an indirect effect value of -0.217 and a significant p-value of 0.000. The cumulative impact of -0.545 represents the overall influence of OC, suggesting a strong negative

correlation with IL. This finding suggests that efforts to improve OC can reduce turnover intentions by enhancing employee loyalty and creating a more positive work environment. Therefore, organizational interventions should focus on improving employee commitment and reducing workplace toxicity to effectively reduce employee turnover. The study identifies two effects of OC, highlighting the need for a comprehensive approach to organizational culture and employee engagement initiatives. Table 6 presents the results of the effect of OC on IL with the mediating effect of TWE.

Table 7 presents a summary of the results for the hypotheses, following the description of the analysis.

TABLE 6- THE EFFECT OF OC ON IL THROUGH WITH MEDIATING ROLE OF TWE

Path	β	SE	t-Value	p- Value	LLCI	ULCI
OC → IL	-0.545	0.052	10.554	0.000	-0.636	-0.430
Direct effect (OC → TWE → IL)	-0.328	0.055	6.006	0.000	-0.432	-0.218
Indirect effect (OC → TWE → IL)	-0.217	0.032	6.716	0.000	-0.283	-0.156

TABLE 7- SUMMARY OF HYPOTHESES

Hypotheses	Summary	Results
H1	Organizational commitment is negatively related to intention to leave among nurses	Supported
H2	Organizational commitment is negatively related to a toxic work environment among nurses	Supported
H3	Toxic work environment is positively related to intention to leave among nurses	Supported
H4	Toxic work environment mediates the relationship between organizational commitment and intention to leave among nurses	Supported

DISCUSSION AND CONCLUSION

This study investigated the correlation between organizational commitment and intention to leave among nurses, as well as the mediating influence of a toxic work environment on this correlation. According to the study findings, nurses' inclination to depart decreases as organizational engagement increases. Various studies in the literature analyze the impact of organizational commitment on intention to leave.

Research conducted in many sources has uncovered significant knowledge about the evolution of the nursing field in diverse countries. Research has shown a significant relationship between affective aspects of job commitment and tendency to quit among nurses in Malaysia [30]. Furthermore, another study showed a significant relationship between quality of work, health attitude and organization values [31]. In Korea, high levels of organizational commitment and job sabotage were found to be important predictors of intention to leave, while in China, high levels of job satisfaction and internal commitment love is associated with the likelihood that nurses will remain in their current role [24]. These findings strongly support the results of our study and confirm the findings of existing literature [4,25,26,28].

Our study contributes to the literature by providing quantitative evidence of the relationship between organizational commitment, a toxic work environment, and intention to leave quit among nurses in the SEHA in Abu Dhabi. It focuses on unique regional challenges and extends existing knowledge with context-specific insights. Through the mediating role of toxic work environment, our study provides an important nuanced understanding for the development of targeted interventions to improve nurses' perceptions.

Workplace bullying had an indirect effect on turnover intention through the mediating role of organizational commitment. Thus, healthcare organizations and nursing managers should formulate effective measures to bolster nurses' organizational commitment with the aim of mitigating their intention to leave the organization [54].

This study examined the relationship between organizational commitment and intention to leave among nurses, as well as the role of a toxic work environment in mediating this relationship. Our findings indicate that higher organizational commitment significantly reduces the intention to leave. Additionally, we found that toxic work environment act as a mediator in this relationship. This study highlights the significance of strengthening organizational commitment and toxic work environment in order to decrease turnover intentions.

These valuable observations are crucial for hospital managers and policymakers to formulate measures that will help them retain nursing staff and maintain a stable and efficient healthcare workforce. Moreover, this research offers significant knowledge for hospital managers, legislators, and other interested parties, empowering them to enact efficient strategies to augment nurse retention, raise job happiness, and eventually guarantee the provision of exceptional patient care.

IMPLICATIONS OF THE STUDY

Theoretical Implication

OC impacts the intention to leave in different ways and at different levels. Yet, more research is needed to investigate the correlation between these two variables in the health sector. This study on nurses adds to the existing literature on OC and IL. Although understood, the relationship between OC and IL requires further elucidation. The overall environment and social situations significantly influence the link between the two variables. This study evaluated the mediation influence of the hazardous work environment notion, which helps employees feel safe and comfortable. OC had a strong negative indirect effect on the desire to depart through a hostile work environment. This finding offers a unique viewpoint on OC and IL, especially in hospitals with significant interpersonal relationships.

Nursing policymakers should consider the significant impact of self-efficacy and work engagement on OC and IL healthcare organizations. Training programs should be designed for supervisors to enhance their skills in providing assistance and giving appropriate feedback to improve work efficacy beliefs. Nursing policymakers must also consider the availability of adequate employment resources, such as fiscal support, training initiatives, and programs promoting work-life balance, to establish work settings that foster high levels of work engagement among nursing staff.

Practical Implication

Many healthcare personnel encounter adverse circumstances like burnout, heavy workloads, and

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diminished motivation. These negative circumstances primarily arise within the nursing profession. Nurses comprise the most significant percentage of healthcare workers and are mainly responsible for providing healthcare services. The adverse circumstances could impact both nurses' well-being and the healthcare delivery standard. Research indicates that nurses experience physical, cognitive, and perceptual burdens. Hence, these issues in working circumstances must be eradicated to ensure the safety of both nurses and patients. Furthermore, the responsibilities of all employees have escalated, and the working conditions have grown increasingly challenging. Nurses must demonstrate proactive behaviours in this setting. Creating a conducive climate for OC in hospitals can help decrease nurses' challenges and empower them to display aggressive behaviours. The study findings show that leaders/directors should create an environment conducive to OC by implementing policies and behaviours that help nurses feel psychologically comfortable and secure.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The study's cross-sectional design results depict the situation at a certain point in time. Testing this model using a correlation design can help bolster the research findings. The study was carried out in public hospitals. Alternatively, the perspective of private hospitals can also be considered. Public and private hospitals are similar. Conversely, the study's sample consisted of nurses. Studying additional professional groups in future research will help in extrapolating the findings achieved for health professionals.

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SOCIAL MEDIA INDUCED FOMO EFFECT ON DEPRESSION: A SERIAL MEDIATION ANALYSIS TOWARDS PROBLEMATIC SOCIAL NETWORKING USAGE AND PHUBBING BEHAVIOUR

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ABSTRACT

BACKGROUND:

Depression is a major mental health disorder with severe personal and societal effects. It is characterised by a variety of feelings that are present at the same time (pessimism, frustration, sadness, etc.). Many issues or worries in the modern world have been heightened by fears such as running out of mobile phones, out of internet packages, or Fear of missing out (FOMO). Despite this, little research on the relationship between these social media-induced FOMO has been undertaken on depression.

OBJECTIVE:

The present study intended to investigate the relationship between FOMO and depression through the serial mediation effect of problematic social networking usage and phubbing behaviour.

METHODOLOGY: SPSS 23 with Process Macro and AMOS 21.0 were used to evaluate the survey data of 379 respondents from universities in North India.

RESULTS:

FOMO has a significant detrimental effect on depression among its users. Also, this relationship was significantly mediated by both problematic social media usage and phubbing behaviour which supports the serial mediation model. Hence, the results exhibit that FOMO predicts problematic social media usage and phubbing behaviour, which in turn causes depression among users.

CONCLUSIONS:

Since most students use social media activity in the digital era, there is a significant risk that these students may be exposed to the negative impacts of problematic social networking usage, phubbing behaviour and depression. Therefore, students, parents, educators, and policymakers need to promote responsible social media use and teach students about detrimental behaviours including FOMO, problematic social media usage, and phubbing.

KEYWORDS

depression, fear of missing out, FOMO, phubbing, problematic social networking usage.

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INTRODUCTION

Depression places a significant strain on society. Around 350 million individuals worldwide suffer from depression, one of the most prevalent mental health diseases [1]. Depression is a mental disease marked by the concurrent presence of a wide range of emotions (Frustration, sadness, pessimism etc.) [2]. According to Rudolph [3], depression is a serious mental health issue with severe personal and societal repercussions. Therefore, it is important from both a scientific and practical one to investigate the potential causes of either an increase or decrease in depression. Nowadays, mobile phones are practically ubiquitous. Younger smartphone users, who form the so-called "always on" generation, are always on their devices [4]. The smartphone is always with its user, making life easier and offering support through terrible times. In other words, the smartphone is a digital companion as much as a piece of technology [5]. By utilising this function, mobile communication helps people connect with others and feel more connected to their families, friends, and other people in their lives. With the widespread use of smartphones, users now access the internet at any time, and anywhere [6]. The analysis report of Social Networking Sites (SNS) 2021 research reveals that young people between the ages of 18 and 29 use all social media platforms. Out of these, 95% of people between the ages of 18 and 29 have at least one social media account, with Instagram and Snapchat being the most widely used [7]. Therefore, many issues or worries in the modern world have been heightened by fears such as running out of mobile phones, out of internet packages, or forgetting the phone at home and fear of missing out. People have come to depend on the digital world, and when it is gone, people's tolerance levels are challenged [8]. According to Przybylski et al. [9], Fear of missing out (FOMO) is the "pervasive uneasiness that others might be enjoying rewarding experiences from which one is absent," and it causes people to worry or fear that they are missing out on important knowledge and experiences. FOMO is also known as a desire to know what other people are doing and stems from the assumption that others are enjoying fascinating experiences while one is absent. FOMO is a result of a lack of emotional support and desires in daily life [10]. Addiction, depression, anxiety, and poor sleep quality are common physical and psychological issues that come along with FOMO [11]. Due to their greater sensitivity and prominence as social media users, young people and adults are typically more susceptible to FOMO [12]. Numerous research studies have shown linkages between FOMO and adolescents' negative health symptoms, depression, increased alcohol usage, stress levels, and sleep issues [13-16]. Furthermore, behavioural addiction scholars stated more focus is needed on the psychological mechanisms that underlie problematic behaviour [15-19]. Problematic social networking site usage (PSNU) is described as a disorder that reflects a behavioural addiction. Problematic social media use is indicative of a quasi-disorder in which compulsive overuse of social media platforms leads to bad outcomes [20]. FOMO is a psychological mechanism that may explain the problematic use of social media. Moreover, one assumption about those with more FOMO is that they want to constantly know what other people are up to, perhaps by using social media [21,22]. However, it is less clear that those factors (e.g., phubbing) may increase the risk of depression. Phubbing is the extent to which your romantic partner/spouse/friend uses or is distracted by his/her cell phone while in your company [23].

While the negative consequences of FOMO are mentioned, the underlying psychological mechanisms that link FOMO to these issues are not fully understood. This represents a significant gap in the existing knowledge. Moreover, given the ever-increasing integration of these devices into daily life, understanding the psychological processes at play in problematic usage is crucial. This suggests a need to investigate how this usage is contributing to depression. Furthermore, it suggests that phubbing might be associated with an increased risk of depression. However, this potential relationship is less clear, and further research is needed to explore whether and how phubbing contributes to mental health problems. So, the goal of this study was to investigate the role of social media-induced FOMO in predicting depression among students because adults between the ages of 18 and 29 said it was extremely difficult to stop using social media [8] as well as the significance of problematic social media usage and phubbing behaviour as a mediating factor in the association of social media-induced FOMO and depression among the students of Punjab and Chandigarh Tricity. Now the question arises "How does social media-induced FOMO predict depression through problematic social media usage and phubbing behaviour?" To answer this question, a serial mediation conceptual framework was developed and studied.

The current study is worthwhile for several reasons. The study's originality is that it has used objectives and models

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that had not previously been studied. Through the literature review, there were very few studies investigating the relationship between social media-induced FOMO and depression. However, no other study in the related literature examined the mediating role of problematic social media usage and phubbing behaviour in the relationship between FOMO and depression specifically serial mediation of these variables. In this respect, this study was considered important in terms of being original and its contribution to the literature. Moreover, there is a need for research that delves deeper into these relationships, explores the underlying psychological processes, and provides valuable insights for developing interventions and strategies to promote healthier digital media use and mental well-being, particularly among young adults.

THEORETICAL FRAMEWORK AND HYPOTHESES FORMULATION

The literature demonstrates that FOMO is brought on by unfulfilled psychological desires [24]. Depression is one of the most prevalent disorders in teenagers, along with FOMO. Miller [25] showed that 8.5% of teenagers had depression, and Ingram [26] claimed that this percentage rose to 20% in people around the age of 18. According to another study, depression was one of the most prevalent disorders worldwide in 2020 [27]. It has been noted that research on the link between social media and depression has increased in recent years. Numerous research showed a positive association between Facebook and Instagram use and depressive symptoms [28-32], it is believed that using Facebook results in envious behaviour toward the experiences of others and has a detrimental impact on well-being [33]. Therefore, the development of social media will be fueled by FOMO emotions, which further encourage users to intensify FOMO feelings. People with FOMO need to adjust because emotion can harm their psychological well-being and would be a major cause of depression among users [34]. In a study by Sette et al. [35] with 409 people between the ages of 18 and 63, it was discovered that those with a history of depression or suicide attempts had higher FOMO levels. Another study found that the association between depression, anxiety, and smartphone issues is mediated by the inclination to distress and FOMO [36]. In their study on college students, Baker et al. [37] discovered that FOMO was linked to depression symptoms. In conclusion, studies in the literature show a link between depression and FOMO that is favourable. However, there might still be aspects of the relationship

between FOMO and depression that have not been thoroughly explored or understood, especially among young adults. Moreover, social media use can become harmful when it is overused. PSNU use has been the subject of several studies [38,39]. The differences between problematic social media use and a potential social media behavioural addiction are still being discussed in the research [17,40]. However, in this study, we employ the term "problematic social networking usage," which we describe as an unhealthy excessive form of social media use, marked by a lack of control over the activity and sustained behaviour despite negative life effects. Our goal is to identify the variables that influence problematic social media use among students. As previously stated, one goal of this study is to determine whether students who report having more FOMO also have more PSMU. This is supported by other research [41-46], which also suggests that persons who feel FOMO might use social media to check in on others to calm their anxieties. Ironically, though, the more individuals check their social media accounts, the more events they can discover that they have been missing. Using social media to calm your nerves could wind up giving you FOMO. As a result, this downward spiral may continue, gradually turning social media use into a problem. Additionally, studies have shown a favourable correlation between social media addiction and depressive symptoms. For example, addiction to Facebook and mobile devices has been linked to depression in studies [47,48]. A study by Wang et al. [49] indicated that social media addiction was a strong indicator of adolescent depression. In addition, a longitudinal study by Vannucci et al. [50] revealed that "heavy social media use appears to be the most problematic social media pattern in predicting psychosocial adjustment during early adolescence. A higher likelihood of depressive symptoms, anxiety [45,51], lower self-esteem [20,51,52], social isolation [53], lower life satisfaction, poorer sleep quality, disordered eating [54], and a higher likelihood of body image dissatisfaction have all been linked to problematic social media use. Thus, it can be implied that problematic social networking usage mediates the relationship between social media-induced FOMO and depression. Additionally, FOMO is a predictor of the use of social media during conversations with co-present individuals known as phubbing. Phubbing has a deleterious effect on relational outcomes including impression creation [55]. People prefer to use cell phones to access the internet. They can stay in touch with their online affiliate groups wherever they are through their smartphones. As a result, we assume that individuals who suffer anxiety may use their smartphones to briefly access

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their social media accounts [56]. People who are anxious and have high levels of FOMO are likely to misuse social media on their smartphones in such a way that it interferes with their offline social contacts, which makes them phub their offline interaction partners. However, partner phubbing increases the chance of developing depression. McDaniel & Coyne [57] and Roberts & David [23] have examined the impact of relationship phubbing and technological distraction on depression. Technoference, also known as partner phubbing, is the regular disruption of a couple's time together or interactions caused by technology, such as a mobile phone or a smartphone [57]. They both discovered that excessive use of technology or frequent phubbing by a partner/friend can have a negative impact on depression. Thus, it can be implied that phubbing mediates the relationship between social media-induced FOMO and depression. Furthermore, the compensatory internet use theory [58] stated that people frequently use social media to lessen their negative emotions, such as loneliness, anxiety, and FOMO. According to a growing body of research, problematic social media use can be significantly and positively correlated with FOMO [59-61]. Additionally, a cross-sectional study reveals that FOMO is the best predictor of social media addiction, outperforming other factors [62]. Furthermore, the optimal flow theory contends that college students will attempt to sustain their excessive usage of social media and smartphones even at great expense, which results in the detrimental effects of their phubbing behaviour [63]. According to certain empirical investigations [16,39,64], problematic social media use is positively connected with phubbing behaviours. Moreover, according to Phubbing's research evidence, this sort of addiction has a detrimental effect on children, families, friends, and romantic relationships [47,65-67]. It can be argued that this addictive social media usage behaviour,

which has detrimental consequences on interpersonal interactions and social interactions in general may also have negative impacts on mental health and lead to certain psychological diseases [68,69]. According to Roberts and David's research [23], phubbing has a detrimental effect on one's well-being and is linked to depressive symptoms. Additionally, those who engage in phubbing behaviours suffer severe depression [68]. Thus, it can be implied that the association between FOMO from social media and depression may be mediated sequentially by problematic social media use and phubbing behaviour.

So, based on above evidence, this study proposed following hypothesis:

H1: Students who experience high social media-induced FOMO, report higher depression.

H2: Problematic social networking usage positively mediates the relationship between social media-induced FOMO and depression.

H3: Phubbing behaviour positively mediates the relationship between social media-induced FOMO and depression.

H4: Problematic social networking usage and Phubbing behaviour serially mediate the relationship between social media-induced FOMO and depression.

CONCEPTUAL FRAMEWORK:
Based on the above literature and hypotheses, the following conceptual framework has been framed in Figure 1:

FIGURE 1: CONCEPTUAL FRAMEWORK
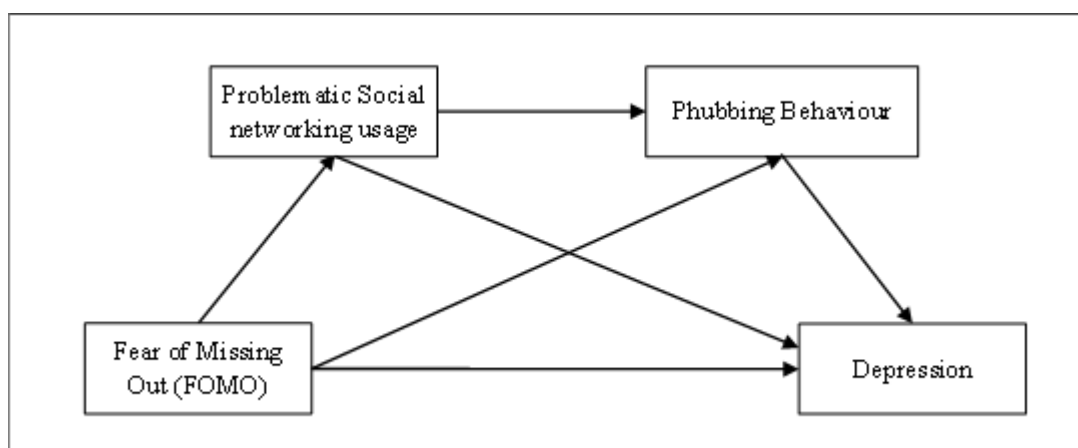
METHODOLOGY

SAMPLE AND PROCEDURE

This study aims to investigate the relationship between social media-induced FOMO and depression among university students in north India. The study used judgmental sampling to collect the data from the students of Punjab and Chandigarh Tricity in India.

G Power is a statistical tool that can be used to calculate an accurate sample size by considering effect size and alpha level [70]. However, this study determined the sample size using the criteria established for applying data analysis tests (factor analysis and regression analysis). According to MacCallum et al., [71] the sample size for the factor analysis should be at least 300. Furthermore, researchers have suggested that a sample size of 300 is appropriate for the factor analysis [72]. However, 400 questionnaires were sent through both online and offline media. About 200 questionnaires were sent through offline and 200 through online mode. 191 and 188 valid responses were received from both modes respectively. Due to incomplete and invalid responses, 21 of the submitted questionnaires were discarded and 379 were left for further analysis. The probability of potential biases was also controlled by sending a maximum invitation of 65 questionnaires to single university students. A large sample size was used in the study for several reasons. First and foremost, a large sample size accurately represents the population. Second, it reduces the influence of outliers or extreme observations. Finally, adequate numbers of samples are required to produce results that differ significantly between variables. Additionally, the fundamental requirements of sample size and data accuracy have been met prior to analysis. For model analysis, it is recommended that the sample size should be between 100 and 150 [73,74]. Therefore, the sample size of 379 for the current study is sufficient to analyze the suggested model. Data was collected from reputed universities like Panjab University, Chandigarh, Chandigarh University, Thapar Institute of Engineering and Technology, Patiala, Guru Nanak Dev University, Ludhiana, Lovely Professional University, Phagwara, Central University of Punjab etc. in Punjab of North India. These universities of Punjab and its capital Chandigarh are listed in the Top 100 universities of NIRF India Ranking 2022 [75]. These universities likely have a diverse student population, which can enhance the generalizability of the findings. Reputed universities are often considered reliable sources of data due to the quality of education and the diversity of their student bodies. Moreover, the study emphasizes that the participation of respondents was informed, voluntary, and safe for research objectives, with no ethical concerns. This ensures that the research was conducted ethically and responsibly, respecting the rights and well-being of the participants.

MEASUREMENT DEVELOPMENT

FOMO: The variables in the present study were measured using existing scales extracted from previous literature. The social media-induced FOMO was measured by five items (FOMO1 to FOMO5) adapted from the scale of Przybylski et al. [9]. The sample item is "I fear my friends have more rewarding experiences than me on social media.'' Items were assessed on a five-point Likert scale ranging from 1(Not at all true of me) to 5 (extremely true of me)

Depression: A five-item scale (DEP1 to DEP5) developed by Salokangas et al. [76] was used. The sample item is "I have felt unworthy." Items were assessed on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Problematic social networking usage: A nine-item scale (PSNU1 to PSNU9) has been constructed based on a scale developed by Caplan [77] with modifications as per the requirement of the study. The sample item is "I have difficulty controlling the amount of time I spend online." Items were assessed on a five-point Likert scale ranging from 1 (never) to 5 (Always).

Phubbing Behaviour Scale: A nine-item (PHUB1 to PHUB9) Partner Phubbing Scale developed by Roberts & David [23] was used to assess participants' partner phubbing. The sample item is " My partner glances at his/her cell phone when talking to me." Items were assessed on a five-point Likert scale ranging from 1 (never) to 5 (Always). Responses to all items were summed to produce a composite score, with higher scores indicating higher levels of partner phubbing.

DATA ANALYSIS

SPSS version 23 was used to code the collected data. Additionally, the instrument's reliability was determined using Cronbach's alpha in SPSS, and its validity was investigated using Confirmatory Factor Analysis (CFA) in AMOS Version 21.0. In SPSS, Cronbach's alpha is a commonly used statistic to assess the internal consistency or reliability of a scale. It measures how closely related a set of items are as a group. A high Cronbach's alpha value

RESULTS

DEMOGRAPHIC PROFILE

Table 1 shows the demographic profile of respondents following gender, age, qualification, family structure, and region.

FACTOR ANALYSIS AND MEASUREMENT MODEL

Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity are often used as preliminary steps in factor analysis to ensure that the data are suitable for extracting meaningful factors or dimensions as shown in Table 2. Kaiser-Meyer-Olkin assesses whether the dataset has enough common variance among variables to warrant factor analysis. A KMO value of more than .8 indicates that the sample is adequate for the factor analysis as there is substantial common variance among the variables. Bartlett's Test of Sphericity checks whether there is enough correlation among the variables to justify factor analysis. According to Barlett's test, p-value<.001 make up the constructs are significantly satisfying. Thereafter, Exploratory Factor Analysis (EFA) with varimax rotation was used to re-evaluate the scales' applicability for the current study as shown in Table 3.

(above 0.60) suggests that the items in the instrument are reliable and measure the same underlying construct consistently [78]. Ensuring both convergent and discriminant validity is essential in research to provide evidence that the measurement tool is reliable and accurately reflects the theoretical constructs being studied. If the correlation between items measuring the same construct is high (convergent validity), and the correlation between items measuring different constructs is low (discriminant validity), it suggests that the measurement instrument is valid in capturing and distinguishing the constructs it is designed to assess [79]. Furthermore, hypothesis testing of direct and indirect effects was carried out in SPSS version 23 using the PROCESS macro with bootstrapping 5000 at a 95% confidence level. The PROCESS macro is a widely used tool for conducting various types of mediation and moderation analyses. A 95% confidence level indicates that the results are considered statistically significant if the confidence intervals do not include zero [80].

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Demographic Variables	Categories	Percentage
Gender	Male	47.7
	Female	52.3
Age	Less than 18	37.4
	18-24	42.2
	Above 24	20.4
Qualification	Diploma	25.3
	Under Graduation	33.7
	Post-Graduation	41.0
Family Structure	Nuclear	57.2
	Joint	42.8
Region	Rural	33.9
	Semi-urban	39.4
	Urban	26.7

Note: (Source: Primary Data)

TABLE 2: KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.879
Bartlett's Test of Sphericity	Approx. Chi-Square	4829.159
	Df	378
	Sig.	.000

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TABLE 3: ROTATED COMPONENT MATRIX

Variables	Items	Factor Loading			
		1	2	3	4
Social media-induced FOMO	FOMO1	.798			
	FOMO2	.825			
	FOMO3	.793			
	FOMO4	.792			
	FOMO5	.817			
Depression	DEP1		.821		
	DEP2		.855		
	DEP3		.873		
	DEP4		.885		
	DEP5		.850		
Problematic social networking usage	PSNU1			.765	
	PSNU2			.817	
	PSNU3			.699	
	PSNU4			.747	
	PSNU5			.815	
	PSNU6			.807	
	PSNU7			.807	
	PSNU8			.777	
	PSNU9			.700	
Phubbing Behavior	PHUB1				.738
	PHUB2				.738
	PHUB3				.788
	PHUB4				.771
	PHUB5				.756
	PHUB6				.750
	PHUB7				.740
	PHUB8				.664
	PHUB9				.779

Note: (Source: Primary Data)- 1.Extraction Method: Principal Component Analysis.

2.Rotation Method: Varimax with Kaiser Normalization.

3.FOMO: Fear of Missing out, DEP: Depression, PSNU: Problematic social networking usage, PHUB: Phubbing Behaviour

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After that, the model fit of the research model was examined through confirmatory factor analysis (CFA) in AMOS 21 [81], as shown in Figure 2. Confirmatory Factor Analysis (CFA) is a statistical method for determining the association between observed variables and validating the factor structure. Then, the proposed model was analyzed to reveal the values of model fit i.e., CMIN/DF=2.22 ≤3, GFI=.825>=.8, PGFI=0.699>=0.5, CFI=

0.909 >= 0.9, TLI=0.900 >= 0.90 and RMSEA= 0.071 =< 0.08. All these values were found to be within acceptable ranges representing the goodness of model fit as shown in Table 4. It represents that the proposed model is a good fit for the data, which means that the model explains the observed data well and that the relationships between variables in the model are consistent with the data [82].

FIGURE 2: CONFIRMATORY FACTOR ANALYSIS
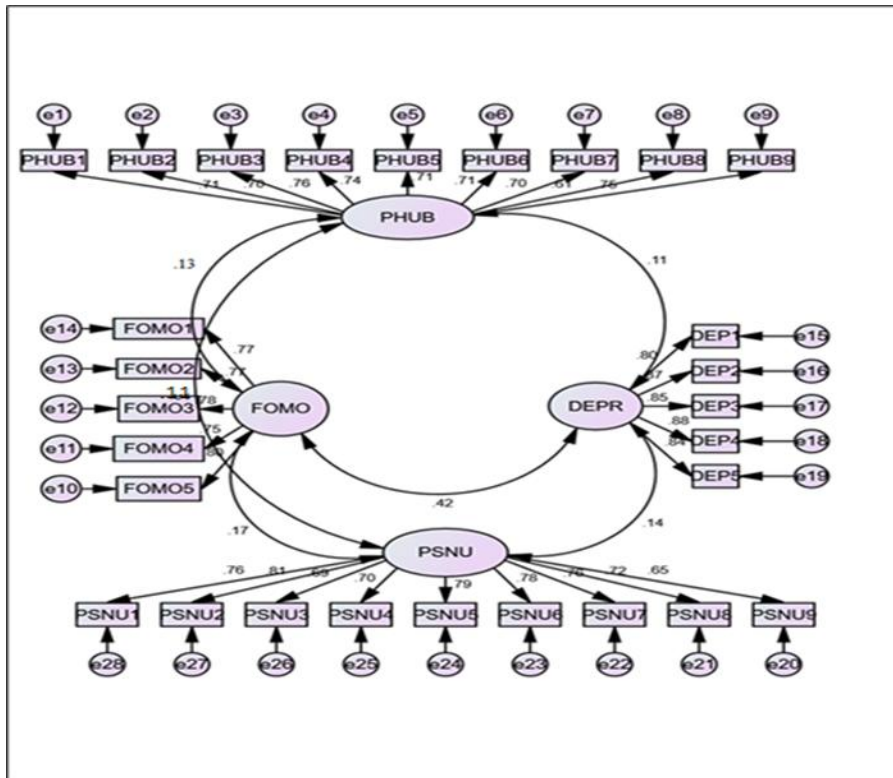
TABLE 4: FIT STATISTICS OF THE MODEL

Model Fit	Model Statistics	Cut-off Criteria
CMIN	766.595	
DF	344	
CMIN/Df	2.228	≤3 [83]
GFI	.825	≥.8 [84]
PGFI	.699	≥.5 [85]
CFI	.909	≥.9 [83]
TLI	.900	≥ 0.9[86]
RMSEA	.071	≤.08 [87]

Note: (Source: Primary Data)

TESTING COMMON METHOD BIAS (CMB)

The current study controls for common method bias by collecting self-reported data via a survey questionnaire at two different points in time. However, when every participant completes a survey, common method bias is possible. As a result, this study employs Harman's Single-factor method to eliminate the CMB dilemma while maintaining respondents' privacy and confidentiality. This method is the most extensively used test to determine biases. The results showed that the variation explained in the study was only 22.28% which is less than Harman's stated criteria of 50% [88], demonstrating that the instrument was free of the common method variance problem. As a result, statistical data suggest that common method bias does not pose a threat to the interpretation of the current study's findings.

RELIABILITY AND VALIDITY ANALYSIS

Reliability Analysis

The reliability of the scales was tested by using Cronbach's alpha coefficient. Cronbach's alpha above 0.7 is considered good for the scales' reliability [78]. Table 5 depicts Cronbach's alpha of the scale items.

TABLE 5: RELIABILITY

Sr. No.	Scales	Cronbach alpha
1	Social media-induced FOMO	.881
2	Depression	.827
3	Problematic social networking usage	.812
4	Phubbing Behavior	.801

Note: FOMO: Fear of Missing out

Convergent and Discriminant validity analysis

Following the identification of factors from the EFA, model fit, and reliability, scales are validated in terms of convergent and discriminant validity through CFA. The convergent and discriminant validity values were calculated using the stats tools package's validity master. All the data was found to be within acceptable ranges, such as CR>0.6 and AVE>0.5 [83,89], confirming internal consistency and convergent validity. Moreover, to achieve discriminant validity, the Fornell and Larker criterion is used, in which the correlation coefficient should be less than .85 (off-diagonal elements are correlation between constructs) and AVE square root scores or diagonal values of all variables (bold) should be greater than correlation values in the corresponding row and column demonstrating discriminant validity [89]. Table 6 shows the variables exhibit convergent and discriminant validity. After that, the model was used for the final analysis of hypotheses testing.

TABLE 6: CONVERGENT AND DISCRIMINANT VALIDITY STATISTIC OF VARIABLES

	CR	AVE	MSV	MaxR(H)	FOMO	PHUB	DEPR	PSNU
FOMO	0.882	0.600	0.173	0.883	**0.775**			
PHUB	0.918	0.557	0.013	0.923	0.132	**0.746**		
DEPR	0.928	0.720	0.173	0.930	0.416	0.114	**0.849**	
PSNU	0.931	0.600	0.030	0.934	0.174	0.112	0.141	**0.775**

Note: (Source: Primary Data)

1. CR= Composite reliability, AVE= Average variance extracted MSV= maximum shared variance.

2. FOMO: Fear of Missing out, DEPR: Depression, PSNU: Problematic social networking usage, PHUB: Phubbing Behaviour

HYPOTHESIS TESTING

Descriptive Statistics

Table 7 summarizes the descriptive statistics findings and variable correlations. All the factors were discovered to be statistically significant and correlated.
Results of Direct Effects

The direct effect of all four constructs is shown in Table 8. FOMO has a positive direct effect on depression (β=.1156, p=0.024), PSNU (β=.3415, p=0.000), and Phubbing behaviour (β=.1321, p=0.002). Similarly, a positive significant impact of PSNU on depression (β=.1565, p=.006), and phubbing behaviour (β=.3550, p<0.00) is observed. Further, phubbing

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behaviour was also found to positively impact depression
(β=.5349, p<0.000).

TABLE 7: DESCRIPTIVE STATISTICS AND INTER-CORRELATIONS AMONG VARIABLES

S. No.	Variables	M	SD	FOMO	PSNU	PHUB	DEPR
1.	Social media-induced FOMO	3.54	.590	1			
2.	Problematic social networking usage	3.51	.570	.154*	1		
3.	Phubbing behaviour	3.53	.576	.141*	.122**	1	
4.	Depression	3.61	.782	.378**	.158*	.147*	1

Note: (Source: Primary Data)

1. *Correlation is significant at the 0.05 level (2-tailed).

2. **Correlation is significant at the 0.01 level (2-tailed).

3.FOMO: Fear of Missing out, DEPR: Depression, PSNU: Problematic social networking usage, PHUB: Phubbing Behaviour

TABLE 8: RESULTS OF DIRECT EFFECT

Relationships	β	se	t	p	boot LLCI	boot ULCI
FOMO-> DEPR	.1156	.0511	2.262	.024	.0150	.2161
FOMO->PSNU	.3415	.0547	6.239	.000	.2337	.4492
FOMO-> PHUB	.1321	.0430	3.0754	.002	.0475	.2167
PSNU->DEPR	.1565	.0574	2.7280	.006	.0436	.2694
PSNU -> PHUB	.3550	.0442	8.0389	.000	.2681	.4419
PHUB -> DEPR	.5349	.0704	7.59	.000	.3963	.6735

Note:(Source: Primary Data)

1. *** p-value < 0.01; ** p-value < 0.05

2. FOMO: Fear of Missing out, DEPR: Depression, PSNU: Problematic social networking usage, PHUB: Phubbing Behaviour

RESULTS OF INDIRECT EFFECTS

The direct and indirect effects of PSNU and Phubbing behaviour were examined. It was observed that after mediation analysis, the direct effect of FOMO on depression is positively significant (β=.1156, 95% CL: .0151, .2161), leading to the acceptance of hypothesis H1. The total size of the indirect effect is (β=.1889, 95% CL: .1103, .2753), and was found to be statistically significant as there are no zeroes between LLCI and ULCI in the confidence interval. Mediation effect of PSNU, H2 (β=.0534, 95% CL: .0124, .1053) and Phubbing behaviour, H3 (β=.0707, 95% CL: .0184, .1261) were found to be statistically significant. Simple mediation analyses predicted in hypotheses 2 and 3 are supported by the results. Further, examining the serial mediating effect H4 (β=.0648, 95% CL: .0333, .1076), is also found to be statistically significant. Through this, the serial mediation effect of PSNU and phubbing behaviour is confirmed in the relationship between FOMO and depression. As proposed, all the results were found to be statistically significant, supporting all hypotheses as shown in Table 9.

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TABLE 9: SPECIFIC INDIRECT EFFECTS

Relationships	H	Effect	boot SE	boot LLCI	boot ULCI	Decision
Direct effect after mediation						
FOMO->DEPR	H1	.1156	.0511	.0150	.2161	Accepted
Indirect Effects						
FOMO -> PSNU -> DEPR	H2	.0534	.0238	.0124	.1053	Accepted
FOMO -> PHUB -> DEPR	H3	.0707	.0276	.0184	.1261	Accepted
FOMO -> PSNU -> PHUB -> DEPR	H4	.0648	.0191	.0333	.1076	Accepted
Total Indirect effect		.1889	.0418	.1103	.2753	

Notes: (Source: Primary Data)

1.H: Hypothesis, FOMO: Fear of Missing out, DEPR: Depression, PSNU: Problematic social networking usage, PHUB: Phubbing Behaviour

2.Number of bootstrap samples for bias-corrected bootstrap confidence intervals: 5000. Level of confidence for all confidence intervals: 95%

DISCUSSION

The purpose of this article was to better understand how depression is the consequence of social media-induced FOMO. The study presented and investigated a serial mediation model of FOMO causing depression through problematic social networking use and phubbing behaviour. The study's empirical findings indicate some significant conclusions.

Firstly, the study examined the direct and indirect effects of FOMO on predicting depression. The study found that FOMO is an essential element influencing depressive symptoms. From hypothesis one, results exhibit a positive significant association between FOMO and depression, which explains that social media-induced FOMO will result in feelings of depression. These findings are consistent with previous studies [29,37] which also found a positive significant relationship between FOMO and Depression. Both direct and indirect effects were found to be statistically significant. The study posits that because of FOMO, individuals may struggle to process the overwhelming amount of information they feel they need to, resulting in a mood disorder characterized by depression. In essence, this research suggests that FOMO has negative impacts on overall well-being, with a particular emphasis on its role in causing depression. The study also argues that increased social media use can lead to a detrimental shift in users' mental well-being. This is attributed to the idea that increased screen time may limit opportunities for individuals, especially students, to engage in activities that have a positive impact on their mental and physical health. In summary, the study's findings support the notion that FOMO is linked to depression and underscores the potential negative consequences of excessive social media use on mental well-being, especially in the context of missed opportunities for positive engagement. This provides valuable insights into the relationship between technology-related phenomena and mental health.

Thereafter, the study explored the mediating role of PSNU and phubbing behavior in the relationship between FOMO and depression. As anticipated, the results of the study indicated that these mediating variables had a positively significant effect on the relationship. These findings contribute to the existing body of literature that has examined the associations of PSNU and phubbing behavior with FOMO and depression, as referenced in previous studies [23,47,57,65,66,68,69]. The study first forecasted the mediation effect of PSNU and found significant empirical results that align with previous research. This suggests that FOMO is a significant predictor of problematic social media usage, which, in turn, leads to symptoms of depression. In other words, individuals experiencing FOMO are more likely to engage in problematic social media usage, which then contributes to depressive symptoms. The study's results emphasize that reducing feelings of FOMO could be a strategy to decrease problematic social media usage and, consequently, alleviate depressive symptoms. Furthermore,

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the study examined phubbing behavior as a mediator in the relationship between FOMO and depression. The results confirmed a positive mediating role for phubbing behavior, which is consistent with findings in existing studies [23,49,68,90,91]. Phubbing, or the act of being distracted by one's phone in social interactions, has been associated with an increased risk of depression symptoms and decreased psychological well-being [92]. This highlights the potential negative impact of phubbing behavior on mental health. In summary, the study's findings suggest that both PSNU and phubbing behavior mediate the relationship between FOMO and depression. These results contribute to a growing body of evidence indicating the importance of considering these variables in understanding the complex interplay between social media-related phenomena, FOMO, and mental health outcomes. The study emphasizes the need to address FOMO and its associated behaviors to mitigate the risk of depression and promote psychological well-being.

Finally, the study also examined the proposed serial mediation of PSNU and phubbing behavior in the relationship between FOMO and depression. The results of this analysis revealed that both PSNU and phubbing behavior played a statistically significant role in influencing FOMO and, subsequently, depression. This is a noteworthy and significant finding, as it represents the first study to investigate serial mediation in this complex relationship. The concept of serial mediation suggests a sequential chain of influence: when FOMO is experienced, it leads to higher levels of PSNU, which, in turn, induces phubbing behavior, and this ultimately results in a detrimental impact on mental health, specifically leading to depression. In essence, the study's findings illuminate that both PSNU and phubbing behavior are critical factors that strengthen the positive association between FOMO arising from social media and the experience of depression. This highlights the importance of understanding the successive and cumulative impact of these variables on mental health outcomes. The results provide valuable insights into the mechanisms through which FOMO can lead to depression, emphasizing the role of problematic social media use and phubbing behavior in this process. In summary, the study's novel exploration of serial mediation in the context of FOMO, PSNU, phubbing behavior, and depression contributes to a deeper understanding of the intricate relationships among these variables and underscores their significance in influencing mental well-being.

IMPLICATIONS

The main aim of this research study was to analyse the relationship between FOMO from social media and Depression. This has been done by analysing several literature reviews concerning the topic discussion. Accordingly, with the findings indicating the effect of social media-induced FOMO and depression there are implications that this study will have on different fields.

THEORETICAL IMPLICATIONS

This study has discovered a link between FOMO and depression. According to this study, FOMO has a variety of detrimental effects, including addiction i.e., problematic social media usage and phubbing behaviour which causes the mental effect of depression. Since phubbing is a relatively recent issue, to our knowledge there has not been any research looking into the more complex connections between phubbing, FOMO, Problematic social media use and depression. However, it is reasonable to predict that links as these variables do exist based on studies completed to date, such as those in the field of new media psychology. Moreover, the current study made a significant contribution to the literature by ascertaining the significant serial mediation of problematic social media use and phubbing in the relationship between social media-induced FOMO and depression. From the viewpoint of business majors, social media has emerged as a field of study that cannot be neglected due to the rapid development of information technology. The basis for reducing depression is laid out by research on the connection between FOMO and depression.

PRACTICAL IMPLICATIONS

The results of this investigation will benefit medical professionals. Specifically, this is intended solely for mental health professionals like psychologists and therapists. The research's conclusions point to the depressing consequences of FOMO, problematic social media usage, and phubbing behaviour. Since it is well known that this mental illness is among the most prevalent in the world, hence, psychologists and therapists who comprehend how online users' despair is caused by FOMO, problematic social media usage, and phubbing behaviour are better able to assist those who are suffering. The second effect of this study was on stakeholders in education. This study can be used as a foundation by university administrations, teachers, and authorities to develop curricula that incorporate social media use. Since most students use social media activity in the digital era, there is a significant

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risk that these students may be exposed to the negative impacts of anxiety and depression. Therefore, students, parents, educators, and policymakers need to promote responsible social media use, educate students about digital citizenship, encourage open conversations about mental health, and provide resources for managing screen time and digital well-being. It is also vital to stay updated on the latest research and trends related to social media usage and its effects on students.

LIMITATIONS AND FUTURE SCOPE

While the findings of the study highlighted the relevance of social media-induced FOMO, problematic social media usage, and phubbing behaviour on depression, however, like any other research, this study also had its significant limitations.

Firstly, despite using a two-wave survey with a three-week gap between them, the study's ability to draw definitive causal inferences regarding the effects of FOMO, PSNU, and phubbing behaviour on depression is hampered by the short time interval employed for data collection. Future research is advised to employ a longitudinal or quasi-experimental study method to better reflect variations in the relationship of variables over time. Second, the study's restricted use of data from northern Indian cities raises questions about its generalization. Moreover, the same model can be reproduced in future research with a bigger sample size in other regions and nations to determine whether there is a cultural influence on the association being studied. Third, FOMO was primarily examined in the study as a factor influencing other factors. Future research should also explore more factors. Finally, this study only examined mediators; subsequent research might focus on moderating variables.

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RESEARCH ARTICLE

NURSES' METAPHORICAL PERCEPTIONS ABOUT THEIR MANAGERS: A MIXED-METHOD RESEARCH

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ABSTRACT

BACKGROUND:

Research in literature has examined the leadership styles of nurse managers. However, no qualitative study based on metaphors could be found to determine the perceptions of nurses regarding their managers in depth and without limitations where they could freely express their opinions. The purpose of this study is to determine the perceptions of nurses regarding their nurse managers with the help of metaphors.

METHODS:

This study used a mixed methods approach to including both quantitative and qualitative research methods. This study was conducted in a total of 118 nurses between August and November 2022. The data were collected as online by the researchers through personal information form and a questionnaire including a semi-structured open-ended form. In the first part of the questionnaire, questions about socio-demographic characteristics were included, and in the second part, the sentence "My nurse manager is like…, because…" was included to determine the metaphors developed by the nurses about their nurse managers. The nurses' answers to this question were analyzed with content analysis.

RESULTS:

The metaphors formed by the participants regarding their nurse managers were gathered under oe positive theme and one negative theme covering 20 categories (13 positive categories and 7 negative categories). In the study, 94 different metaphors were identified, and 53 of these were positive metaphors, while 41 were negative metaphors. In the positive sense, the participants perceived their managers as trustworthy, supportive family members, individuals who restore/coordinate, individuals who protect/defend, hardworking, source of happiness, just/fair, source of power, source of support, problem-solver, nutrition, source of knowledge, and guiding. In the negative sense, the participants perceived their managers as harming/harmful, passive, unstable/inconsistent, coercive/oppressive, opportunistic, useless, and biased.

CONCLUSION:

The results of this study showed that most nurses perceived their managers positively.

KEYWORDS

metaphor, nurse, nurse manager, qualitative study

INTRODUCTION

For centuries, people have been interacting with a broad environment including the smallest groups they are in, their organization, their country, and the entire world. For a person to be able to manage and influence themselves or the environment that they are interacting with, they need to have management and leadership capabilities [1]. Today, effective managers, especially leaders, have substantial importance in healthcare organizations. The reason for this is that healthcare services are becoming much more complicated due to globalization, advancements in technology, and crises such as epidemic diseases, disasters, and war. Therefore, there is a constantly increasing need for managers who can operate these services and show effective leadership [2].

Nurses, who take on important responsibilities as an indispensable part of teams that provide healthcare services, rise to the position of "nurse manager" not only based on their training and education but also by improving their knowledge, skills, and qualifications [3], and they play important roles in the supervision of nursing practices [4]. The management styles and behaviors adopted by nurse managers are critical in ensuring the quality of healthcare services and achieving positive outcomes in organizational areas such as job satisfaction and motivation [5].

The success of nurse managers is dependent on their acceptance and embracement as leaders by their subordinates. This is because, when nurses have positive perceptions of their managers, they work more in harmony with them. This is why the perceptions of nurses regarding nurse managers constitute an important factor that affects the likelihood of obtaining positive organizational outcomes. The traits nurses look for in their managers and their relationships with their managers influence their job satisfaction, organizational commitment, intention to turnover, and many other attitudes and behaviors [6, 7]. Thus, studies conducted to determine how exactly nurses perceive their managers and their feelings, thoughts, and points of view regarding their managers are recommended [5].

While studies have examined the leadership styles of nurse managers, the data obtained in these studies have been limited to a certain number of statements and questions in data collection instruments presented to nurses such as scales and questionnaires. In such studies, nurses may not find opportunities that reflect their thoughts other than those already included in the data collection forms [6, 8]. There is a need for studies aiming to determine the perceptions of nurses regarding their managers in depth and without limitations where they could freely express their opinions. One of the most suitable methods that can be used for this purpose is the usage of metaphors [9].

Metaphors are cognitive instruments that are used to determine how an expression, an event, an object, and especially an abstract concept that is difficult to understand is perceived and interpreted by individuals using fewer words and various comparisons, while they usually have figurative meanings. Metaphors are also mental images that have the potential to influence the future acts of individuals [10]. Such mental images pertaining to the perceptions of nurses regarding their managers are among the main determinants that will direct their characteristics such as motivation, job satisfaction, organizational trust, and organizational commitment in the context of their relationships with their managers, whether they accept their managers as leaders, and their practice of duties and responsibilities for both the present and the future. The purpose of this study is to determine the perceptions of nurses regarding their managers using metaphors. It is believed that the results of this study will provide significant contributions to the literature by revealing the traits and behaviors of nurse managers perceived positively or negatively by nurses, as well as the characteristics and behaviors nurses expect/embrace. Moreover, the results will allow nurse managers to gain an awareness of their management styles by getting an insight into themselves. Furthermore, by the revelation of the negative characteristics and behaviors perceived by nurses in their managers, supportive data will be gathered for management training programs to improve these perceptions. In this study, answers were sought to the following research question: What are the metaphors adopted by nurses regarding their perceptions of their managers?

MATERIAL AND METHODS

STUDY DESIGN

A mixed method, including both quantitative and qualitative research methods, was used in this study. Quantitative method was used to determine the sociodemographic characteristics of nurses, and

qualitative method and metaphor analysis technique based on the transcendental phenomenological approach were used to determine nurses' perceptions of their managers.

The purpose of phenomenological studies, which form the basis of qualitative research, is to explain a concept, event or phenomenon, and to reveal individuals' perceptions, feelings and thoughts on the subject. Participants who will participate in this study must have experienced situations such as phenomena, events and concepts that they can understand [11, 12]. Metaphors are a qualitative study technique based on explaining a difficult phenomenon, event or concept by making use of these experiences of individuals and expressing and concretizing the perceptions and emotions related to these with various analogies or known terms [9].

SAMPLE

The population of the study included all nurses working in the country where the study was carried out (N=243,565) [13].

Purposeful sampling method, one of the non-probability sampling methods commonly used in qualitative research studies, was used in the research. The sample consisted of 118 nurses who had at least six months of working experience in their institution, who could be reached online, and who agreed to participate in the research (Figure 1).

INSTRUMENTS

The data was collected via online by the researchers using a form developed on Google Forms. The form includes questions about the socio-demographic characteristics of the participants (9 questions) and a sentence containing metaphors (in accordance with the metaphor question pattern). The descriptive form included questions about participants' socio-demographic characteristics such as gender, marital status, education status, unit of employment, and years of professional experience. After the participants answered the questions about their sociodemographic characteristics, they were given the incomplete sentence "My nurse manager is like a(n)… because … " (metaphor question pattern) and asked to fill in the blanks in this sentence with a metaphoric expression. In studies using metaphors as a research tool [14, 15], the word or concept used for similarity is often used to more clearly associate the link between the subject and the source of the metaphor. Before these questions were asked

of the participants, they were provided with a written explanation about what a metaphor is and how it can be defined. To make the concept more comprehensive, an example metaphor was provided. The data collection form that was used in the study was tested for comprehensibility in a group of nurses not included in the main sample, and positive feedback was received. After this stage, the main data of the study were collected.

DATA COLLECTION

The data of the research were collected using metaphors, which is a frequently used data collection method to explain and understand experiences and perceptions. Collecting data through metaphors allows obtaining detailed information about how people perceive the subject through the metaphors obtained and the impact of the metaphors on the individual [9].

The data were collected between August and November 2022. The link to the online form that was prepared was sent to nurses via social media and communication platforms used by nurses that provide group conversations, and nurses were invited to participate in the study. The link was sent three times at weekly intervals. The data collection process continued until data saturation. Saturation occurs when additional data is not collected or nothing new is added to the research as a result of the analysis [16]. If the data collected in this study was a repetition of previous data and no new codes were created, saturation occurred and the data collection process was terminated. The data collection form was filled out by 118 volunteer nurses. It took approximately 5-10 minutes to fill out the form. These compositions written by nurses via Google Forms were used as the main data source in this study. The study was carried out by following the steps of the COREQ Checklist [17]. The collected data were saved online in a password-protected form only accessible to the researchers.

DATA ANALYSIS

Socio-demographic characteristics (age, gender, etc.) were summarized as numbers and percentages using SPSS. There is no single way to do metaphorical analysis. It ranges from listing metaphorical expressions to organizing data into themes. In this study, content analysis method, one of the qualitative analysis methods, was used. Content analysis is a systematic and replicable method in which some words of a text are summarized in smaller content categories using codes that are created based on certain rules. Using codes, this technique aims to explain the

underlying concepts of data, and the relationships between these concepts [18]. In this study, while categorizing the data, not only the stated metaphors but their reasons for statement were taken into account. This was because the same metaphor stated by two different people may be used with different meanings. For this reason, the content analysis was carried out keeping the justification for each stated metaphor in mind. Based on this consideration, some metaphors with the same words could be included simultaneously under different categories (as their justifications/reasons were different).

The analysis stages included (1) listing the stated metaphors in alphabetical order, (2) data refinement, (3) data categorization, and (4) theme creation (Figure 1). The collected metaphors were first listed alphabetically, and those that had shared characteristics or were related to each other were categorized by also examining their justifications/reasons. Next, 20 categories under 2 themes considered to cover the 94 metaphors best were created. The data were then examined to identify metaphorical statements representing each metaphor, and example statements are provided.

FIGURE 1. FLOW CHART OF THE RESEARCH
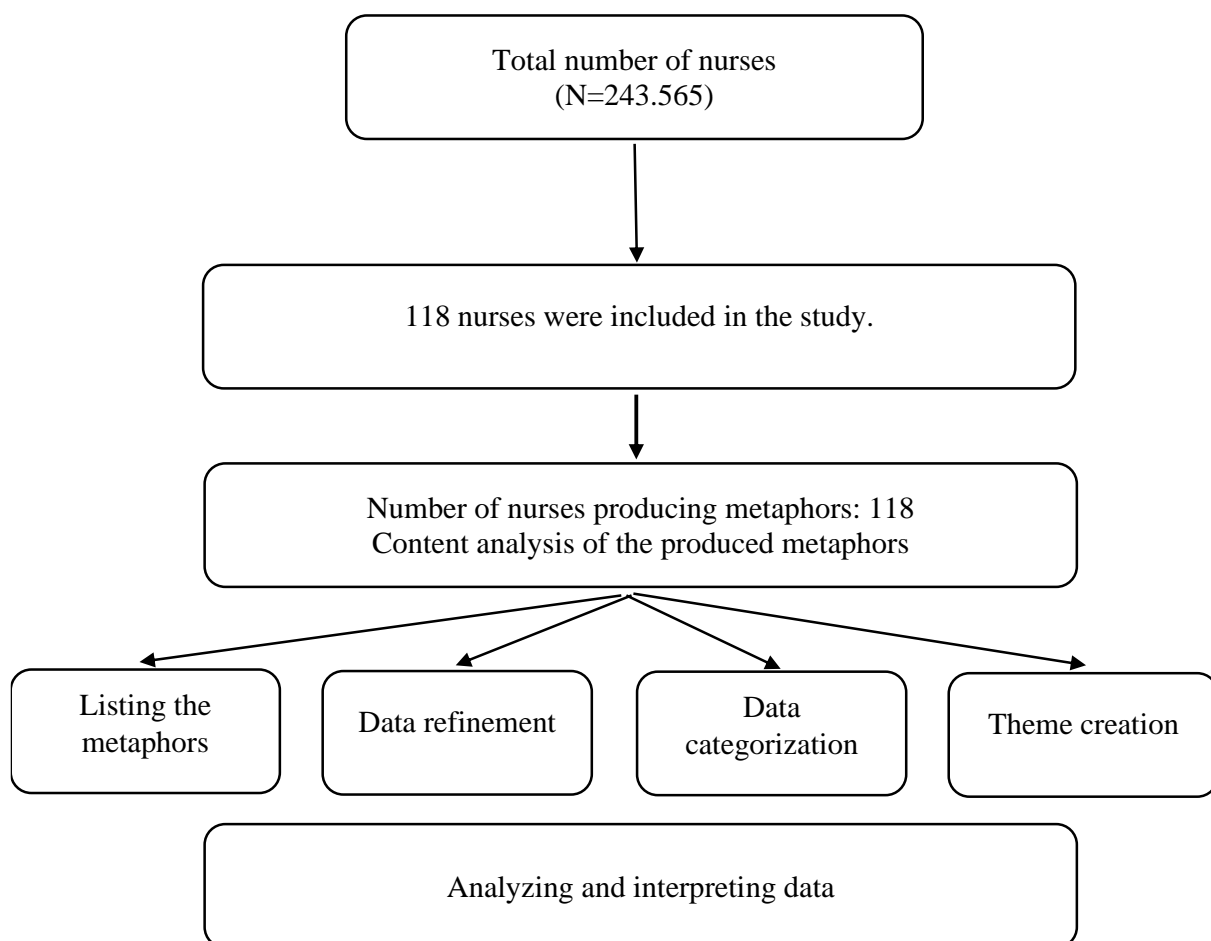
ETHICAL PRINCIPLES

Before starting the study, ethical approval was obtained from the Bandirma Onyedi Eylul University Ethics Committee (Date: 07.02.2022, No: 2022/2). At the stage of data collection, potential participants were informed about the study in the informed consent form included in the data collection form, and those who agreed to participate were allowed to respond to the questions on the form. To protect their confidentiality, no identifying information, including name, surname, or e-mail address, was collected from the participants. The protocol of the study was implemented in line with the principles of the Declaration of Helsinki.

RESULTS

The mean age of the participants was 35.44±8.26, 90.7% of the participants were women, 72% had undergraduate degrees, and 67.7% were service nurses. The mean professional experience level of the participants was 12.47±9.48 years, 78.8% had experience of previously working at another institution, and the mean duration for which they worked at their current institution was 5.13±5.26 years. While 80.5% of the participants reported to the head nurse of their unit, 10.1% reported to the nursing director at their institution (Table 1).

TABLE 1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS (N=118)

Characteristics	n	%
Age M±SD=35.44±8.26		
Gender		
Female	107	90.7
Male	11	9.3
Marital status		
Married	83	70.3
Single	35	29.7
Education level		
Vocational school of health	13	11.1
Undergraduate	85	72
Postgraduate	20	16.9
Unit of employment		
Inpatient unit	80	67.7
Specialized unit (e.g., emergency)	28	23.7
Administrative unit	10	8.6
Professional experience		
0-5 years	47	39.9
Over 5 years	71	60.1
M±SD=12.47±9.48		
Has worked at another institution before		
Yes	93	78.8
No	25	21.2
Duration of working at current institution		
0-5 years	80	67.7
Over 5 years	38	32.3
M±SD=5.13±5.26		
Reports to		
Unit head nurse	95	80.5
Nursing director	12	10.1
Other (supervisor nurse, quality management directory)	11	9.4
TOTAL	118	100

The metaphors formed by the participants regarding their nurse managers were gathered under one positive theme and one negative theme covering 20 categories. While 13 of these categories were positive, 7 were negative categories. Ninety-four different metaphors (53 positive and 41 negative metaphors) were gathered under these categories. Some metaphors with the same names were included simultaneously in different categories.

Theme 1: Positive Metaphors (n=72)

The positive metaphors shared by the participants about their nurse managers were gathered under 13 categories including a total of 53 different metaphors, and 10 of these metaphors were simultaneously included in different categories. The metaphors that were gathered under multiple categories were "flower" (n=7), "mother" (n=3), "bee" (n=3), "scale" (n=3), "friend" (n=3), "sibling" (n=2), "protector" (n=2), "angel" (n=2), "key" (n=2), and "computer" (n=2). The examples under the positive metaphors theme showed that the participants perceived their managers as trustworthy (n=9), supportive family members (n=8), individuals who restore/coordinate (n=8), individuals who protect/defend (n=7), hardworking (n=7), source of happiness (n=6), just/fair (n=6), source of power (n=5), source of support (n=4), problem-solver (n=4), nutrition (n=3), source of knowledge (n=3), and guiding (n=2) (Figure 2). With reference to positive metaphors, some of the respondents said:

"My nurse manager is like a friend because she has always helped me by standing by me in good and bad times." – Respondent 28
"My nurse manager is like a mother because she listens to my issues whenever I feel helpless and try to find a solution." – Respondent 57

"My nurse manager is like a queen bee because she keeps the whole team together, make sure that everything operates, are motherly, work with a team spirit, and facilitate the continuation of tasks." – Respondent 43

"My nurse manager is like a castle because she embraces and defend us, that is, nurses." – Respondent 21

"My nurse manager is like a bee because she is a person who knows how to work with a team spirit and is productive, successful, and hardworking." – Respondent 107

"My nurse manager is like a flower because she brings happiness when she arrives." – Respondent 17

"My nurse manager is like a scale because she appears to be right in the middle and impartial."
– Respondent 4

"My nurse manager is like a light because she enlightens us with her knowledge and experience." – Respondent 83

"My nurse manager is like a crutch because she helps me advance in fields where I fall short as an individual." – Respondent 36

"My nurse manager is like a painkiller because she is a person who makes your life easier and finds solutions when you are in trouble." – Respondent 13

"My nurse manager is like a computer because she knows, teaches, and coordinates everything." – Respondent 91

"My nurse manager is like a navigation because she tries to discover new routes and solutions." – Respondent 64

FIGURE 2. POSITIVE METAPHORS AND SUB-CATEGORIES ABOUT NURSE MANAGERS BY NURSES
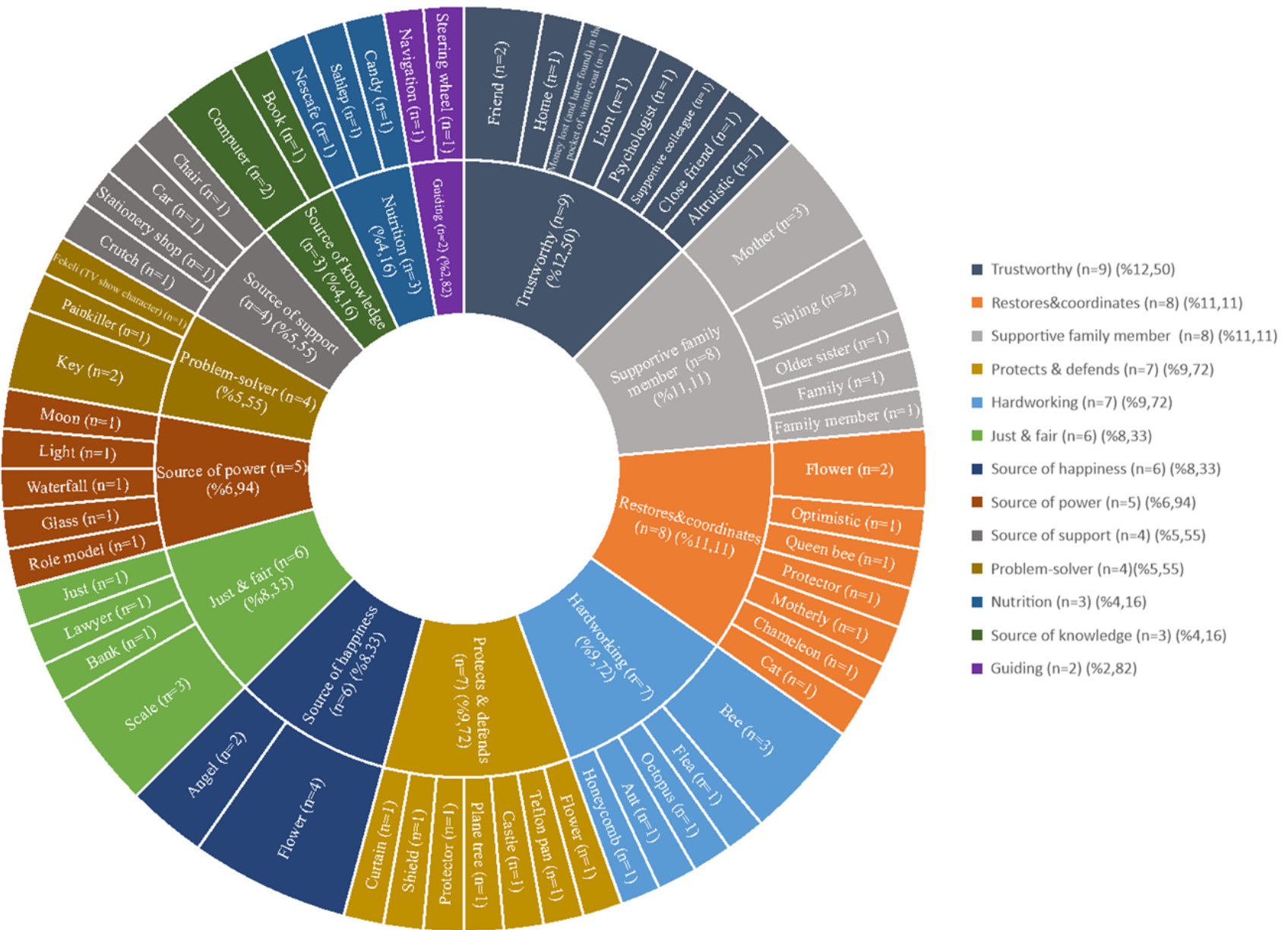
FIGURE 3. NEGATIVE METAPHORS AND SUB-CATEGORIES ABOUT NURSE MANAGERS BY NURSES
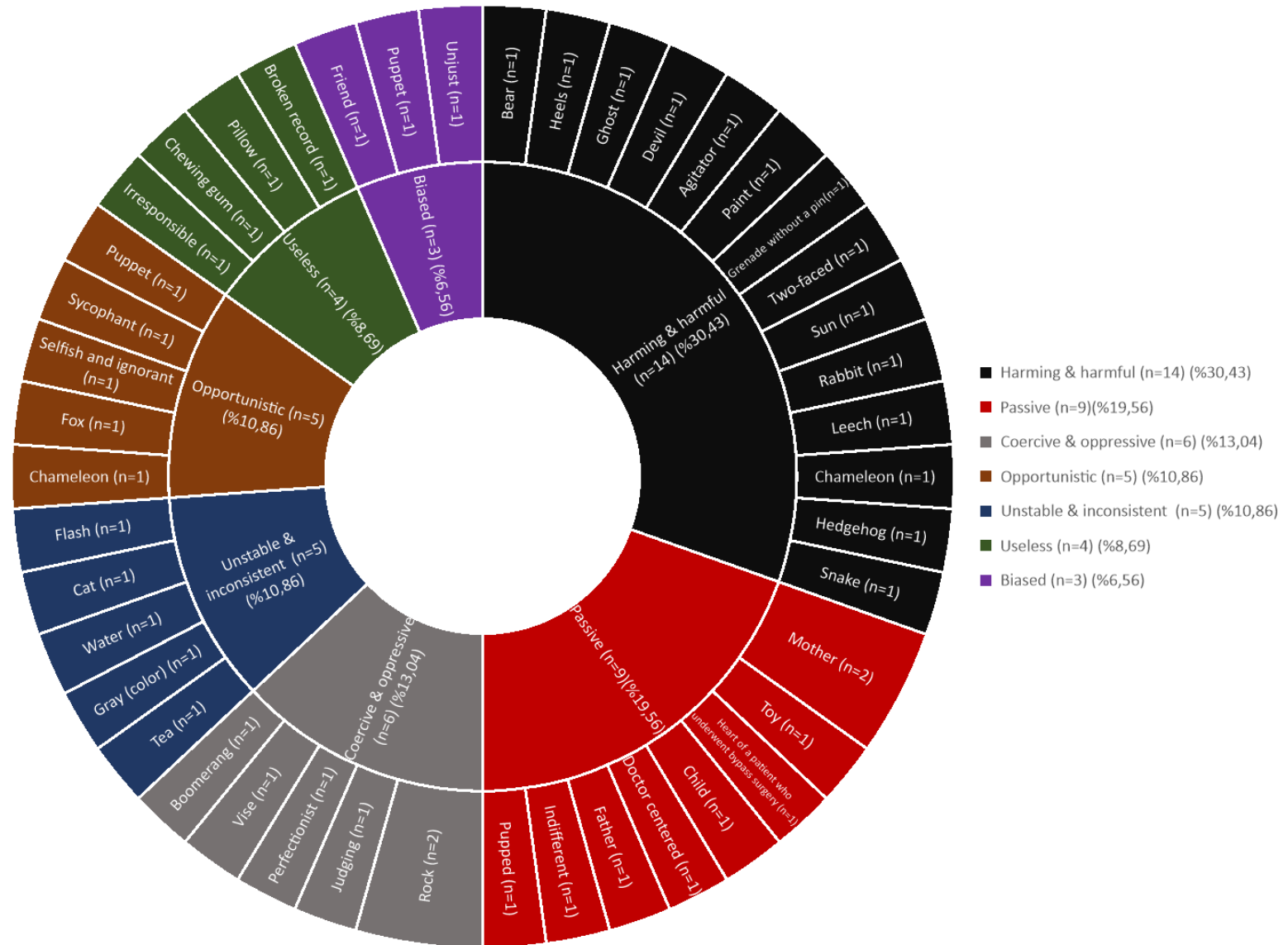
Theme 2: Negative Metaphors (n=46)

The negative metaphors shared by the participants about their nurse managers were gathered under 7 categories including a total of 41 different metaphors, and 4 of these metaphors were simultaneously included in different categories. The metaphors that were gathered under multiple categories were "chameleon" (n=2), "rock" (n=2), "mother" (n=2), and "puppet" (n=3). The examples under the negative metaphors theme showed that the participants perceived their managers as harming/harmful (n=14), passive (n=9), unstable/inconsistent (n=5), coercive/oppressive (n=6), opportunistic (n=5), useless (n=4), and biased (n=3) (Figure 3). With reference to negative metaphors, some of the respondents said:

"My nurse manager is like a snake because she holds every favor they do against you and take part in mobbing." – Respondent 27

"My nurse manager is like a toy because we can manipulate him however we want and get him do anything we want." – Respondent 49

"My nurse manager is like a cat because when you try to pet a cat, it may let you pet it if it wants, but the same cat could scratch you if it feels like it at that moment." – Respondent 8

"My nurse manager is like a rock because she is strict and disciplined about work." – Respondent 102

"My nurse manager is like a chameleon because she acts based on their interests." – Respondent 91

"My nurse manager is like a pillow because she sits down right after arriving at work, do not get up, do not listen to our problems, and do not do anything." – Respondent 34

"My nurse manager is like an unjust because she shows preferential treatment and constantly treat people unfairly. She makes fun of you when you talk about your problems. She displays favoritism." – Respondent 4

DISCUSSION

According to the results of this study, which aimed to reveal the mental images of nurses regarding their managers, most nurses (n=72, 61%) produced positive metaphors, meaning that they perceived their managers positively. This was a favorable result. However, it should be noted that 41 different negative metaphors were produced by 46 nurses (39%), which showed that they perceived their managers negatively.

The finding that the participants perceived their managers as trustworthy, supportive family members, people who restore/coordinate, and people who protect/defend and associated them with similar characteristics was closely related to the institutional characteristics of the profession of nursing and the roles of nurse managers. The nature of nursing necessitates nurse managers to assume roles such as problem-solving and protection [5]. These roles can be thought to emerge as a part of expectations from the profession of nursing and their responsibilities as managers. As emphasized by Warshawsky and Cramer (2019), nurse managers are expected to solve problems about both their job and patients, be knowledgeable about their job, and establish order. Nurse managers also need to treat their subordinates fairly, be reliable, supportive, and protective for their team and patients, and take on guidance and leadership roles [19]. They have responsibilities in protecting the healthcare team and patients and providing a pleasant work environment [1, 6, 20]. In this context, the positive perceptions of nurses regarding their nurse managers may be seen as a reflection of these roles and expectations. The successful performance of these roles by nurse managers may be leadership characteristics that are considered positive by nurses.

While performing their duties, nurse managers try to keep up with and complete all tasks under a work overload for reasons such as the low number of employees and the high number of patients [21]. Therefore, the perceptions of the participants regarding their managers as "bees" that are constantly working, "octopuses" that try to deal with everything, and "fleas" that move fast can be considered a finding that needs to be taken into consideration in terms of the workload of managers. Previous studies showed that nurse managers felt constantly in a hurry and took too many responsibilities due to their heavy workload [22], and nurse managers were perceived to have a task-oriented management style by both nurses and themselves [23]. It is thought that the female gender was effective in the emergence of these findings. This is because the participants shared metaphors that are usually associated with women such as a mother, an older sister, a queen bee, shielding, and motherliness, along with those that make people feel good and provide them with confidence and joy such as "flower, mother, friend, sibling, and angel". The

production of emotion-related metaphors by the participants may be related to the fact that the nature of the profession of nursing involves emotions such as compassion and sympathy [1], as well as the general perception of women as more emotional people due to gender stereotypes [24]. It was reported that approximately half of female employees stated that working with female managers raised positive feelings in them, and 78% thought they were understood better by female managers as they were "women" and "mothers" [25]. In another study, working with a female manager was found to have six main advantages including their roles as women and mothers, their creation of a positive work environment, their practical and fast solutions to problems, their mentorship roles, their completion of tasks within the planned schedule, and their status as good listeners [25, 26]. These findings were supported by the fact that most participants of this study were married.

The perception of nurse managers that satisfy their subordinates emotionally despite their work overload also suggests that they value interpersonal relationships, they have good empathy skills as guiding leaders [27], and thus, nurses feel emotionally close to their managers. The positive findings of this study regarding these issues are considered favorable in terms of the support of the healthcare team by nurse managers [7], making sure that the operation of the team is effective, achieving commitment to the manager, increasing the motivation of nurses, and reducing their turnover intentions [28]. While it was stated that nurses saw their managers mostly as mentors, coordinators, and directors [5], it was emphasized that it is important for nurse managers to raise feelings of happiness in their employees in terms of job satisfaction, productivity, efficiency, and best practices in patient care [29].

Other metaphors shared by the participants in a positive context included "computer", "key", "moon", and "light", which referred to their position as role models with their knowledge and problem-solving capacity. This showed that nurse managers had good problem-solving skills, they were perceived to be knowledgeable and role models by their subordinates, and thus, they performed the roles and responsibilities that were expected of them [19, 30].

Although most of the participants of this study had positive perceptions of their nurse managers, the rate of those who perceived their managers negatively (39%) should also be considered an important finding. These participants were found to usually perceive their managers as harmful, passive, unstable/inconsistent, coercive/oppressive, opportunistic, useless, and biased.

The participants who thought their managers harmed them likened their managers to the devil, chameleons, snakes, hedgehogs, and rabbits. They thought that their managers could do all kinds of bad things, they did not value their employees, they lied as they pleased and blamed people, and they exploited their employees. This suggested that nurse managers display an exploitative and autocratic management style that does not value employee relationships [31]. The finding that the participants perceived their managers as coercive/oppressive, opportunistic, and biased also supported the aforementioned findings. These findings might indicate that nurse managers may see their subordinates as rivals, and for this reason, they may treat them in a harmful, oppressive, and biased manner. Likewise, in another study, it was found that female managers were more envious and competitive than male managers, they acted emotionally, they had a large ego, and they were strict and aggressive, more autocratic, and tyrannical, while it was also highlighted that female managers could experience "queen bee syndrome" [25]. The results of another study showed that nurses expected their managers to be supportive, respect them, and value them [32]

It was seen in this study that the participants who considered their managers to be passive usually likened them to toys and puppets. This situation may mean that these managers were liberal (cowardly) managers who could not exercise their own management styles and authority completely, left their subordinates free to roam, and acted under the influence of others [33]. The finding that some participants considered their managers useless was in parallel with this possibility.

Another characteristic associated with nurse managers by the participants was being unstable and inconsistent. Accordingly, the participants expressed these views using metaphors such as water, gray as a color, and flash in a pan. These findings indicate that nurse managers were "fox"-like managers who adopted a Middle-of-the-Road management style that led them to act based on their environment, not have an exact/clear leadership style, behave politically, and change their minds easily [34].

The negative evaluations of the participants about their managers suggested that health institutions are not careful enough in their selection of nurse managers, and

sometimes managers who affected the confidence and motivation of nurses negatively were employed. This result was interpreted as a situation that needs to be kept in check to prevent nurses from leaving their jobs. This is because, as mentioned in the literature, opportunistic and ineffective managers increase the turnover intentions of their subordinates by lowering their confidence and job motivations [35], and biased managers who favor some employees lead to a reduction in the perception of organizational justice and affect the job satisfaction of their employees negatively [36].

STRENGTHS AND LIMITATIONS

This study has several strengths. Our findings support and extend those of previous studies on perceptions of managers in different contexts, while also offering novel and unique findings. Like every other study, this study had some limitations. First of all, the data were collected online, not in person. Some nurses may have hesitated to share their opinions about their managers. Additionally, the metaphors created by the participants were limited to their self-reports depending on their cultural, social, and professional experiences. The lack of other metaphor analysis studies about this topic was a limitation in terms of the discussion of the findings of this study along with the findings of other studies. Finally, the created themes and categories were based on the interpretations of the researchers.

RECOMMENDATIONS FOR FURTHER RESEARCH

Considering these results, the following recommendations can be made:
- Nurse managers should be evaluated by their subordinates and receive feedback at regular intervals,
- Nurse managers should make self-evaluations from the perspectives of their subordinates and be self-aware,
- To evaluate nurse managers more objectively, the way they are perceived by other members of the healthcare team should also be determined,
- The qualifications of candidates should be kept in mind in the selection of nurse managers,
- Nurse managers who are positively evaluated by their subordinates should be rewarded,
- Nurse managers who are negatively evaluated should review their management styles and adopt more favorable management styles, especially those that value employees and interpersonal relationships,

- The topic should be investigated from a broader perspective including larger samples in different regions, institutions, fields of study, and cultures.

IMPLICATIONS FOR POLICY AND PRACTICE

Exposing the way nurses perceive their nurse managers is very important in terms of understanding, rewarding or supporting the development of managerial and leadership behaviors exhibited by nurse managers. It is necessary to prioritize and invest in the way manager nurses are perceived, as it can affect many variables, especially nurses' communication, motivation, nursing care, desire to change units/departments, intention to leave and patient outcomes. Senior manager nurses can eliminate obstacles, contribute to the development of nursing services management and the professional nursing profession by constantly monitoring managers' perception styles.

CONCLUSION

The results of this study showed that most nurses perceived their managers positively. The positive perceptions of the participants regarding their managers including concepts and metaphors such as trustworthy, supportive family members, people who restore/coordinate, people who protect/defend, hardworking, source of happiness, just/fair, and source of power indicated that nurse managers performed the roles and responsibilities expected of them, and their subordinates were also satisfied with their performance. It was also determined that some participants had negative perceptions about their managers that could damage their sense of trust, motivation, and justice, including their views that nurse managers were harming, passive, unstable/inconsistent, coercive/oppressive, opportunistic, useless, and biased.

ETHICAL CONSIDERATIONS

This study was accepted by the Bandirma Onyedi Eylul University Health Sciences Non-Interventional Research Ethics Committee (Decision date: 07.02.2022; Decision number: 2022/2).

CONFLICT OF INTEREST STATEMENT

The authors declare no financial, or non-financial conflict of interest.

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THE ROLE OF PRIMARY HEALTH CARE IN THE TIMELY TREATMENT AND HOSPITALIZATION OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION: EVIDENCE FROM GEORGIA

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ABSTRACT

INTRODUCTION:

Family physicians play a critical role in managing and urgently referring patients with myocardial infarction. This study aims to examine the role of primary healthcare system related to timely treatment and, when necessary, hospitalization of patients with acute myocardial infarction.

METHODOLOGY:

As part of this quantitative research, a survey was conducted with patients with acute myocardial infarction.

RESULTS:

Patients primarily contact emergency medical services directly, bypassing their family doctor. Only 11% of patients consulted a family doctor during their illness, indicating that primary healthcare in Georgia is not sufficiently developed. Among patients who directly sought emergency services at symptom onset, 95.8% received emergency care within two hours. However, patients who consulted their family physician before hospitalization experienced shorter delays, allowing for quicker referral to emergency services compared to those who attempted self-treatment. Family doctors are more likely to recognize symptoms accurately and refer patients promptly when needed. In contrast, self-treatment—prevalent in our study (n=98, 22.5%)—is associated with longer delays (n=90, 66.7%) in accessing emergency care.

CONCLUSION:

Public health campaigns are recommended to encourage patients with chest pain to seek immediate emergency medical assistance. For minor discomfort, consulting a family doctor is more appropriate.

KEYWORDS

family doctor, acute myocardial infarction, primary health care

INTRODUCTION

According to the statistical data from 2020 [1], in terms of registered and new cases of diseases, circulatory system diseases take the first place in Georgia. The share of

circulatory system diseases is 17.6% of all diseases registered in the country, and 10.2% of new cases. From 2000 to 2020, there was a trend of increasing prevalence of circulatory diseases and new cases in Georgia. Researchers attribute this increase to the rise in the number of beneficiaries using

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the program as a result of the introduction of the universal healthcare program in 2013. Hypertensive diseases (58.4%), ischemic heart diseases (15.3%), and cerebrovascular diseases (3.1%) are characterized by high morbidity and mortality within this group of diseases.

Timely medical care is vitally important during myocardial infarction. Many patients do not realize the importance of the symptoms of the disease and do not consult a doctor in time, resulting in the loss of precious time required for treatment. According to studies [2], only 10-15% of patients turn to emergency medical services within the first three hours after the initial symptoms of myocardial infarction develop. Within the first six hours, 20-25% seek help, and after 12-24 hours, 75-80% do so.

Studies indicate that the majority of patients die before receiving proper medical care, within the first hours of symptom onset [3]. Experts assert that the faster and more timely the diagnosis and treatment of ST-segment elevation myocardial infarction (STEMI) patients, the greater the potential to reduce mortality, improve outcomes, and shorten hospital stays [4]. In 2017, the European Society of Cardiology adopted a guideline for STEMI, establishing the "zero time" or cut-off time immediately after the diagnosis of STEMI, following an ECG [5].

It is essential to start reperfusion therapy as soon as possible, ideally no later than 90 minutes after the first medical contact [6]. However, the most crucial factor in achieving the best possible outcome for the patient is the total ischemia time, i.e., the time between symptom onset and reperfusion therapy. Thus, patient decision-making time is critical, but delays in treating symptoms of myocardial infarction remain a problem, as prehospital delay times are consistently high [7].

To develop effective interventions encouraging timely patient action, it is vital to study and understand how patients with myocardial infarction are diagnosed and treated. In many countries, patients have access to medical advice via telephone, internet, or self-care guidelines. However, it is not known to what extent individuals benefit from their family doctor's medical advice over the phone instead of immediately contacting an ambulance, and how such decisions affect diagnosis time during myocardial infarction.

Approximately 1-3% of patients experience chest pain [8]. In 10-18% of cases, chest pain is caused by ischemic heart disease, with 2-4% resulting from myocardial infarction or unstable angina, requiring emergency care. Family physicians, as primary care providers, play a key role in the early detection and treatment of acute myocardial infarction and are often the first contact for patients [9].

In Georgia, the primary health care system is not as developed as in many other countries. Consequently, continuous supervision by family doctors for patients with myocardial infarction is inadequate [10]. Patient awareness of myocardial infarction symptoms, self-care measures, and the importance of timely emergency calls is low, leading to delayed hospitalization [11].

The time elapsed between the onset of symptoms and appropriate medical care is a critical factor in determining the clinical course of patients with myocardial infarction. Decision-making time is the most significant component of patient delay in the prehospital phase. Many cases of sudden cardiac death occur before the patient is hospitalized [12]. Therefore, continuous supervision by family doctors, proper awareness, and a quick response to symptoms of acute cardiac ischemia are of great importance.

According to existing clinical guidelines for the prevention of cardiovascular diseases, family physicians should evaluate the risk factors and clinical consequences associated with chest pain and decide whether the patient should be transferred to the hospital [13]. This underscores the importance of the primary health care system in the management of patients with chronic cardiovascular diseases [14, 15, 16], particularly in Georgia, where the primary health care system is underdeveloped. Family doctors play a key role in coordinating disease treatment [17]. They are responsible for carrying out preventive measures and, if necessary, referring patients to medical specialists or hospital services, as well as conducting follow-up and monitoring of hospital treatment [18]. Adequate access to primary health care services and continuous follow-up by family physicians is a critical factor in preventing deterioration of the patient's health [19i].

To date, many studies have examined the reasons for delayed hospitalization in patients with symptoms of myocardial infarction [20]. However, the role of primary care in delayed hospitalization for acute myocardial infarction in Georgia has not been thoroughly investigated. The relevance and scientific novelty of this research are determined by the fact that, for the first time, a

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comprehensive study was conducted in Georgia on the timeliness of treatment, the scope and nature of self-help for patients with myocardial infarction at the prehospital stage, their awareness, and the reasons for late referral to emergency medical services.

The research aims to comprehensively study the challenges of the primary health care system in Georgia regarding the timeliness of treatment for patients with acute myocardial infarction in the prehospital stage and, if necessary, hospitalization.

METHODOLOGY

STUDY DESIGN AND PARTICIPANTS
A quantitative, cross-sectional research design was conducted. Three large hospitals of three big cities in Georgia (Tbilisi, Kutaisi, and Batumi) were selected for the study. The selection criteria of hospitals were more than 100 bed fund and high bed occupancy. The target group of the study was represented by the patients with acute myocardial infarction from selected cardiology clinics. Inclusion criteria for the study included patients aged 18 years or older. Patients with unrelated medical conditions are frequently excluded. A total of 436 patients with acute myocardial infarction were included in the study.

RESEARCH TOOLS
An adapted version of the questionnaire was used as a research tool. The questionnaire was developed based on various research and experts' opinions [21]. Prior to the start of the study, the questionnaire was pre-piloted. Adaptations were made considering the socio-cultural context, language, specific research interests, target respondents, and needs identified during piloting. Respondents were interviewed during physical meetings at the clinic. The average duration of filling out the questionnaire was about 15 minutes. Data collection was carried out over a five-week period from February 5 to June 30, 2024.

ETHICAL ISSUES
Before starting the study, approval was obtained from the Research and Ethics Committee of the Caucasus University. The survey was conducted following the principle of informed consent. Before participating in the study, the meaning and purpose of the study were explained to the respondents, after which verbal consent was obtained from them regarding their willingness to participate in the study.

Respondents were given an explanation that they would not be harmed for participating in the study. They were informed that they could refuse to participate in the study at any stage of the interview. The anonymity and confidentiality of the participants was protected in the study. Names and surnames of the participants were not indicated anywhere.

LIMITATIONS OF THE STUDY
Limitations of the study include its focus on a limited geographical area and the inclusion of only patients with myocardial infarction. Future studies would benefit from including patients with other conditions. Additionally, conducting an analysis from the providers' perspective would offer further insights and provide more comprehensive evidence.

RESULTS

A total of 436 patients with acute myocardial infarction were included in the study, of whom 77.5% (n=338) were men, and 65.8% (n=287) lived in urban areas. Most of the interviewed patients (n=195, 44.7%) denied tobacco dependence, and 31.2% (n=136) reported alcohol use. The average age of the patients was 62 years (range 34-91), with the largest age group being 65-79 years old (n=189; 43.3%).

Of the hospitalized patients, 82.1% (n=358) experienced symptoms while at home. The majority developed symptoms on weekdays (n=348, 79.8%), during the evening or night, between 18:00 and 6:00 (n=265, 60.8%), and were not alone (n=305, 70%). Additionally, 61.7% of patients (n=269) had previously experienced similar symptoms (Table 1).

Timely hospitalization of patients depends on various complex factors, including the distance to the nearest medical facility. At the onset of symptoms, 78.2% of patients (n=341) reported that the nearest medical facility was less than 50 km away. Patients' medical histories indicated arterial hypertension (58%, n=251), previous myocardial infarction (n=83, 19%), angina pectoris (n=74, 17%), diabetes (n=78, 18%), atrial fibrillation (n=22, 5%), and chronic heart failure (n=17, 4%). The majority of patients (n=318; 73%) were subsequently diagnosed with ST-elevation myocardial infarction (STEMI) (Table 1).

At the initial stage, only 48 patients (11%) contacted a family doctor. Instead, 47% of patients (n=205) contacted

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emergency medical services directly, 22.5% (n=98) self-medicated, and 19.5% (n=85) called a cardiologist.

When family doctors were involved, 43.8% (n=21) of patients directly contacted emergency medical services via mobile phone; 31.3% (n=15) of family physicians visited the patient during the day and then referred the patient to the emergency medical service; and 12% of family doctors (n=25) visited the patient immediately and called the emergency service (Table 1).

Female patients (n=35, 72.9%) with higher education (n=31, 64.6%), those living in rural areas (n=37, 77.1%), non-smokers (n=31, 64.6%), and alcohol users (n=27, 56.3%) were more likely to consult a family doctor before hospitalization. Additionally, these patients typically did not live alone (n=37, 77.1%), were not alone at the onset of symptoms (n=35, 72.9%), became ill on weekdays (n=41, 85.4%), and developed symptoms during the evening/night (n=27, 56.3%). Moreover, patients with a history of similar symptoms (n=32, 66.7%) and those diagnosed with ongoing non-ST-elevation myocardial infarction (NSTEMI) (n=32, 66.7%) were more likely to consult a family doctor. Hypertension was also more common among patients who consulted a family doctor (n=28, 58.3%) (Table 1).

TABLE 1 CHARACTERISTICS OF PATIENTS WHO CONTACTED OR DID NOT CONTACT A FAMILY DOCTOR BEFORE HOSPITALIZATION WHEN PRESENTING SYMPTOMS OF ACUTE MYOCARDIAL INFARCTION

	Sum N = 436	Consult a family doctor n=48 (11%)	Other n=388
Age			
< 50	34 (7.8)	4 (8.3)	30 (7.7)
50-64	126 (28.9)	15 (31.3)	111 (28.6)
65-79	189 (43.3)	21 (43.8)	168 (43.3)
80 >	87 (20)	8 (16.7)	79 (20.4)
Gender			
Female	98 (22.5)	35 (72.9)	63 (16.2)
Male	338 (77.5)	13 (27.1)	325 (83.8)
Education			
Average	258 (59.2)	17 (35.4)	241 (62.1)
Higher	178 (40.8)	31 (64.6)	147 (37.9)
Dwelling place			
City	287 (65.8)	11 (22.9)	276 (63.3)
Village	149 (34.2)	37 (77.1)	112 (27.7)
Tobacco consumption			
Yes	154 (35.3)	14 (29.2)	140 (36.1)
No	195 (44.7)	31 (64.6)	164 (42.3)
Rarely	87 (20)	3 (6.3)	84 (21.6)
Alcohol consumption			
Yes	136 (31.2)	13 (27.1)	123 (31.7)
No	123 (28.2)	27 (56.3)	96 (24.7)
Rarely	177 (40.6)	8 (16.7)	169 (43.6)
Live alone			
Yes	95 (21.8)	11 (22.9)	84 (21.6)
No	341 (78.2)	37 (77.1)	304 (78.4)
I got sick at home			
Yes	358 (82.1)	10 (20.8)	348 (89.7)
No	78 (17.9)	38 (79.2)	40 (10.3)

I was alone when the symptoms started			
Yes	131 (30)	13 (27.1)	118 (30.4)
No	305 (70)	35 (72.9)	270 (69.6)
I got sick over the weekend			
Yes	88 (20.2)	7 (14.6)	81 (20.9)
No	348 (79.8)	41 (85.4)	307 (79.1)
My symptoms started in the evening/night between 18:00 and 6:00			
Yes	265 (60.8)	27 (56.3)	238 (61.3)
No	171 (39.2)	21 (43.8)	150 (38.7)
Distance to hospital			
≥ 50 km	95 (21.8)	8 (16.7)	87 (22.4)
≤ 50 km	341 (78.2)	40 (83.3)	301 (77.6)
Presence of similar symptoms in the past			
Yes	269 (61.7)	32 (66.7)	237 61.1
No	167 (38.3)	16 (33.3)	151 38.9
Presence of concomitant diseases in the past			
Angina	74 (17)	9 (18.8)	65 (16.8)
Hypertension	251 (58)	28 (58.3)	223 (57.5)
diabetes	78 (18)	8 (16.7)	70 (18.0)
pulsatile arrhythmia	22 (5)	3 (6.3)	19 (4.9)
heart failure	17 (4)	1 (2.1)	16 (4.1)
Myocardial infarction	83 (19)	7 (14.6)	76 (19.6)
diagnosis			
ST-elevation myocardial infarction (STEMI)	318 (73)	16 (33.3)	302 (77.8)
Non-ST-elevation myocardial infarction (NSTEMI)	118 (27)	32 (66.7)	86 (22.2)
Actions taken by the patient at the onset of symptoms			
Contact your family doctor	48 (11)	13 (27.1)	35 (9.0)
Contact emergency medical services directly	205 (47)	17 (35.4)	188 (48.5)
Self help	98 (22.5)	10 (20.8)	88 (22.7)
The cardiologist was called	85 (19.5)	8 (16.7)	77 (19.8)
Action of the family doctor after calling the patient			
Direct patient referral to emergency medical service via mobile	21 (43.8)	7 (35)	14 (50)
Visit the patient immediately and call emergency services	12 (25)	5 (25)	7 (25)
Visiting the patient during the day and then referring to the emergency medical service	15 (31.3)	8 (40)	7 (25)

The average delay time from the onset of symptoms to the decision to receive medical care was 0:45 hours in patients who contacted their family doctor before hospitalization and 2:40 hours in other patients (p<0.01). Additionally, 9% of patients contacted their family doctor before hospitalization and 22% of other patients delayed more than 6 hours before deciding to seek medical care.

The length of time from the onset of an angina attack to seeking medical care is influenced by various factors. The majority of patients who had higher education (n=79, 54.9%), were urban residents (n=100, 69.4%), used tobacco (n=76, 52.8%), and did not use alcohol (n=74, 51.4%). Furthermore, those who did not live alone (n=123, 85.4%) and were not alone when symptoms developed (n=126, 87.5%) were more likely to become ill on working days (n=131, 91%) (Table 2).

TABLE 2 FACTORS RELATED TO THE LENGTH OF TIME TO SEEK MEDICAL CARE FROM THE ONSET OF AN ANGINA ATTACK.

	Sum N = 436	≤ 2 hr, n=144, 33%	2-6 hr, n=157, 36%	>6, n=135, 31%
Age				
< 50	34 (7.8)	6 (4.2)	12 (7.6)	16 (11.9)
50-64	126 (28.9)	26 (18.1)	42 (26.8)	58 (43)
65-79	189 (43.3)	75 (52.1)	73 (46.5)	41 (30.4)
80 >	87 (20)	37 (25.7)	30 (19.1)	20 (14.8)
Gender				
Female	98 (22.5)	39 (27.1)	31 (19.7)	28 (20.7)
Male	338 (77.5)	105 (72.9)	126 (80.3)	107 (79.3)
Education				
Average	258 (59.2)	65 (45.1)	95 (60.5)	98 (72.6)
Higher	178 (40.8)	79 (54.9)	62 (39.5)	37 (27.4)
Dwelling place				
City	287 (65.8)	100 (69.4)	102 (65)	85 (63)
Village	149 (34.2)	44 (30.6)	55 (35)	50 (37)
Tobacco consumption				
Yes	154 (35.3)	26 (18.1)	61 (38.9)	67 (49.6)
No	195 (44.7)	76 (52.8)	71 (45.2)	48 (35.6)
Rarely	87 (20)	42 (29.2)	25 (15.9)	20 (14.8)
Alcohol consumption				
Yes	136 (31.2)	25 (17.4)	47 (29.9)	64 (47.4)
No	123 (28.2)	74 (51.4)	24 (15.3)	25 (18.5)
Rarely	177 (40.6)	45 (31.3)	86 (54.8)	46 (34.1)
Live alone				
Yes	95 (21.8)	21 (14.6)	41 (26.1)	
No	341 (78.2)	123 (85.4)	116 (73.9)	33 (24.4)
				102 (75.6)
I was alone when the symptoms started				
Yes	131 (30)	18 (12.5)	55 (38.2)	58 (40.3)
No	305 (70)	126 (87.5)	102 (70.8)	77 (53.5)
I got sick over the weekend				
Yes				45 (31.3)
No	88 (20.2)	13 (9)	30 (20.8)	90 (62.5)
	348 (79.8)	131 (91)	127 (88.2)	

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My symptoms started in the evening/night between 18:00 and 6:00				
Yes	265 (60.8)	86 (59.7)	97 (67.4)	82 (56.9)
No	171 (39.2)	58 (40.3)	60 (41.7)	53 (36.8)
Actions taken by the patient at the onset of symptoms				
Contact your family doctor	48 (11)	6 (4.2)	42 (26.8)	0
Contact emergency medical services directly	205 (47)	138 (95.8)	67 (42.7)	0
Self-help	98 (22.5)	0	8 (5.1)	90 (66.7)
The cardiologist was called	85 (19.5)	0	40 (25.5)	45 (33.3)

56% of patients (n=244) reported that they sought medical care late. The main reasons for the delay in seeking medical help during illness were as follows: did not consider themselves sick enough to seek medical help (n=112, 45.9%), considered self-help as a faster and easier way (n=74, 30.3%), did not have time to go to the doctor (n=34, 13.9%), did not want to bother the doctor (n=24, 9.8%). These factors were more pronounced in patients who were more than 6 hours late (Table 3).

TABLE 3: REASONS FOR DELAY IN SEEKING MEDICAL CARE DURING ILLNESS

	Sum N = 244, 56%	≤ 2 hrs. n=33, 13.5%	2-6 hrs. n=90, 36.9%	>6,n=121, 49.6%
Did not consider myself sick enough to seek medical help	112 (45.9)	16 (48.5)	42 (46.7)	54 (44.6)
I thought that self-help is a faster and easier way	74 (30.3)	8 (24.2)	28 (31.1)	38 (31.4)
I didn't have time to go to the doctor	34 (13.9)	5 (15.2)	12 (13.3)	17 (14.0)
I didn't want to bother the doctor	24 (9.8)	4 (12.1)	8 (8.9)	12 (9.9)

DISCUSSION

The study confirmed that the majority of patients had serious cardiovascular diseases, particularly ST-elevation myocardial infarction (STEMI) (n=318, 73%). Socio-demographic factors such as gender, education, and place of residence influenced patients' behavior in contacting their family doctor before hospitalization. Factors like education level, tobacco and alcohol use, time of symptom onset (during work or leisure time, evening/night hours), and being alone also affected the time from the onset of an angina attack to seeking medical care.

The study revealed that only 11% of patients consulted a family doctor when experiencing symptoms of acute myocardial infarction, with these patients being diagnosed with non-ST-elevation myocardial infarction (NSTEMI). The primary action of patients experiencing chest pain was to directly contact emergency medical services (47%), followed by self-help (22.5%) and calling a cardiologist (19.5%). This trend may be influenced by the fact that emergency medical care in Georgia is entirely free for patients.

The low referral rate to family doctors during illness suggests that primary health care in Georgia is not adequately developed [22, 23]. The lack of development of the primary health care system in Georgia is indicated by the fact that the number of referrals to outpatient medical facilities is 3.5 per patient (in European countries it reaches 7.5 per patient) [24]. Patients refer to medical specialists without the advice of a family doctor and engage in self-medication [25, 26]. This deficiency is evident in the low level of trust in family doctors and the limited use of primary healthcare services compared to European standards [27].

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Thus, the patient's consultation with the family doctor is not the main way to receive medical care. Many patients do not consider that they should first consult their family doctor in case of illness. Studies show that referral to a family doctor increases delays in emergency medical services [28, 29, 30]. According to our study, 95.8% of patients who went directly to emergency medical services at the onset of symptoms took less than 2 hours to receive emergency medical services.

However, patients who consulted their family physician before hospitalization had shorter delay times and were able to access emergency medical services earlier, up to 6 hours earlier than patients who self-medicated. This is because family doctors properly perceive the symptoms and try to refer patients to the emergency medical service in time if necessary. In contrast to this, during self-treatment, which also has a large share in our study (n=98, 22.5), the delay time for emergency medical assistance is relatively high (n=90, 66.7).

In 31% of cases, the time to seek emergency medical care exceeded 6 hours. This delay can be attributed to the complex decision-making process following the onset of chest pain, which involves cognitive, emotional, and contextual factors [31].

It is essential to improve patient education on treatment plans, rehabilitation, and post-hospital care [32]. In this regard, understanding the symptoms of cardiovascular disease and the risks associated with delaying treatment is important, as it can reduce the likelihood of developing complicated forms of acute myocardial infarction [33]. Additionally, family doctors should inform patients about maintaining a healthy lifestyle, particularly by discouraging tobacco use, promoting healthy eating, and encouraging physical activity. The role of primary care staff is crucial in facilitating such educational efforts.

CONCLUSION

The family physician plays a significant role in managing patients with angina pectoris and facilitating referral to emergency medical care. However, many patients directly contact emergency medical services without consulting their family doctor. Public health campaigns are recommended to encourage patients with chest pain to immediately contact emergency medical services. If the discomfort is minor, it is more appropriate to consult a family doctor.

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DEVELOPMENT OF A HEART HEALTH ATTITUDE SCALE FOR ADULTS IN TURKEY: A SCALE DEVELOPMENT STUDY

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ABSTRACT

BACKGROUND:
Examining adults' attitudes toward heart health can be effective in identifying and preventing cardiovascular disease risk, educating, and treating individuals.

AIM:
This study was designed to develop a valid and reliable measurement tool for assessing adult individuals' attitudes toward heart health.

METHODS:
The sample for this methodological study consisted of 445 patients admitted to two university hospitals in the provinces of Eskişehir and Kocaeli, Türkiye for cardiological disorders. The research data were collected using a Personal Information Form and Adult Heart Health Attitude Scale (AHHAS). For the validity and reliability of the scale, test-retest analysis, content validity analysis, and item analyses were used, and exploratory and confirmatory factor analyses were performed, and structural equation modeling was used for internal consistency and construct validity.

RESULTS:
Based on expert opinion, the content validity index of the scale was calculated as 0.86. In the exploratory factor analysis, the Kaiser-Meyer-Olkin (KMO) coefficient was 0.643, and Bartlett's Test of Significance was $\chi^2=953.841$, $p<0.001$. As a result of the factor analysis, the number of items was reduced from 45 to 28. The item-total correlation coefficients ranged from 0.430 to 0.864, leading to a 6-factor scale with 29 items, explaining 54.4% of the total variance. The factor loadings of the items ranged between 0.453 and 0.851, and Cronbach's alpha value was between 0.446 and 0.718 for the sub-factors, and 0.834 for the total scale.

CONCLUSION:
As a result of the analyses, it was determined that AHHAS is a valid and reliable scale that can be used for the Turkish adult population. Healthcare providers can use AHHAS to determine adults' attitudes toward heart health.

KEYWORDS
Cardiovascular diseases, risk factors, adults, attitude, patients, nurses, reliability, and validity

INTRODUCTION

Chronic diseases are increasing due to the aging population and changing lifestyles worldwide and in Türkiye [1]. Among these chronic diseases, cardiovascular diseases (CVDs) are globally the leading cause of death. It was reported that approximately 17.9 million people died due to CVDs in 2019, accounting for 32% of all global deaths [2]. In Türkiye, circulatory system diseases were the leading cause of death in 2023, accounting for 33.4% of all deaths. Of these, ischemic and other heart diseases made up 66.5% of the deaths related to circulatory system diseases [3]. More than 75% of cardiovascular diseases (CVDs), which are among the leading causes of death worldwide and in Turkey, are preventable and improving risk factors can help reduce the increasing burden of CVD on both individuals and healthcare providers [3,4]. The most important risk factors affecting the development of CVDs include behavioral risk factors such as an unhealthy diet, physical inactivity, and tobacco and alcohol use. The effects of behavioral risk factors may manifest in individuals as increased blood pressure, blood sugar, blood lipid levels, and obesity [5]. The risk of CVD increases in the early stages of life, especially in young adults aged 35-64, due to behavioral risk factors such as obesity, high blood pressure, and smoking [6].

The most important approach to preventing CVDs is to adopt a healthy lifestyle throughout life [7]. It was shown that healthy lifestyle behaviors, namely healthy eating, regular physical activity, effective stress management, non-smoking, and taking responsibility for one's health, reduce the risk of CVDs [5]. Health professionals, especially nurses, have important roles in the adoption of healthy lifestyle behaviors and the management of preventable risk factors [8]. In preventing the development of CVD risk factors, nurses can contribute to early diagnosis of risk factors by identifying risky individuals, training and following these individuals, and guiding them to treatment, if necessary, by using their educator and counselor roles [9,10]. Previous studies showed that nurse-led interventions to prevent CVDs are effective in primary and secondary prevention of CVDs [8,9,11–13].

Having sufficient information and exhibiting a preventive attitude can enable one to be protected from diseases and take the necessary measures [14]. Robinson et al. examined whether positive health attitudes were associated with healthy behaviors in individuals with CVD or moderate risk of coronary heart disease (n=15,794) and reported that participants with positive health attitudes were more likely to exercise regularly and maintain the desired weight compared to participants with negative health attitudes and that they requested health services from their physicians more frequently [15]. Identifying cardiovascular risk factors in adults, determining their attitudes toward risk factors, and taking measures are crucial in improving heart health. To address this need, a comprehensive, valid, and reliable measurement tool is required to objectively assess adults' attitudes toward cardiovascular risk factors. To the best of our knowledge, no study has evaluated the knowledge, attitudes, and practices related to CVD risk factors and symptoms in the Turkish population using such a tool. This study aimed to develop the Adult Heart Health Attitude Scale (AHHAS) and evaluate its validity and reliability.

METHODS

STUDY DESIGN AND SETTING

The study was designed as a methodological type. It was conducted with patients with heart disease who applied to two university hospitals in Kocaeli and Eskişehir for diagnosis and treatment between 2 August 2021 and 31 January 2023. According to the literature, the sample size should be at least 5 times the number of items on the scale to develop one and 10 times the number of items to increase its reliability [16]. In the power analysis, alpha=0.05, 1-Beta=0.99 and effect size=0.2" were taken and the total number of patients was determined as n=443 as a result of the analysis. Based on this suggestion, patients who came to the cardiology outpatient clinics of two university hospitals for examination during the date of the study and 445 patients who received inpatient treatment in the cardiology service due to surgical intervention constituted the sample of the study. Patients who volunteered to participate in the study, were over 18 years old, and completed the data collection forms completely were included in the sample. Those who did not meet these criteria were excluded from the study. Sample selection was made using the random sampling method.

MEASURES

A Patient Information Form, Short Form-36 (SF-36, Quality of Life Scale), and AHHAS were used for data collection.
Patient information form: The personal information form consists of a total of 15 questions: 10 questions regarding the sociodemographic characteristics of the patients

participating in the study, such as age, gender, marital status, and 5 questions regarding the risk factors for cardiac diseases, chronic disease status, and continuously used medication.

The SF-36: The scale was developed by Ware in 1987 to evaluate an individual's health status and quality of life [17]. The Turkish adaptation, validity, and reliability study of the scale was performed by Pınar [18]. The multi-title scale includes 36 statements, 3 main headings, and 8 health areas under these headings. The functional status subheading includes quality of life, physical activity limitations for health problems, social activity limitations due to emotional and social problems, and limitation of daily living activities due to physical and emotional health problems. Well-being, including mental health, pain, and vitality, is another subheading. The last subheading is general health perception, which includes the assessment of health as a whole and the evaluation of changes in health compared to the past year. These three subheadings constitute the global quality of life, which includes functional status, well-being, and general health perception. The scale evaluates the state of health in the past four weeks. The score on SF-36 quality of life scale ranges from 0 to 100.17 SF-36 has a positive scoring system, and an increase in the score of each health area of SF-36 indicates good quality of life [17].

AHHAS: The scale was developed by the researchers by reviewing the literature and aims to determine the individual's attitude toward improving heart health. It consists of 28 items and 6 subdimensions: "Weight Control (8 questions)", "Psychosocial Status (6 questions)," "Healthy Eating (6 questions)," "Harmful Habits (3 questions)," "Processed Foods (2 questions)," and "Health Management (3 questions)." Items are scored on a 5-point Likert scale with response options of (5) Always, (4) Often, (3) Sometimes, (2) Rarely, (1) Never. In this scale, it is understood that the individual exhibits a positive attitude toward improving heart health as the scale score increases.

SUB-FACTORS OF THE SCALE
Weight Control (Factor 1) includes consuming products such as rice, pasta, and bread in the meals, adding salt to the food, doing physical activity, using stairs, and doing sports regularly.

Psychosocial Status (Factor 2) includes feeling happy, active, and sociable, taking responsibility in daily life,

staying away from stress, anxiety, and anger, and sleep status.

Healthy Eating (Factor 3) includes eating vegetables-fruits, nuts, fish, chicken, vegetable oils, fibrous foods, and avoiding consuming packaged foods.

Harmful Habits (Factor 4) includes avoiding smoking, not being involved in smoking environments, and avoiding excessive alcohol consumption.

Processed Food (Factor 5) includes avoiding sugar-sweetened beverages and processed meat products at meals.

Health Management (Factor 6) includes regular use of medication, regular check-ups, and regular blood pressure measurement.

DEVELOPMENT PROCESS OF AHHAS
Step 1. Literature review and creation of an item pool: The literature was reviewed using the words "cardiovascular disease," "heart health," "risk factors," "attitude," and "scale development" [5–7,18-25].

During the literature review, statements that might be suitable for the item pool were noted. A 45-item draft scale was created by paying attention to the clarity of the items and not including more than one judgment.

Step 2. Receiving expert opinions (content validity): The item pool for the scale was reviewed by a panel of experts, including 5 cardiology specialists, 2 nursing faculty members, 1 faculty member from statistics, 1 from educational measurement and evaluation, and 1 from the Turkish language department. The experts rated each item on a scale of '1 = not appropriate,' '2 = needs major revision,' '3 = needs minor revision,' and '4 = appropriate' to assess item suitability. These scores were analyzed using the Davis technique [26]. Based on the evaluation, 16 items were removed from the scale—11 items with a Content Validity Index (CVI) below 0.80 and 5 items due to redundancy. After these revisions, the draft scale was reduced to 29 items, with CVI values for the remaining items ranging between 0.82 and 1.00.

Step 3. Pilot application: After the scale was evaluated by the experts, necessary adjustments were made, and a pilot application was performed with the draft scale. For the pilot application, the scale was implemented on 85 people

selected from the determined population. The intelligibility of the questions and their language suitability were evaluated with the pilot application, and it was determined that there was no incomprehensible item on the scale. Then, for test-retest reliability, the scale was re-applied to 85 patients two weeks after the first application.

Step 4. Data collection: It was planned to implement data collection tools on at least 290-300 patients between 2 August 2021 and 31 January 2023. During data collection, the purpose, method, and expected benefits of the study were explained to the participants who agreed to participate in the study using the Informed Consent Form.

Data were collected from the sample of Kocaeli Research and Application Hospital in face-to-face interviews. Since data collection in face-to-face interviews was not allowed at Eskişehir Health, Research, and Application Hospital due to the risk of COVID-19 transmission, researchers created Google forms and sent them to patients via WhatsApp, and the patients filled in the form online. It took an average of 15-20 minutes to fill the survey forms.

Step 5. Psychometric tests: Exploratory factor analysis, confirmatory factor analysis, and reliability and normality analysis were performed for the validity and reliability of the scale. AHHAS development steps are shown in Figure 1.

FIGURE 1. FLOW CHART OF THE QUESTIONNAIRE DEVELOPMENT PROCESS
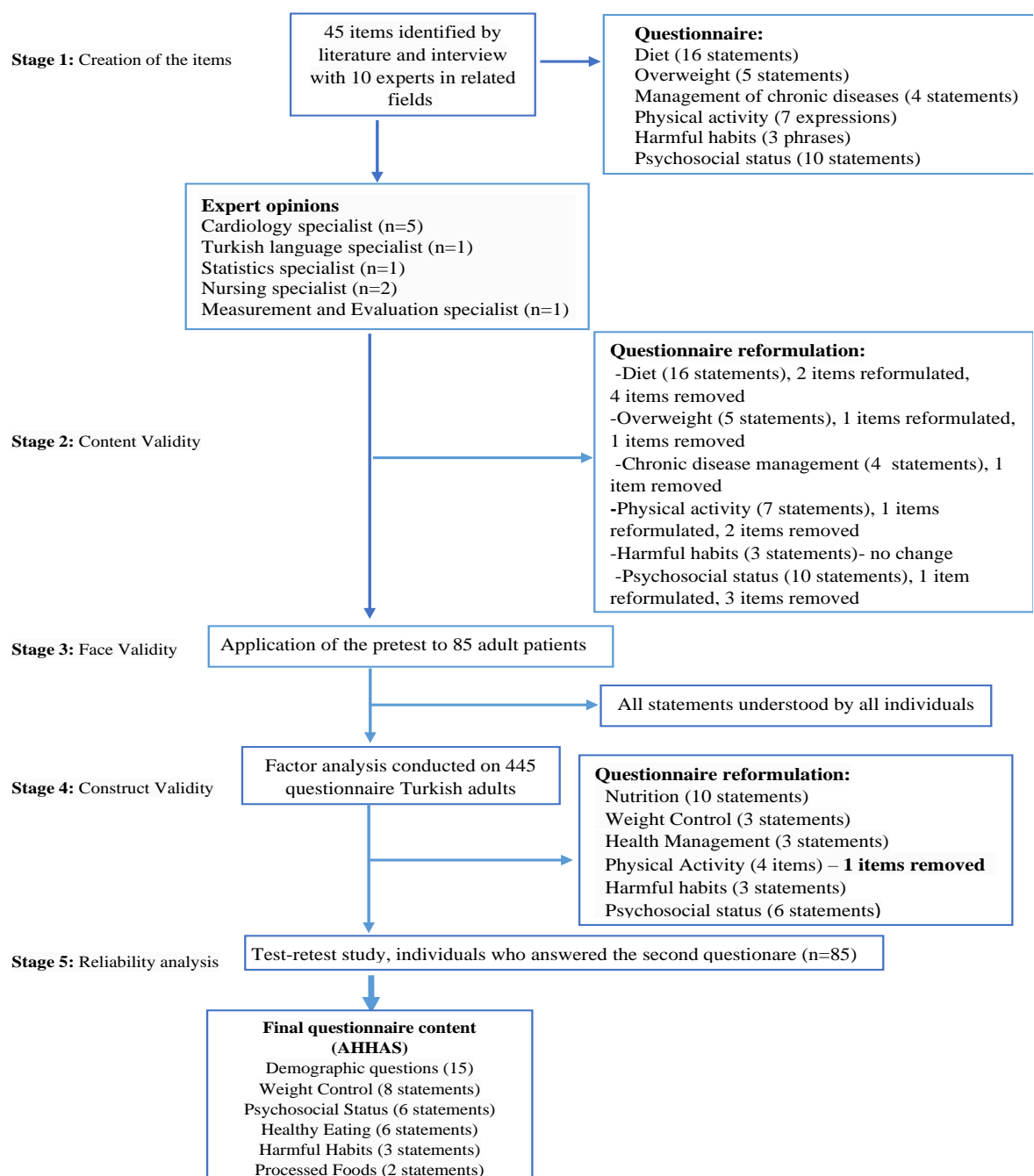
STATISTICAL ANALYSIS

Statistical analysis was performed using IBM SPSS 20.0 (IBM Corp., Armonk, NY, USA) and LISREL v8.8 (SSI Inc., IL, USA) package programs. The fitness of the numerical variables to the normal distribution was evaluated with the Kolmogorov-Smirnov Test. Numerical variables were given as median (25th - 75th percentile) and frequency (percentages). To test the comprehensibility of the questions, the Pearson correlation coefficient was calculated for the test-retest reliability, which was performed at two-week intervals. The Cronbach a coefficient was calculated separately for the internal consistency of AHHAS and its sub-factors. Exploratory Factor Analysis (EFA) was performed to test the validity of the scale structure in Turkish culture. The main components method was used to determine the factors, and the varimax factor rotation method was used to determine the suitable factors. The suitability of the sample was tested with the Kaiser-Meyer-Olkin coefficient. The suitability of the data for factor analysis was tested with Bartlett's Sphericity Test. The fitness of the sub-factors to the original variables was measured by Confirmatory Factor Analysis (CFA). Structural Equation Modeling (SEM) was used to control the structural model created. The relationship between the sub-factors of AHHAS was determined using the Pearson correlation coefficient. A p-value of <0.05 was considered sufficient for statistical significance in two-way tests.

RESEARCH ETHICS

Ethics committee approval with the decision number of KU GOKAEK-2021/14.17 and project number 2021/240 was taken from KU Non-Interventional Clinical Research Ethics Committee on 07/29/2021. Written permission was obtained from the chief physician of the hospitals where the research was conducted, and informed consent was obtained from the patients participating in the research.

RESULTS

The median age of the patients was 55.29, the median BMI was 26.71, 70.1% were hospitalized in the cardiology ward, 53.5% were male, 81.1% were married, 42% were primary school graduates, 28.5% were retired, and 96.6% had social security. 59.5% of the patients' income was equal to their expenses, 38.7% did not smoke, 79.8% did not drink alcohol, 45.2% exercised occasionally, 91% had a chronic disease, and 90.6% had medication that they used constantly (Supplementary Table 1).

RELIABILITY ANALYSIS

The Cronbach's a coefficient was evaluated to examine the reliability of AHHAS. Cronbach's a coefficient of the subscales was found to be 0.704 for "Weight control," 0.718 for "Psychosocial Status," 0.705 for "Healthy Eating," 0.446 for "Harmful Habits," 0.653 for "Processed Foods," and 0.586 for "Health Management." Cronbach's a=0.834, which measures the internal consistency value of the scale. Considering this internal consistency value, it was determined that the scale questions were sufficient for the measurement of adults' attitudes toward heart health, and the internal consistency of the scale was ensured. Test-retest analysis was performed to ensure that the scale does not change over time, and there was a strong positive correlation between the total scores of the first test and the last test (r=0.821; p<0.001).

VALIDITY ANALYSIS

EFA was performed to test the validity of AHHAS. As a result of EFA, a structure that explains 54.4% of the total variance of the data structure used in the scale consisting of six factors and 29 items was reached. In EFA performed for the validity of the scale, the smallest and largest factor loads were 0.453 and 0.851. The Kaiser-Meyer-Olkin index was 0.643, suggesting that the data were suitable for factor analysis. Bartlett's sphericity test was significant ($\chi2$=953.841, p<0.001). The scale is divided into 6 sub-factors to explain the attitudes of adult patients toward heart health. The rotated factor loading matrix is shown in Table 1.

CONFIRMATORY FACTOR ANALYSIS (CFA)

CFA was conducted to test the suitability of the structure revealed by exploratory factor analysis. The scale item "I give importance to maintaining my sexual life regularly for my heart health." had a negative value (-0.564) as a result of EFA and thus, confused the results of CFA. Therefore, it was excluded from CFA. A structural equation model with 28 items and 6 sub-factors was created according to the results of CFA (Graphic 1). The fit measures used to evaluate of the validity of the structural equation modeling were RMSEA=0.075 (CI=0.071; 0.080), AGFI=0.81, and GFI=0.84. These results show that the created model is valid.

SUPPLEMENTARY TABLE 1. SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PATIENTS (N=445)

Characteristics		Mean (SD)	
Age		55.29 (15.59)	
BMI		26.71 (4.54)	
		n	**%**
Patient admission	Cardiology outpatient clinic	133	29.9
	Cardiology service	312	70.1
Gender	Female	207	46.5
	Male	238	53.5
Marital status	Married	361	81.1
	Single	84	18.9
Education level	Illiterate	19	4.3
	Primary school	187	42.0
	High school	104	23.4
	Bachelor's degree	107	24.0
	Graduate degree	28	6.3
Occupation	Housewife	111	25.0
	Retired	127	28.5
	Self-employed	67	15.1
	Government officer	45	10.1
	Other	95	21.3
Social security	Yes	430	96.6
	No	15	3.4
Income level	Income < expenses	108	24.3
	Income = expenses	265	59.5
	Income > expenses	72	16.2
Smoking	Yes, I smoke	106	23.8
	No, I do not smoke	172	38.7
	I used to smoke but I quit	167	37.5
Alcohol consumption	Yes, I consume regularly	18	4.0
	No, I do not consume	355	79.8
	I consume occasionally	72	16.2
Exercising	Yes, I exercise regularly	73	16.4
	No, I do not exercise	171	38.4
	I sometimes exercise	201	45.2
Chronic disease	Yes	405	91.0
	No	40	9.0
Continuous medication	Yes	403	90.6
	No	42	9.4
Total		**445**	**100.0**

SD: Standard Deviation; BMI: Body Mass Index

TABLE 1. FACTOR MATRIX LOADINGS (EFA) FOUND WITH THE VARIMAX ROTATION METHOD

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Item 4	0.458					
Item 5	0.536					
Item 11	0.453					
Item 12	0.621					
Item 13	0.460					
Item 17	0.746					
Item 18	0.536					
Item 19	0.694					
Item 24		0.529				
Item 25		0.663				
Item 26		0.695				
Item 27		0.677				
Item 28		0.689				
Item 29		0.552				
Item 1			0.585			
Item 2			0.598			
Item 3			0.518			
Item 6			0.575			
Item 7			0.458			
Item 8			0.453			
Item 20				-0.564		
Item 21				0.669		
Item 22				0.518		
Item 23				0.738		
Item 9					0.737	
Item 10					0.851	
Item 14						0.575
Item 15						0.761
Item 16						0.794
Explanatory Percentage (%)	11.21	9.69	8.96	8.48	8.11	7.96

EFA: Exploratory Factor Analysis

GRAPHIC 1. STRUCTURAL EQUATION MODEL OF AHHAS (N=445)

Chi-Square=1160.67, df=335, P-value=0.00000, RMSEA=0.075
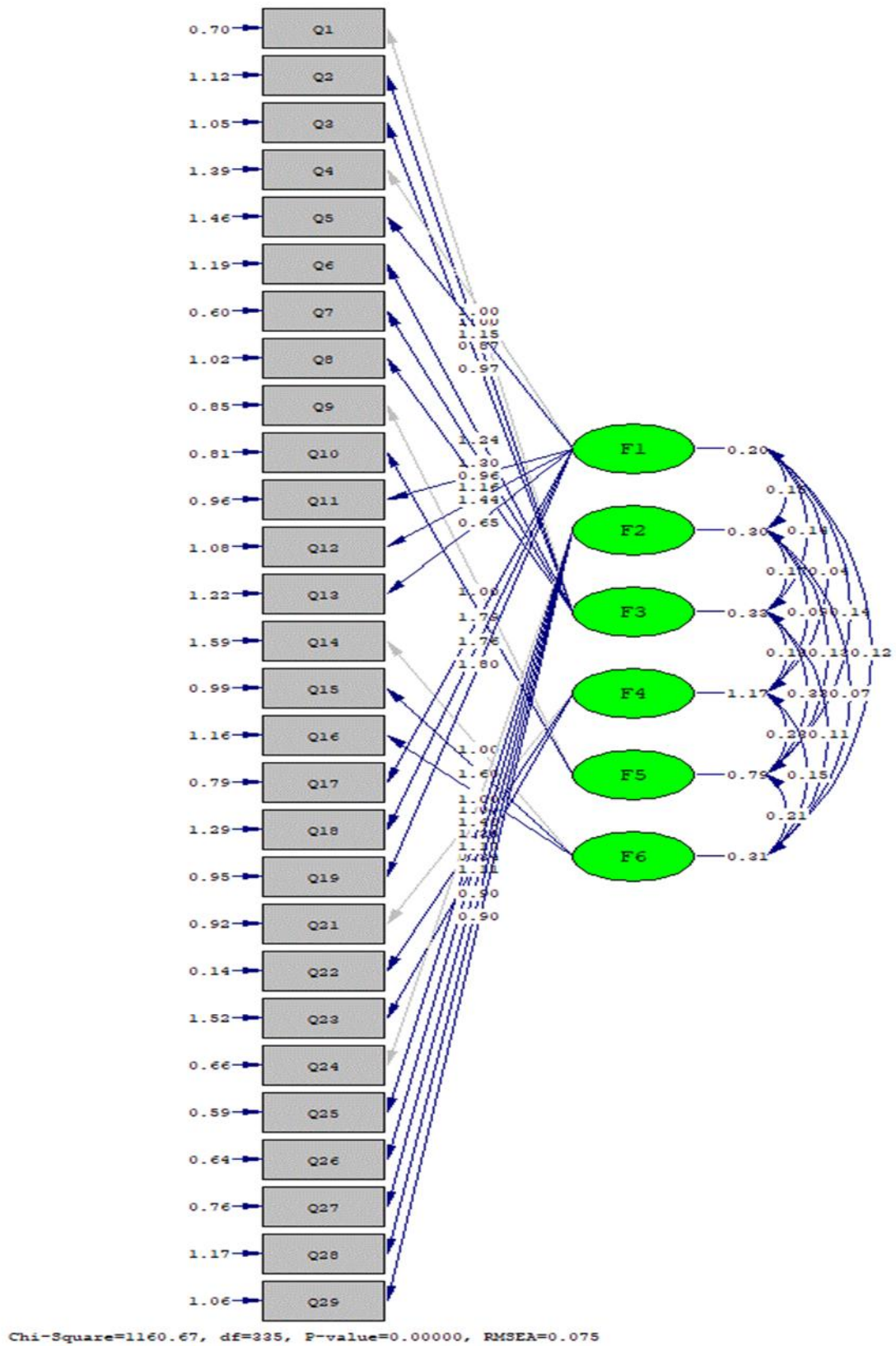
Sub-factors: F1-WC: Weight Control; F2-PS: Psychosocial Status; F3-HE: Healthy Eating; F4-HH: Harmful Habits; F5-PF: Processed Foods; F6-HM: Health Management

TABLE 2. AHHAS ITEMS AND ITEM STATISTICS

Sub-Factors	Items	Mean	SD	Item Correlation	
				TSS	SFS
Weight Control (Factor 1)	4. I avoid consuming products such as rice, pasta, and bread in my meals.	3.07	1.26	0.419	0.485
	5. I do not add extra salt to my food, and I pay attention to the salt rate in my meals.	3.68	1.31	0.498	0.550
	11. I know that excess weight/obesity is harmful to heart health, so I take care not to gain weight.	3.95	1.07	0.419	0.548
	12. I weigh myself regularly to keep my weight under control.	3.30	1.22	0.495	0.624
	13. I stop eating when I am full.	4.07	1.14	0.341	0.430
	17. Instead of sitting most of the day, I do physical activities such as walking, swimming, and exercising.	3.30	1.20	0.488	0.648
	18. I prefer to use the stairs rather than the elevator.	3.08	1.38	0.433	0.629
	19. I do sports regularly.	2.65	1.27	0.446	0.645
Psychosocial Status (Factor 2)	24. I usually feel happy.	3.79	0.98	0.409	0.633
	25. I am generally an active and social person.	3.90	1.08	0.465	0.714
	26. In general, I take responsibility in my daily life (at home, at work, etc.).	4.18	1.02	0.422	0.675
	27. I try to solve my problems by myself. When I cannot, I get support from my circle.	4.07	1.06	0.457	0.655
	28. I stay away from stress, anxiety, and anger as much as possible in my daily life (at home, at work, etc.).	3.44	1.18	0.467	0.590
	29. I sleep an average of 7-8 hours a day.	3.95	1.14	0.390	0.612
Healthy Eating (Factor 3)	1. I pay attention to including vegetables and fruits in my meals.	3.82	1.01	0.462	0.685
	2. I pay attention to eating nuts with hard shells and oily dried fruits (walnuts, hazelnuts, peanuts, etc.) in my meals.	3.21	1.16	0.410	0.576
	3. I prefer to consume fish and chicken meat instead of red meat.	3.26	1.16	0.446	0.610
	6. I prefer vegetable oils (olive oil) instead of animal fats (tail fat) in my meals.	3.68	1.29	0.481	0.649
	7. I prefer to consume fibrous foods (apple, citrus fruits, spinach, legumes, oats, rye, etc.).	3.74	1.07	0.555	0.717
	8. I pay attention to the fact that my food is natural and additive-free, and I avoid consuming packaged foods.	3.70	1.20	0.523	0.601
Harmful Habits (Factor 4)	21. I avoid smoking because I know its harmful effects on heart health.	3.98	1.44	0.343	0.774
	22. I prefer not to be in smoking areas.	3.61	1.45	0.390	0.812
	23. I avoid drinking excessive amounts of alcohol.	4.25	1.28	0.285	0.553
Processed Foods (Factor 5)	9. I avoid consuming sugar-sweetened beverages (coke, energy drinks, etc.) in my meals.	3.67	1.27	0.474	0.864
	10. I avoid consuming processed meat products (salami, fermented sausage, sausage, etc.) in my meals.	3.47	1.26	0.507	0.859
Health Management (Factor 6)	14. I regularly use my medication/medications (such as medications for anticoagulation, blood pressure, blood sugar, and cholesterol).	4.00	1.37	0.313	0.694
	15. Even though I do not have any health problems, I have regular check-ups (basic health checks).	2.63	1.33	0.465	0.732
	16. I regularly measure my blood pressure.	3.10	1.40	0.425	0.792

TSS: Total Scale Score; SFS: Sub-Factor Score; SD: Standard Deviation

SUPPLEMENTARY TABLE 2. CORRELATIONS AND CRONBACH A VALUES FOR SUB-FACTORS OF AHHAS

r (p)*		Weight Control (Factor 1)	Psychosocial Status (Factor 2)	Healthy Eating (Factor 3)	Harmful Habits (Factor 4)	Processed Foods (Factor 5)	Health Management (Factor 6)	Total AHHAS Score	Cronbach a
Factor 1	r	-	0.435	0.456	0.255	0.339	0.314	0.680	0.704
	p		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Factor 2	r		-	0.419	0.281	0.221	0.173	0.596	0.718
	p			<0.001	<0.001	<0.001	<0.001	<0.001	
Factor 3	r			-	0.265	0.433	0.268	0.702	0.705
	p				<0.001	<0.001	<0.001	<0.001	
Factor 4	r				-	0.248	0.247	0.587	0.446
	p					<0.001	<0.001	<0.001	
Factor 5	r					-	0.283	0.697	0.653
	p						<0.001	<0.001	
Factor 6	r						-	0.627	0.586
	p							<0.001	

*: Pearson correlation analysis

AHHAS: Adult Heart Health Attitude Scale

SUPPLEMENTARY TABLE 3. CORRELATIONS BETWEEN THE SUB-FACTORS OF AHHAS AND SF-36

AHHAS Sub-factors		SF-36 Sub-dimensions							
		Physical Functioning	Role Physical	Role Emotional	Vitality	Mental Health	Social Functioning	Pain	General Health Perception
Weight Control	r	0.305	0.299	0.271	0.276	0.178	0.252	0.252	0.336
	p	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001
Psychosocial Status	r	0.275	0.227	0.233	0.274	0.310	0.206	0.254	0.364
	p	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001	p<0.001
Healthy Eating	r	0.149	0.200	0.197	0.150	0.190	0.13	0.188	0.221
	p	0.005	p<0.001	p<0.001	0.005	p<0.001	p<0.001	p<0.001	p<0.001
Harmful Habits	r	-0.028	-0.011	0.078	-0.006	0.070	0.012	0.014	0.034
	p	0.595	0.834	0.143	0.918	0.190	0.825	0.787	0.525
Processed Foods	r	-0.071	0.041	0.030	0.049	0.094	0.107	0.179	0.042
	p	0.187	0.440	0.579	0.359	0.079	0.046	0.001	0.432
Health Management	r	-0.156	-0.002	-0.027	0.039	0.009	0.029	0.026	-0.031
	p	0.003	0.966	0.611	0.471	0.870	0.589	0.631	0.562
Total AHHAS Score	r	0.079	0.166	0.173	0.177	0.197	0.175	0.219	0.211
	p	0.139	0.002	0.001	0.001	p<0.001	0.001	p<0.001	p<0.001

AHHAS: Adult Heart Health Attitude Scale;   SF-36:Short Form-36

In Supplementary Table 2, it was found that there was a positive and statistically significant correlation between the AHHAS subscales and the total scale score (p<0.001). The Cronbach a values indicating the contribution of sub-factors to the scale are also given in Supplementary Table 2. The a values are between 0.446 and 0.718. It was determined that the harmful habits sub-factor contributed less to the scale than the other sub-factors.

In Supplementary Table 3, a strong, significant positive relationship was found between weight control, psychosocial status and healthy eating, which are sub-factors of AHHAS, and all sub-factors of the SF-36 Scale (p<0.001). The correlation between the total AHHAS score and the subdimensions of SF-36 was examined, and no significant correlation was determined between the total AHHAS score and physical functioning (r=0.079, p=0.139).

DISCUSSION

A series of steps were taken in the study which was carried out to examine the attitudes of Turkish adults toward heart health, evaluate the validity and reliability of the newly developed scale, and bring it into the nursing literature. The results confirmed the validity and reliability of this 28-item measurement tool. The results were compared with those of the scale developed by Koohi et al. (2021), which also measures knowledge, attitudes, and practices related to heart health in adults and shares similarities with the scale we developed.

DISCUSSION OF THE RESULTS REGARDING THE RELIABILITY OF AHHAS

The findings of the test-retest, which assessed the reliability of the scale, were examined, and it was observed that there was a strong positive correlation between the total scores of the first test and the last test (r=0.821 p<0.001). In Koohi et al.'s study, this value was r = 0.57, and a positive moderate relationship was determined [27]. In our study, the reliability of AHHAS was found to be Cronbach a=0.834. In Koohi et al.'s study, the Cronbach a value of the entire scale was not given, but the values for the subscales were given separately [27]. These results show that this tool, which was developed to measure adults' attitudes toward heart health, is quite reliable.

In the study of Koohi et al., in which the reliability of the subscales was examined, the Cronbach alpha coefficients were 0.856 for "knowledge," 0.915 for "attitude," 0.711 for "physical activity-related behaviors," and 0.509 for

"nutrition and smoking behaviors" [27]. In this study, for the sub-factors of AHHAS, the Cronbach a value was 0.704 for "Weight Control," 0.718 for "Psychosocial Status," 0.705 for "Healthy Eating," 0.446 for "Harmful Habits," 0.653 for "Processed Foods," and 0.586 for "Health Management." Cronbach's a values were found to be quite reliable for weight control, psychosocial status, healthy eating, processed foods, and low reliability for harmful habits and health management. Koohi et al. reported that the contribution of "nutrition and smoking behaviors" to the scale was the lowest compared to other sub-factors while the contribution of the "attitude" sub-factor to the scale was the highest [27]. However, Koohi et al. argued that "excessive alcohol consumption" is an important risk factor for cardiovascular diseases; however, it is not acceptable to question such sensitive information, since such information is associated with stigmatization and social embarrassment in the culture of Islamic countries [27]. Similarly, our study showed that the "psychosocial status" subfactor had the highest contribution to the scale. The "harmful habits" sub-factor was found to have the lowest contribution to the scale compared to the other sub-factors. However, it was not found appropriate to be removed from the scale since it has a contribution even if it was low. The reason for the low contribution of the "harmful habits" sub-factor to the scale can be explained by the fact that individuals have lower attitudes toward heart health as they do not behave appropriately or do not respond correctly to the situations in this subfactor.

DISCUSSION OF THE RESULTS REGARDING THE VALIDITY OF AHHAS

As a result of the EFA, which was applied to determine the structural validity of AHHAS, it was seen that the scale structure explained 54.4% of the total variance of the scale. In the EFA performed in the study, the scale was divided into 6 sub-factors named "Weight Control," "Psychosocial Status," "Healthy Eating," "Harmful Habits," "Processed Foods," and "Health Management." In our study, since Factor 1 includes questions about consuming carbohydrates in meals, adding salt to food, paying attention to weight gain, weighing ourselves regularly, doing physical activity, using stairs, and doing sports regularly, this factor is named "Weight control". Since Factor 2 includes questions about the person's mental state, initiative in daily life, taking responsibility, anger, anxiety and stress management, this factor was named "Psychosocial situation." Since Factor 3 includes questions about healthy nutrition, such as eating vegetables and fruits, nuts, fish and chicken, vegetable oils and fiber foods,

this factor was named "Healthy nutrition." Since Factor 4 includes questions about avoiding smoking, not being in smoking environments, and avoiding consuming excessive amounts of alcohol, this factor was named "Harmful habits." Since Factor 5 includes questions about avoiding consuming sugar-sweetened beverages and processed meat products at meals, this factor was named "Processed foods." Since Factor 6 includes questions about medication use, check-ups and blood pressure measurement, this factor was named "Health management." The exploratory percentages of the variances of the sub-factors were found to be 11.21%, 9.69%, 8.96%, 8.48%, 8.11%, and 7.10%, respectively. In the factor analysis of the 20th item, the analysis gave a result in the negative direction (-0.564). Except for item 20, all the questions contribute significantly to the entire scale, showing that the data structure is suitable for factor analysis. In the study of Koohi et al., the scale was divided into 4 sub-factors named "knowledge," "attitude," "physical activity-related behaviors," and "nutrition and smoking behaviors." In general, the percentage of the total variance of the scale was 48.43% and the exploratory percentages of the variances of the sub-factors were 17.049%, 19.519%, 5.527%, and 6.334%, respectively [27].

For the construct validity of the scale, EFA analysis was performed on the data of the adult patient group. As a result of the analysis, it was seen that the scale was divided into 6 sub-factors. In the first version of the scale with 6 sub-factors, the items that constitute the "Nutrition" sub-factor (items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10) changed as a result of EFA and constituted the "Healthy Nutrition" sub-factor consisting of 6 items (items 1, 2, 3, 6, 7, 8). The 9th and 10th items in the "Nutrition" sub-factor created a new sub-factor named "Processed Foods" as a result of EFA. The 4th and 5th items in the "Nutrition" sub-factor were included in the "Weight control" sub-factor. In the first version of the scale, the items (11, 12, 13) in the "Weight Control" sub-factor did not change as a result of EFA but were included in the same sub-factor. Items 17, 18, and 19 were included in the "Physical Activity" sub-factor in the first version of the scale but then were included in the "Weight Control" sub-factor as a result of EFA. The 20th item, "I give importance to maintaining my sexual life regularly for my heart health." had a negative value (-0.564) in EFA and it was excluded from the scale because it confused the CFA results. Regular sexual activity increases the dilatation capacity of blood vessels, improves vascular wall function, delivers oxygen to muscles more efficiently, and, accordingly, improves cardiovascular health [28]. Liu et al. reported that men and women who have sexual intercourse at moderate frequency will have a lower cardiovascular risk than those who are not sexually active [29]. The 20th item excluded from the scale in our study is related to sexuality. In X, where the majority of people whose religion is Islam, sexuality is a sensitive issue related to social embarrassment. In the study, considering the sensitive nature of this information about sexuality in Turkish culture, it can be said that the item had a negative value since the participants did not report the truth. Fowler stated that one of the five basic features required to increase the measurement quality of a question is that participants should always be willing to give the correct answers to the question [30]. The result obtained in our study supports this information.

As a result of EFA, considering the items in the "Weight Control" sub-factor (items 4, 5, 11, 12, 13, 17, 18, 19), it was not surprising that besides direct weight-related items, items that are related to each other, such as eating carbohydrate-containing foods, adding salt to meals, doing physical activity, and doing sports, were loaded on the "Weight Control" sub-factor, suggesting that these sub-factor items are interrelated and consistent.

In the first version of the scale, the items in the "Health Management" sub-factor (14,15,16), the items in the "Harmful Habits" sub-factor (21,22,23), and the items in the "Psychosocial status" sub-factor, (24, 25, 26, 27, 28, 29) did not undergo any changes as a result of EFA.

Structural Equation Modeling is an analysis that examines the contribution of the sub-factors created by CFA to the model and confirms the results [31,32]. When the validity of the model created for AHHAS was tested with fit criteria, it was determined that the factor structure obtained in the structural equation model was consistent according to the factor analysis. The fit values of the Structural Equation Model of AHHAS were RMSEA=0.075 (CI=0.071; 0.080), AGFI=0.81, and GFI=0.84. These results show that the model is valid and can be used to determine adults' attitudes toward heart health [33]. In the study by Koohi et al., according to the results of the 29-item CFA model consisting of four subscales, the root mean square error of approximation (RMSEA) was 0.068; comparative fit index (CFI) was 0.94; goodness-of-fit index (GFI) was 0.83; normed fit index (NFI) was 0.90; incremental fit index (IFI) was 0.9, indicating acceptable model fit indices [27].

There was a positive and significant correlation between the sub-factors of AHHAS and the total scale score

(p<0.001). These results showed that all items of AHHAS were sufficiently correlated with the score of the relevant sub-factor and that the item reliability of the sub-factors was high, proving the reliability of the newly developed scale.

No significant correlation was found between the total AHHAS score and the physical functioning subdimension, one of the subdimensions of SF-36 (p>0.05); however, there was a significant correlation between the other sub-dimensions (p<0.001).

STUDY LIMITATIONS

The main limitation of the research is that the study was carried out with adult patients who applied to the cardiology outpatient clinic and cardiology service of two university hospitals in two provinces. Another limitation of the study was that data were collected online using Google Forms, as face-to-face interviews were not permitted due to the risk of COVID-19 transmission among the patient group from Eskişehir province, which formed part of the sample. The study was conducted with patients admitted to university hospitals in urban areas, which may limit its representation of patients from rural settings. As a result, the findings cannot be generalized beyond this group. Additionally, due to sociocultural factors, patients' views on sensitive topics such as sexuality and alcohol consumption were not fully explored. These limitations restrict the generalizability of the study's findings to other populations.

CONCLUSION

The study determined that the Adult Heart Health Attitude Scale (AHHAS) is a valid and reliable tool for assessing heart health attitudes in adults in X. The findings are expected to contribute to the nursing and medical literature, supporting the development of future programs to improve heart health in adults. It is recommended that the scale be used in studies focused on adult heart health to assess attitudes toward risk factors, guide the development of educational activities for preventing these risks, and be applied in larger sample groups across different countries and urban and rural populations.

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DETERMINANTS OF NURSING PERFORMANCE IN SANDI KARSA HOSPITAL, MAKASSAR CITY, INDONESIA

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ABSTRACT

Nursing performance is an aspect that demonstrates the fulfillment of a nurse's duties and responsibilities. This study aimed to analyze the determinants of nurse performance in Sandi Karsa Hospital Makassar City. This is a quantitative research using a cross-sectional study design. The sample consisted of 93 nurses collected through exhaustive sampling method. Data collection was performed using questionnaire instruments and analyzed using chi-squared and multiple linear regression tests. The results showed that there was a relationship between skills ($p=0.024$), compensation ($p=0.005$), workload ($p<0.001$), job design ($p=0.020$) and knowledge ($p<0.001$) with the performance of nurses in performing nursing care. Meanwhile, there was no relationship between attitude and performance of nurses ($p=1.000$). Workload had the most influence on nurses' performance ($B=2.729$; $SE=0.743$; $Exp(B)=15.322$; $p<0.001$). This study concludes that some factors are associated with nurses' performance, with workload being the most determining factor.

KEYWORDS

performance, nurses, attitude, skills, compensation, workload, job design, knowledge.

INTRODUCTION

The quality of healthcare services in hospitals is significantly determined by the healthcare workforce [1–3]. In this context, nurses are the most dominant [4]. Data from the Ministry of Health of the Republic of Indonesia showed that the number of health human resources (HRH) in hospitals in 2023 was 817,145 personnel, the largest proportion of which are nurses (i.e. 65.3% or about 533,796 personnel). Nurses play a very important role because of their intensive and continuous interaction with patients [5,6]. They are also responsible for providing comprehensive care to patients [7, 8].

The Indonesian National Nurses Association (PPNI) states that the evaluation of nurses' performance can be assessed by their adherence to the nursing care process or the so-called ASKEP (asuhan keperawatan), which consists

of assessment, nursing diagnosis, intervention, implementation, and evaluation [9–11]. Therefore, they must also be accompanied by a good level of qualification and excellent performance [12]. The performance of qualified nurses is reflected in the care they provide to patients [13,14]. Good nursing performance plays a key role in creating a positive image of the hospital in the community and contributes to the achievement of organizational goals, one of which is to improve the health status of the community [15,16].

A study in one of the private hospitals in East Java showed that nurses' performance evaluation received 55% of the patients' dissatisfaction [17]. Research has also been conducted on similar issues. These examined the factors that may affect the dissatisfaction and found that several factors such as attitudes, skills, compensation, workload, job design, and knowledge are associated and affect nurses' performance [18–26].

According to the above report, a preliminary observation was conducted in Sandi Karsa Hospital, Makassar City. Based on the observation of 87 care samples, there were 28 care documents (33.3%) that were still incomplete, which were validated by medical records staff. These incompletes dominated by nursing reports and concluded did not meet the established standards [27]. Furthermore, nurses' performance assessed with 13 performance evaluation indicators [28] resulted 74% still in quite good as well as 4.3% remain poor (data from January-March 2023). Some patients also complained about the unfriendly nurse, and the nurses' station is often empty. Therefore, dissatisfaction resulted higher and may affect the report of nurses' performance. This interesting preliminary finding should be investigated in depth to find out what factors are involved. However, there is no research conducted in this hospital to investigate the determinant that may contribute to this phenomenon.

Thus, this study objective is to analysis of the determinants of nursing performance in Sandi Karsa Hospital, Makassar City, Indonesia.

METHODS

STUDY DESIGN, LOCATION, AND PARTICIPANTS

This research is quantitative research with a cross-sectional study approach. The sample in this study were nurses who currently working at Sandi Karsa Hospital, Makassar City.

Inclusion criteria were nurses in charge of providing health services, with work experience ≥ 1 year, and willing to participate in the study. Meanwhile, the exclusion criteria were not on work leave or continuing education. The total population of nurses was 93 people. The exhaustive sampling method was used, which means that the entire population qualified to be enrolled as a sample.

INSTRUMENTS, PROCEDURES, AND ETHICAL CONSIDERATIONS

This research has received ethical approval number 6539/UN4.14.1/TP.01.02/2023. The participants would be asked to voluntarily participate in the research and signed written informed consent once they agreed.

The instrument used was the self-administered questionnaire consisting of a type of questions related to attitude, skills, compensation, workload, job design, and knowledge. Attitude means the views or feelings in the application of nursing care that nurses have in dealing with patients, such as greeting, being kind and friendly, and controlling patients' conditions (e.g., I greet patients before and after patient encounters; a=0.868). Skills means the nurse's ability to perform the nursing process in terms of interviewing or communicating, conducting physical examinations, and making observations (e.g., I am able to act as a counselor for patients; a=0.838). Compensation means something that nurses receive in return for their work, in this case the adequacy of the service money received, the receipt of benefits and insurance, and wages outside of reasonable working hours (e.g., The salary you receive is based on your workload; a=0.872). Workload means the amount and complexity of work that nurses are expected to do in a given period of time, without being burdened by non-nursing tasks (e.g., I don't feel like I'm working under pressure; a=0.813). Job design means the process of designing tasks and responsibilities to organize how nurses perform daily tasks (e.g., Work assignments from supervisors are very diverse/not monotonous; a=0.810). Knowledge means the body of information held by nurses about nursing concepts, principles, and practices (e.g., In emergency management, airway, breathing, circulation, disability, and exposure are sequential in the primary assessment; a=0.602). Nursing performance means the nursing care consists of assessing, diagnosing, planning, implementing, and evaluating the care provided to the patient and is fully documented.

The scale used a Likert scale from the lowest category "poor" to the highest category "very good". Each category

was rated from 1 (one) to 5 (five). The range "very mild - very overload" would be used for the workload variable.

STATISTICAL ANALYSIS

Data were analyzed using IBM SPSS for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). The reliability test of the questionnaire was performed with Cronbach's alpha test. Univariate analyze for characteristic data using frequency (n) and percentage (%), bivariate analyze using chi-squared test, and multivariate analyze using multiple linear regression test. The test was considered significant if the p-value was <0.05 at the 95% confidence level.

RESULTS

Table 1 shows that the majority of participants were in the age group <30 years, with a total of 38 people (40.9%). Based on gender, 77 subjects (82.5%) were female. Based on marital status, 76 people (81.7%) were married. Based on education, most respondents were in Bachelor level (S1), which is 75 people (80.6%) and based on working duration, there were 66 people (71%) were employed for ≥2 years.

TABLE 1. CHARACTERISTICS OF RESPONDENTS

Characteristics	Frequency (n=93)	Percentage (%)
Age		
< 30 years	38	40.9
31-35 years	30	32.3
36-40 years	23	24.7
> 40 years	2	5.5
Sex		
Male	16	17.2
Female	77	82.5
Marriage status		
Married	76	81.7
Unmarried	17	18.3
Education		
Diploma/D3	12	12.9
Bachelor/S1	75	80.6
Postgraduate/S2	6	6.5
Being employed (duration)		
<2 years	27	29
≥2 years	66	71

TABLE 2. DISTRIBUTION OF RESPONDENTS ACCORDING TO THE DETERMINANT VARIABLES

Variables	Frequency (n=93)	Percentage (%)
Attitude		
Good	86	92.5
Poor	7	7.5
Skills		
Good	86	92.5
Poor	7	7.5
Compensation		
Good	79	84.9
Poor	14	15.1
Workload		

Mild	74	79.6
Overload	19	20.4
Job design		
Good	84	90.3
Poor	9	9.7
Knowledge		
Good	71	76.3
Poor	22	23.7
Nurses' Performance		
Good	65	69.9
Poor	28	30.1

Table 2 shows that most nurses have a good attitude in providing nursing care (92.5%), the skills are mostly in the good category (92.5%), the compensation provided by the hospital is good (84.9%). Most nurses feel that the workload in the hospital is in the mild category (79.6%), the job design in the hospital is good (90.3%), the knowledge is mostly in the good category (76.3%), and the performance of nurses were mostly complete, so that the majority of the performance of nurses was in the good category (69.9%). Table 3 shows that there was a relationship between skills (p=0.024), compensation (p=0.005), workload (p<0.001), job design (p=0.020) and knowledge (p<0.001) with nurses' performance in providing nursing care. Meanwhile, there was no relationship between nurses' attitude and performance (p=1.000).

Table 4 shows that workload (p<0.001) and knowledge (p=0.001) factors have a significant effect on nurses' performance after controlling for all variables, with workload (B=2.729; SE=0.743; Exp (B)=15.322; p<0.001) having the greatest effect on the outcome.

TABLE 3. BIVARIATE ANALYSIS OF DETERMINANTS OF NURSE PERFORMANCE

Variables	Nurses' performance				p-value
	Good		Poor		
	n	%	n	%	
Attitude					
Good	60	69.8	26	30.2	1.000
Poor	5	71.4	2	28.6	
Skills					
Good	63	73.3	23	26.7	0.024
Poor	2	28.6	5	71.4	
Compensation					
Good	60	75.9	19	24.1	0.005
Poor	5	35.7	9	64.3	
Workload					
Mild	61	82.4	13	17.6	<0.001

Overload	4	21.1	15	78.9	
Job design					
Good	62	73.8	22	26.2	0.020
Poor	3	33.3	6	66.7	
Knowledge					
Good	58	81.7	13	18.3	<0.001
Poor	7	31.8	15	68.2	

TABLE 4. LOGISTIC REGRESSION MULTIVARIATE ANALYSIS OF THE MOST INFLUENTIAL VARIABLES ON NURSES' PERFORMANCE

Variables	B	S.E.	Wald	df	Sig.	Exp (B)
Skills	0.467	1.144	0.167	1	0.683	1.596
Compensation	0.677	0.859	0.621	1	0.431	1.967
Workload	2.729	0.743	13.501	1	<0.001	15.322
Job design	0.965	1.085	0.791	1	0.374	2.625
Knowledge	2.207	0.675	10.709	1	0.001	9.092

DISCUSSION

However, the multivariate results showed that only workload and knowledge have significant effect on nurses' performance after adjustment. First, we would like to discuss about the most influential factors that is workload. In addition, we will also discuss the other significant factors. Nursing is one of the professions with the highest potential for stress associated with high workload due to the pressure of job demands [29]. It could be argued that workload is the most significant and influential determinant of nurses' performance. In general, workload is a set or a number of activities that must be completed by an individual or an organizational unit in a given period of time [30]. If the perceived workload is overload, it will affect nurses' performance even at a low level. The results of this study are consistent with previous studies [19,31], which found the significant relationship between workload and nurse performance in hospitals. In the current study, in accordance with hospital reports, some nurses feel burdened by non-nursing tasks that they are obliged to perform. In addition, many of them complained to their colleagues about late shift. As a result, it increases the potential of workload. Meanwhile, the nurse-to-patient ratio is still quite high at 1:5, which does not meet the rules of Permenkes RI Number 340 of 2010 [32].

Knowledge is also found as a determinant of nurses' performance, which is supported by previous findings [22,33]. Knowledge has an impact on the understanding of nurses in the practice of nursing. The better knowledge they have, the better performance they have done. According to Iqbal et al., they argue that knowledge is necessary to provide quality service and key factor to consider safety and care for health workers. Therefore, this finding proves that the effect of knowledge is significant to affect the nurses' performance [22].

Other factors including skill, compensation, and job design seem to show difference on the proportion associated with nurses' performance, which positively indicate that the good skill, compensation, and job design had or experienced by nurse can increase their performance. Although, in the current study did not show tremendous effect on nurses' performance. Some studies have revealed and supported the findings about the association between skill [33,34], compensation [24,35], and job design (36) with nurses' performance. The skill in nursing including practicing caring and professional counseling is needed by patients to get their safety and health [33,34]. This is very conclusive because nurse is always in patient's side while they get treatment in hospital. The work skills employed by a nurse enable him or her to perform the required work effectively

and efficiently. According to Istikomah et al. [39], expertise is a basic foundation for employee performance, where expertise is a part of skills. Compensation is the primary motivation that drives people to work [35] and is part of human resource (HR) management as a reward for work. Compensation can affect nurses' work and performance. The higher the compensation a nurse receives, the better the performance and vice versa [36]. In addition, job design is the process of determining the tasks, how the tasks are performed, and how the job relates to other jobs in the organization. Job design makes it easy for managers to determine a job for HR (i.e., nurse) [37]. Good job design will encourage employees (e.g., nurses) to enjoy work and increase their sense of responsibility to improve performance [38].

This study has limitations. This finding may not be assured to generalize to the whole hospital because the conditions may be different. However, we still believe that this finding can be a reference to perform research to seek more possibility of the nuance of determinants affecting nurses' performance. Meanwhile, the self-administered questionnaire could be led to bias information. Most of the respondents did not have much time to be interviewed due to their busy schedules, therefore, it is the best choice to collect the data. There was a briefing on how to fill the questionnaire, but let them fill without supervision, could be possible to error.

CONCLUSION

This study concludes that some factors are associated with nurses' performance including skills, compensation, workload, job design, and knowledge. Workload is the most determining factor affecting the nurses' performance. The knowledge could also be considered has more impact.

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PRESENTEEISM IN CASE OF A DISEASE OR ILLNESS AND ITS RELATIONSHIP WITH ANXIETY AND DEPRESSION AMONGST DOCTORS IN A TERTIARY CARE HOSPITAL IN KARACHI, PAKISTAN: A CROSS SECTIONAL STUDY

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ABSTRACT

INTRODUCTION:

Presenteeism refers to a common practice of working while sick, working longer hours than required and attending calls outside of work hours. This can have a negative impact on physical, emotional, and psychological well-being of the employees, causing lack of productivity. Occupations whose everyday work includes providing treatment, care, and welfare services such as doctors, nurses and other healthcare professionals tend to have a greater risk of presenteeism. Previous studies have shown an association between presenteeism and the occurrence of mental illnesses such as anxiety and depression.

OBJECTIVE:

The main objective of our study was to investigate the correlation between presenteeism and the prevalence of anxiety and depression amongst doctors working at Jinnah Postgraduate Medical Centre and to analyse its projected influence on the healthcare system.

METHODOLOGY:

A cross-sectional study was conducted through a questionnaire, which was administered to medical doctors of Jinnah Postgraduate Medical Centre (JPMC), Karachi Pakistan (n=278) in May, June, and July 2023. After this, a Hospital Anxiety and Depression Scale (HADS) chart was administered to measure prevalence of anxiety and depression.
Results: In our study, 278 medical doctors participated, 73.0% (n=203) were female and 27.0% (n=75) were male. 85.6% (n=238) of the participants reported to have worked while they were sick in the past 12 months, and only 14.4% (n=40) reported never. Applying the HADS scale, 36.3% (n=101) were identified as abnormal cases of anxiety and 43.5% (n=121) were reported to be abnormal cases of depression.

CONCLUSION:

Presenteeism may be commonplace in the medical field, but considering its association with anxiety and depression, it may lead to higher rates of job burnout, decreased productivity, and error. Increasing awareness about this issue could influence future policies regarding sick leave and the stigma surrounding it, whilst helping reduce the economic and productivity losses caused by presenteeism.

Presenteeism In Case of A Disease Or Illness And Its Relationship With Anxiety And Depression Amongst Doctors In A Tertiary Care Hospital In Karachi, Pakistan: A cross sectional study

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1

INTRODUCTION

Presenteeism refers to a common practice of working while sick, working longer hours than required, and attending calls outside of work hours.[1] A study conducted by Klein et al. in 2013 in Germany illustrated that 90% of the participants were working at least once over a period of 12 months regardless of being ill.[2] Presenteeism has been associated with affecting an individual's physical, emotional, and mental well-being, leading to conditions such as depression and anxiety.[3] According to ICD-10, depression or depressive disorder is a mental condition characterised by depressive mood (e.g., sad, irritable, empty) or loss of pleasure accompanied by other cognitive, behavioural, or neurovegetative symptoms that significantly affect the individual's ability to function.[4] While anxiety is defined as apprehensiveness or anticipation of future danger or misfortune accompanied by a feeling of worry, distress, or somatic symptoms of tension. The focus of anticipated danger may be internal or external.[4]

Both these mental disorders cause impairment, leading to an inability to contribute to the community.[5] A study conducted by Tsuchiya et al. in 2012 in Japan states that the influence of mental disorders on work performance most commonly causes 28 to 30 lost days per year.[6] Furthermore, excessive pressure from the workplace and decreased productivity due to presenteeism, causes job dissatisfaction, emotional exhaustion and insomnia; key factors leading to mental health disorders.[7] In the working population the prevalence of depression and anxiety disorders throughout the year ranges from 3.5% - 6.0% for depressive disorder in European countries and 6.4% mood disorder in the United States.[8] A study conducted by Amin et al (2020) found a 43% prevalence of anxiety and depression amongst frontline doctors in Pakistan. With more than a third of doctors in Pakistan suffering from anxiety and depression, the need for research into risk factors and alleviating measures is imperative.[9]

Additionally, occupations whose everyday work includes providing treatment, care and welfare services such as doctors, nurses and other healthcare professionals tend to have a greater risk of presenteeism. This is due to excessive occupational workload and the overbearing expectation of doing the missed work after a period of absence.[10] According to a study conducted by Sendén et al.(2013), as a part of the Health and Organisation among University hospital Physicians in Europe (HOUPE) project, the prevalence of presenteeism among European physicians is 70 to 86%, creating a behavioural pattern where doctors hide their own illness mostly due to a competitive environment.[11] Doctors tend to avoid taking sick leave and keep working long hours whilst having infections and other diseases, creating a harmful environment for the patients and other staff members.[12] Presenteeism leads to a build- up of stress, which is associated with accelerated disease processes.[3] Moreover, it is shown that presenteeism amongst doctors was associated with higher medical errors, loss of productivity, and negative effect on the health of co-workers.[13] Medical training amongst all specialties comes with extended working hours and interrupted sleep, leading to difficulties in concentration, cognition, motor skills, mood and higher rates of burnout.[14,15]

Over the years, research has been done on presenteeism and its association with depression/anxiety worldwide. However, in Pakistan, limited research has been conducted to understand its impact on healthcare professionals. Exploring this subject can aid in understanding the long-term threat presenteeism poses to healthcare professionals to create a change in policy regarding sick leave and mental health of doctors, in a country with a worsening grade of job dissatisfaction.[16]

RATIONALE:

Previous studies have shown the relationship between anxiety and depression and presenteeism.[17] Mental illnesses present with various emotional mood and sleep disturbances. Though, instead of taking an absence from work or getting the right treatment, doctors often adhere to job demands, which can result in poor decision-making skills, decreased productivity, and professional competence of a doctor. Therefore, this study aims to investigate the relationship between presenteeism and anxiety and depression and the potential implications

Presenteeism In Case of A Disease Or Illness And Its Relationship With Anxiety And Depression Amongst Doctors In A Tertiary Care Hospital In Karachi, Pakistan: A cross sectional study

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presenteeism may have on the medical workforce in Pakistan.

MATERIAL AND METHOD:

We conducted a cross-sectional study through an online google form questionnaire, which was administered to medical doctors of Jinnah Postgraduate Medical Centre (JPMC), Karachi

Pakistan (n=278) in May, June, and July 2023. Inclusion criteria was doctors at all departments of JPMC and exclusion criteria was medical doctors who are not currently affiliated with the medical institute being studied, doctors of physiotherapy, Doctor of Pharmacy, and non-consenting participants. The first part of the questionnaire consisted of demographics of the study population. Then, moved onto work environment factors such as attendance reward systems in the hospital, monthly salary, etc. Our questionnaire was taken from the Xiaoyu Xi et al. study and altered slightly to accommodate the sociocultural differences of Pakistan.[18]

Presenteeism was measured using the following single-item question "How many times has it happened over the previous 12 months that you have gone to work despite feeling that you really should have taken sick leave because of your state of health?" Answers were given through a multiple-choice option of 'never', 'once', '2-5 times', and 'over 5 times'. For analysis, the options were divided into two categories, 'never or once' and 'twice or more'.[18]

Prevalence of anxiety and depression was measured by the HADS chart. The HADS is a 14- item scale that collects ordinal data. Out of the 14 items, seven items relate to anxiety and seven items relate to depression. To each item, there are four scores: 0 (never), 1 (occasionally), 2 (often) and 3 (always). A total of 6 items were reverse scored. The possible scores range from 0 to 21 for anxiety and 0 to 21 for depression. A score between 0 and 7 was considered normal cases, a score of 8-10 identified borderline cases and a score of 11-21 indicated abnormal cases of anxiety or depression.[19]

We analysed our data with the software, statistical package for the social sciences (SPSS) version 2.0. We took the mean result of all the responses as multiple participants filled our questionnaire with different answers. We asked the participants to fill out the form physically on our phones via google forms and sent the questionnaire via email and WhatsApp to some participants to ensure the most responses. We aimed to receive responses from all levels of seniority (i.e., house officers, residents, medical officers, senior residents, and head of departments), however doctors at a higher level of seniority were often too busy to participate or were unavailable.

Ethical approval was obtained from the Institutional Review Board of Jinnah Sindh Medical University (reference number: JSMU/IRB/2023/796).

RESULTS:

RESPONSE RATE

A total of 278 surveys were administered, with a response/completion rate of 100% (n=278). 70.4% (n=196) surveys were completed by doctors of junior management status (i.e., house officers), while 22.7% (n=63) surveys were completed by doctors of middle management status (i.e., residents). Doctors of sub-top management (i.e., medical officers and senior residents) and top management (i.e., head of departments) accounted for 5.4% (n=15) and 1.4% (n=4) survey responses, respectively.

PROFILE OF RESPONDERS

Among the participants, 73.0% (n=203) were females and 27.0% (n=75) were males, 90.6% (n=252) were aged between 20-29, 8.3% (n=23) were aged between 30-39, 1.1% (n=3) were aged between 40-49 and none being aged 50 plus.

With 80.9% (n=225) having completed their Bachelors/MBBS, 6.5% (n=18) of the study population completed their Masters/M.Phil. /MCPS, and 12.6% (n=35) had done their PhD/FCPS. Furthermore, 93.6% (n=261) did not have a chronic disease, Comparing the leadership style of their superiors, 52.5% (n=146) of the study population felt they worked in a democratic leadership type, 34.9% (n=97) in an authoritarian superior leadership type and 12.6% (n=35) in laissez-faire leadership. Further descriptive information about the participants is shown in Table 2.

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TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

Variables	Types	Counts	Proportions
Age	20-29	252	90.6
	30-39	23	8.3
	40-49	3	1.1
Gender	Female	203	73.0
	Male	75	27.0
Marital Status	Divorced	3	1.1
	Married	64	23.0
	Never married	210	75.5
	Widowed	1	.4
Pregnancy status	Non-pregnant or spouse was not pregnant	268	96.4
	Pregnancy or spouse was pregnant	10	3.6
Number of children	0	253	91.0
	1	14	5.0
	2	11	4.0
Living Dynamics	Alone	58	20.9
	Joint	128	46.0
	Nuclear	71	25.5
	Shared housing	21	7.6
Highest education level	Bachelor/MBBS	225	80.9
	Master/M.Phil./MCPS	18	6.5
	PhD/FCPS	35	12.6
History of chronic diseases in the past year	No	261	93.9
	Yes	17	6.1

TABLE 2: WORK-RELATED CHARACTERISTICS OF THE STUDY POPULATION

Variables	Types	Counts	Proportions
Reward system for full attendance	Do not know	18	6.5
	No	228	82.0
	Yes	32	11.5
Monthly salary	1-1.2 Lakh	22	7.9
	60,000-80,000	160	57.6
	80,000-1 Lakh	36	12.9
	Greater than 1.2 Lakh	7	2.5
	Less than 60,000	53	19.1
Number of years working at the current hospital	0-2 years	224	80.6
	2-4 years	40	14.4
	4-6 years	9	3.2
	Greater than 6 years	5	1.8
	Junior management (i.e., house officers)	196	70.5

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Level of seniority	Middle management (i.e., residents)	63	22.7
	Sub-top management (i.e., medical officers and senior residents)	15	5.4
	Top management (i.e., head of departments)	4	1.4
People management duty	No, I am not a leader (absence of staff from the lower levels)	198	71.2
	Yes, I am a leader (presence of staff from the lower levels)	80	28.8
Weekly work hours	35-39	35	12.6
	35-49	8	2.9
	40	45	16.2
	41-45	24	8.6
	46 or more	128	46.0
	Less than 34	38	13.7
No. of Calls	0-4 in a month	63	22.7
	2 times in a week	168	60.4
	3 times in a week	19	6.8
	4 or more times in a week	28	10.1
Makeup work (Substitute availability)	None or only a small proportion	58	20.9
	Somewhat less than half	77	27.7
	Somewhat more than half	79	28.4
	Virtually all	64	23.0
Superior's leadership type	Authoritarian (Controlling)	97	34.9
	Democratic (Participative)	146	52.5
	Laissez-faire (Minimum interference)	35	12.6

85.6% (n=238) of the participants reported to have worked while they were sick in the past 12 months, and only 14.4% (n=40) reported never. Of the 85.6%, 22.7% (n=63) reported once, 38.8% (n=108) reported 2-5 times, and 24.1% (n=67) reported more than 5 times. Participants also reported that making up virtually all the tasks missed when back to work (n=64, p-value= 0.013) had a significant development on presenteeism. Males had a significantly higher proportion of presenteeism (n=75, p-value=0.002) when compared to their female counterparts. Doctors with 2 children had decreased cases of presenteeism (n=11, p-value= 0.046). Work hours equal and greater than 46 hours a week (n=128, p-value=0.04) was also significant. Physicians on call 3 times per week (n=19, p-value=0.007) reported to have less cases of presenteeism.
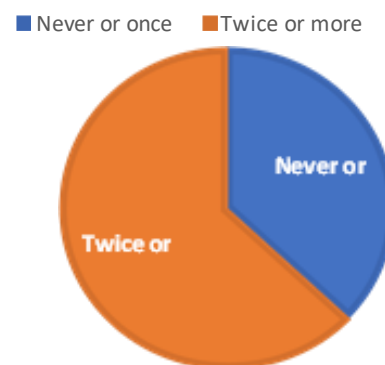
FIGURE 1: PREVALENCE OF PRESENTEEISM

■ Never or once ■ Twice or more

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TABLE 3: PREVALENCE OF PRESENTEEISM

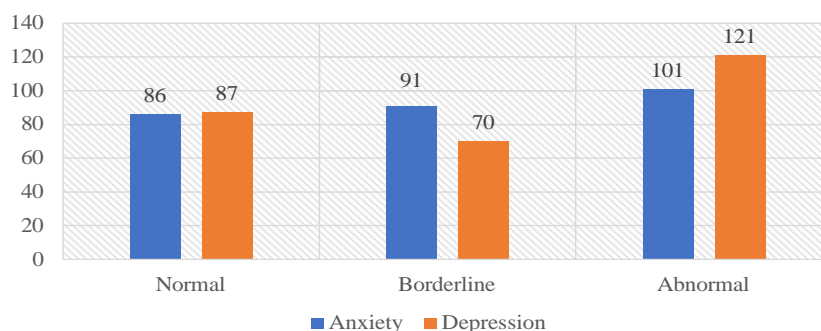| Prevalence of Presenteeism				
	Frequency	Percent	Valid Percent	Cumulative Percent
Never or once	103	37.1	37.1	37.1
Twice or more	175	62.9	62.9	100.0
Total	278	100.0	100.0	

TABLE 4: FACTORS SIGNIFICANTLY AFFECTING PREVALENCE OF PRESENTEEISM

Number of Work Hours				
	Frequency	Percent	Valid Percent	Cumulative Percent
35-39	43	15.5	15.5	15.5
40	45	16.2	16.2	31.7
41-45	24	8.6	8.6	40.3
46 or more	128	46.0	46.0	86.3
Less than 34	38	13.7	13.7	100.0
Total	278	100.0	100.0	
Makeup work				
	Frequency	Percent	Valid Percent	Cumulative Percent
None or only a small proportion	58	20.9	20.9	20.9
Somewhat less than half	77	27.7	27.7	48.6
Somewhat more than half	79	28.4	28.4	77.0
Virtually all	64	23.0	23.0	100.0
Total	278	100.0	100.0	
***Other significant factors are included in Annex 1**				

TABLE 5: PREVALENCE OF DEPRESSION AND ANXIETY BASED ON "HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)"

Prevalence of depression and anxiety based on "Hospital Anxiety and Depression Scale (HADS)"			
Anxiety Score	Symptom-free	86	30.9
	Suspicious cases	91	32.7
	Confirmed case	101	36.3
Depression Score	Symptom-free	87	31.3
	Suspicious cases	70	25.2
	Confirmed case	121	43.5

FIGURE 2: PREVALENCE OF DEPRESSION AND ANXIETY BASED ON "HOSPITAL ANXIETY AND DEPRESSION SCALE (HADS)"

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Applying the HADS scale, 36.3% (n=101) were identified as abnormal cases of anxiety and 43.5% (n=121) were reported to be abnormal cases of depression. Borderline (suspicious) (n=91, p-value=0.001) and abnormal (confirmed) cases of anxiety (n=101, p-value= 0.007) were significant in doctors with presenteeism. Alternatively, abnormal cases of depression (n=121, p-value=0.043) in patients had significantly decreased instances of presenteeism.

Logistic regression analysis showed that 8 variables were significantly associated with presenteeism with statistical difference as shown in table 6. Compared with participants with normal cases of anxiety or depression, participants with abnormal cases of anxiety and borderline cases of anxiety were more likely to practise presenteeism whereas participants with abnormal cases of depression were less likely to practise presenteeism (all p<0.05). Data analysis using SPSS also showed that there were interactions between anxiety and depression which, however, did not affect the overall finding about the association between abnormal cases of anxiety or depression and presenteeism in this study. In addition to two demographic factors (gender and being a parent), four work-related factors were also more likely to resulting in presenteeism including the knowledge of attendance reward system, weekly work hours, number of calls taken in a week, and lack of ease of replacement of missed work (all p<0.05).

TABLE 6: LOGISTIC REGRESSION ANALYSIS OF FACTORS ASSOCIATED WITH PRESENTEEISM

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Gender	Male	-1.401	.448	9.795	1	.002	.246	.102	.592
Number of children	0			4.674	2	.097			
	1	-1.516	1.113	1.854	1	.173	.220	.025	1.947
	2	-2.626	1.318	3.969	1	.046	.072	.005	.958
History of chronic diseases in the past year	Chronic Disease	1.304	.906	2.071	1	.150	3.684	.624	21.763
Reward system for full attendance	Do not know			11.577	2	.003			
	No	1.353	.684	3.917	1	.048	3.869	1.013	14.777
	Yes	-.341	.822	.172	1	.678	.711	.142	3.558
Weekly work hours	Less than 34			20.294	5	.001			
	35-39	-.268	.652	.169	1	.681	.765	.213	2.746
	35-49	20.010	12794.885	.000	1	.999	489954871.736	0.000	
	40	-.394	.608	.420	1	.517	.675	.205	2.220
	41-45	-.195	.668	.085	1	.770	.823	.222	3.048
	46 or more	1.685	.579	8.474	1	.004	5.393	1.734	16.772
No. of Calls	0-4 in a month			8.491	3	.037			
	2 times in a week	-.235	.443	.281	1	.596	.790	.332	1.885
	3 times in a week	-2.149	.797	7.271	1	.007	.117	.024	.556

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DISCUSSION:

In this study, we found the prevalence of presenteeism to be high, with 62.9% of doctors reporting presenteeism 2 or more times in the previous 12 months. We also found that 36.3% of doctors had abnormal cases of anxiety and 43.5% of doctors had abnormal cases of depression. Whilst the prevalence of presenteeism is similar to presenteeism reported in hospital doctors in China (66.4%) in Xiaoyu Xi's study et al, the rates of abnormal cases of anxiety and depression were found to be much lower in this study.[18] Xiaoyu Xi's study et al. reported 68.8% of abnormal cases of anxiety and 72.3% of abnormal cases of depression.[18] This vast difference could be due to our study having a much smaller sample size (n=276) when compared to Xiaoyu Xi's study et al. (n=1153).[18]

We found that 85.6% of the study population worked while they were sick in the past 12 months. Despite there being around 175,000 registered doctors in Pakistan, a majority have moved abroad to practise and many female physicians often do not work due to family and social expectations.[17] As a result, the doctor to patient ratio becomes 1 doctor for every 1,764 persons.[17] With a healthcare system ranked 154th out of 195 countries in terms of performance, physicians find themselves under immense pressure to show up to work even when feeling unwell.[17]

A majority of the participants in our study were aged between 20-29 (90.6%), had completed their Bachelors/MBBS (80.9%), and were a part of junior management status (i.e., house officers) (70.4%). This younger age group could also account for the high prevalence of presenteeism found in our study, as our participants were at the bottom of the 'medical hierarchy', with little to no control over their schedules, workload and gain little reward. A study by M Faisal et al. found that promotions and rewards were based on seniority rather than performance.[20] It also found that overburdened staff and unnecessary job responsibilities sometimes compromised patient care.[20]

In our study, we found that males had a significantly higher proportion of presenteeism than their female counterparts. This was unexpected as a study by C. Chambers et al. found that women and younger doctors had the highest rates of presenteeism.[13] Alternatively, a study by P. M. Conway et al. found that contrary to expectations, the prospective association between presenteeism and future depression had no gender related differences.[21] The difference between all these findings must be accounted for through differences in work environments, age, political and social climate, culture as well as the major differences in sample sizes. Unless a study is specifically conducted on presenteeism in female doctors vs male doctors, gender remains as a confounder rather than a potential effect modifier in exploring presenteeism and its effects on anxiety and depression, as explained by P. M. Conway et al. [21]

Our study found that leadership style, whether it be democratic, authoritarian, or laissez-faire, did not have a significant effect on the prevalence of presenteeism. This is interesting as we thought that an authoritarian style leadership would increase stress on doctors and push them towards presenteeism. Instead, we found no significant differences between the rates of presenteeism and the corresponding leadership styles. This may be due to personality differences resulting in doctors thriving in different work environments, and the psychosocial pressure of success.[22]

The majority of our study population (93.9%) did not suffer from chronic disease. A previous study Cocker et al., found that poorer general health resulted in greater absenteeism and thus, associated with the 'health-protective' effects of absenteeism.[3] Our study had a greater population in good health standing, which may contribute to the high rates of presenteeism as healthy people are more likely to ignore their health needs and continue to work while sick.

Similar to Xiaoyu Xi et al., our study also found that if a doctor would have to make up the tasks not completed during their absence, these doctors would practise presenteeism at a greater rate than their co-workers who did not have to make up missed work.[18] Therefore, task substitution and the amount of work that was to be made up after one's absence had a significant effect on the rates of presenteeism.

Doctors with multiple children were reported to have less cases of presenteeism than those with no children or a single child. This may be due to social responsibility and prioritisation. Considering our study population was made up of mainly females, this may have influenced the result as, in traditional Pakistani culture, the mother is the primary caretaker of children, leading to absenteeism.[23] This factor could be investigated in further studies.

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Physicians on call 3 times per week reported to have less cases of presenteeism. This may be due to the more labour intensive and physically taxing work done on call versus a normal workday. Therefore, physicians with a larger number of calls in the week may feel the need to rest before returning to work. Such practices should be encouraged in the medical field as they decrease productivity losses and reduce risk of illness spreading to patients.

The study found that those with less than 34 hours of weekly work and those with over 46 hours of weekly work had increased rates of presenteeism. With a shorter work week, doctors may resort to presenteeism as they do not want to burden their co-workers and have a greater leave period to relax and resolve their illness. While those with a longer than 46-hour work week may have increased rates of presenteeism, due to the need to make up their missed work, they may instead choose to work while they are ill, to not burden themselves or their co- workers. The study Al Nuhait et al. found the most common reasons reported for presenteeism were not wanting to burden co-workers, feelings of duty toward patients, and avoiding an increased future workload caused by absence.[24] Doctors may also trivialise less severe illnesses and soldier on, which over an extended period of time can lead to exhaustion, ill-being, and productivity damage and continue an ensuing resource loss cycle.[25, 26]

Considering the relationship between presenteeism and mental illness, a study by J Klein et al. found that presenteeism was associated with psychosocial stress, which can be caused by high efforts and demands, low rewards and increased overcommitment.[2] Working while ill takes more effort than required normally, and this can result in greater stress levels and allostatic load.[21] Based on the Effort-Recovery model, this may affect the individual's capacity to relax after work.[21] This cycle can lead to prolonged psychophysiological overactivation and also burdens the recovery process, keeping the doctor sick for longer. Increased allostatic load has been associated with accelerated disease processes, unhealthy behaviours, and an increased risk of cardiovascular disease.[3] Inadequate recovery, psychophysiological overactivation and a poor work environment can all contribute to an increased risk of depression, according to P. M. Conway et al. [21]

Presenteeism can also be associated with a lifestyle of at-risk health behaviours, such as poor sleep, low physical activity, and poor diet. These factors have been associated with the incidence of major depression, due to dysregulated physiological pathways.[21] Our study found that depression caused lower rates of presenteeism, contrasting the findings of the Xiaoyu et al. study.[18] The findings of our study are clinically appropriate, as depression often causes anhedonia, lowering job satisfaction and willingness to come to work sick. Interestingly, this could help the doctor recover faster, as they would get the required rest. Future studies could examine this contrast and factors that may cause the practice of presenteeism, such as intrinsic work values like autonomy, competence, and satisfaction and extrinsic work values such as socioeconomic status, social approval, financial and social security, career prospects, etc.[25] The effects of presenteeism on productivity and work output can be investigated in further studies and possible coping strategies and policies to support doctors facing the negative effects of presenteeism should also be studied.[18]

CONCLUSION:

Presenteeism may be commonplace in the medical field, but considering its association with anxiety and depression, it may lead to higher rates of job burnout, decreased productivity, and error. Increasing awareness about this issue could influence future policies regarding sick leave and the stigma surrounding it, whilst helping reduce the economic and productivity losses caused by presenteeism.

LIMITATIONS OF STUDY:

Although we aimed to conduct a reliable cross-sectional study of all doctors at JPMC to get an understanding of the factors that could contribute to presenteeism, the sample size was not large enough to account for all the levels of seniority and the impact this could have on the results. Majority of participants were female; therefore, further study would include gaining a

more equal response rate from both sexes. Our study also relied on participants recalling the past 12 months which may be too long, leading to inaccurate results due to memory loss. Also, the presenteeism, anxiety and depression were measured using self-assessment rather than more objective methods. This study focused solely on a single hospital. Subsequent investigation could include multiple hospitals nationwide and doctors in various settings

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other than a hospital for a more comprehensive understanding of the workforce.

CONTRIBUTIONS:

CL: Review & Editing, Validation TA: Supervision, Validation JAS: Investigation, Writing Original Draft, Review & Editing, Visualization, Project Administration HA: Investigation, Writing Original Draft, Review & Editing, Visualization, Project Administration SABN: Conceptualization, Investigation, Formal Analysis, Methodology MH: Writing Introduction, Investigation, Review & Editing IAA: Investigation, Review & Editing TI: Writing Introduction, Investigation, Review & Editing AH: Writing Introduction, Investigation, Review & Editing FW: Investigation, Review & Editing

CONFLICT OF INTEREST:

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

DATA AVAILABILITY STATEMENT:

The data that support the findings of this study are available from the corresponding author, HA, upon reasonable request.

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Presenteeism In Case of A Disease Or Illness And Its Relationship With Anxiety And Depression Amongst Doctors In A Tertiary Care Hospital In Karachi, Pakistan: A cross sectional study

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SOCIO-DEMOGRAPHIC AND ECONOMIC FACTORS ASSOCIATED WITH HYPERTENSION AMONG MEN IN INDIA

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ABSTRACT

BACKGROUND:

The leading risk factor for cardiovascular disease, Hypertension, is becoming more prevalent worldwide and is especially prevalent in low- and middle-income nations (LMICs) like India.

OBJECTIVE:

This study aims to examine the change in the prevalence of Hypertension and to develop a statistical model for risk factors of Hypertension among Men in India.

MATERIALS AND METHODS:

This study used data from the National Family Health Survey (NFHS 4 and 5) samples of men aged 15-54 years whose blood pressure (BP) was measured during the survey.

RESULTS:

The study shows that the prevalence of Hypertension among men was 16.3% to 21.5% from NFHS-4 to 5 and we also found an increase in the prevalence of Hypertension and association across selected socio-demographic and economic variables for Hypertension. It was found in both NFHS 4 and 5 Hypertension were higher in the 45-54 age group compared to younger age group. Men who consume alcohol had higher odds (OR: 1.32, C.I: 1.27-1.37 and OR: 1.42, C.I: 1.37-1.48) of getting hypertension than those who do not consume alcohol and Education, Employment, marital status, and residence were showing significantly associated and higher odds with hypertension among Men. The accuracy of the logistic regression model has been calibrated to reach 71.1%, with sensitivity and specificity exceeding 70%. Users of the model have access to the modified probabilities.

CONCLUSION:

The findings suggest the effect of socioeconomic and habit factors on hypertension which will help in improved interaction with medical services for the treatment of hypertension.

KEYWORDS

Socio-Demographic factors, Economic factors, Hypertension, India

INTRODUCTION

India is a diverse country, and several of its states are undergoing epidemiological health changes brought on by urbanization. Urbanization has fueled food consumption, increased cigarette use, and alcohol, and reduced physical activity as a result of economic prosperity. The spectrum of illnesses is changing from communicable to non-communicable diseases (NCDs) as a result of this economic revolution [1]. NCDs are a broad category of illnesses that include chronic respiratory conditions, cancer, Hypertension, diabetes, and cardiovascular conditions [2]. Hypertension, commonly referred to as high or rising blood pressure, also known as the silent killer, is a serious risk factor for many non-communicable diseases and has grown to be a significant global public health problem due to the high rate of premature deaths globally [3, 4]. In addition to being a frequent risk factor for peripheral vascular disease, retinopathy, nephropathy, dementia, and cognitive decline, hypertension also raises the risk of cardiovascular disease, including atherosclerosis, heart disease, heart failure, stroke, and angina [5].

High systolic blood pressure (SBP) has been linked to roughly 10.4 million deaths and 218 million disability-adjusted life years (DALY) in 2017, according to the global burden of disease (GBD) research. High SBP contributed to 9% of all DALYs overall [6]. A list of the six primary risk factors contributing to the global illness burden included hypertension, which was in third place globally, after hazardous sexual behavior and underweight [7]. According to estimates from the World Health Organisation (WHO), there are presently over 1.13 billion individuals with hypertension, and two-thirds of them reside in low- and middle-income nations (LMIC) [8]. A significant cause of mortality and disability in South Asian nations including Bangladesh, India, Nepal, Bhutan, and Sri Lanka is hypertension and its associated problems [9]. According to the Global Burden of Hypertension Study, 199 million Indians had hypertension in 2015, and the prevalence of hypertension in India and its states is on the rise [10]. The recent study has shown the Countrywide prevalence of hypertension was 18.3%. Men with 21.5% were found to have a higher prevalence as compared to women with 14.8% in India [11]. In India, hypertension is a major risk factor for 15% of all deaths from cardiovascular diseases and accounts for 5.1% of mortality overall [12].

Regardless of geography, educational attainment, or family financial position, recent population-based research has demonstrated that the prevalence of hypertension is comparatively greater in middle and older age groups [13]. Significantly, India's rates of hypertension prevalence in younger age groups surpass those of Central and Eastern Europe, which was previously thought to have the greatest prevalence of hypertension globally [10]. Several studies have found that the main risk factors for hypertension include age, obesity, dietary habits, behavioral factors, regional heterogeneity, family history, and socioeconomic level [14–16]. But these studies do not provide any appropriate statistical models for the risk factors of Hypertension.

Even so, the lack of regularly available data has restricted research on hypertension in India, and the few studies that have been conducted thus far have either been conducted on a local scale with a small sample size or in conjunction with other non-communicable illnesses [17, 18]. This may be because, up until recently, India lacked a representative data set at the national, regional, or district levels. Fortunately, there is a rare chance to examine the shift in the prevalence of hypertension and its related variables among males aged 15 to 54 according to the most recent cycle of the National Family Health Survey (NFHS-4 and NFHS-5). The majority of hypertension research included data on older age groups. Since younger people are thought to have a reduced risk of contracting the disease, they are typically ignored. Therefore, the present study will focus on determining the change in the prevalence of Hypertension as well as ascertaining the statistical model that allows us to determine which socioeconomic and demographic characteristics are major risk factors of hypertension as well as assist in analyzing the interactions and determining which factors are most strongly linked to Hypertension.

MATERIALS AND METHODS

DATA SOURCE

Data from the 4th and 5th rounds of the NFHS, Indian Demographic and Health Survey (DHS), were used in the study. The NFHS was established in the early 1990s, and it frequently publishes data on India's population, health, and nutrition for the country's states and union territories under the leadership of the Ministry of Health and Family Welfare (MoHFW). NFHS considers overall India and sample houses were chosen based on the proportion of urban and

rural residents in each state. The multistage sample setup was used in every state. The U.S. Centers for Disease Control and Prevention (CDC) evaluated and approved the survey procedure, which included the substance of all survey questionnaires. The IIPS and ICF Institutional Review Boards also approved the protocol. The NFHS's study design, sampling procedures, and data-gathering information had been made public in NFHS reports.[19]

The 5th round of the NFHS was gathered from 28 states, 8 union territories, and 707 districts between 2019 and 2021. The 4th round of the NFHS was collected between 2015 and 2016 from 29 states, 7 union territories, and 640 districts. Hypertension measurements were gathered for the first time in India through the NFHS survey. To estimate key indicators, it includes data on the health and family welfare of 112,122 men ages 15-54 and 699,686 women between the ages of 15 and 49 in NFHS-4 and there are 724,115 women ages 15-49 and 101,839 males between the ages of 15 and 54 information available in NFHS-5. For this study, we focused on the male sample in NFHS-4 and NFHS-5.

VARIABLES' DESCRIPTIONS

Outcome variable

The measurements of Blood Pressure (BP) for each respondent were taken three times at intervals of five minutes using the OMRON BP monitor by a skilled health investigator. Though, the BP level was calculated by taking the average of the last two measurements. A person whose average systolic blood pressure (SBP) was greater than or equal to 140 mmHg or average diastolic blood pressure (DBP) was greater than or equal to 90 mmHg or a person who is currently taking prescribed medicine to lower his/her elevated BP was considered to be hypertensive. For analysis, we constructed a dichotomous hypertension variable where samples with hypertension (defined earlier) were given code 1 and non-hypertensive as 0 in both NFHS-4 and NFHS-5.

Predictor variables

We considered demographic and socio-economic characteristics as covariates to identify the important risk factors associated with hypertension among men. Age was categorized as 15–24, 25–34, 35–44, and 45-54 for men in both NFHS-4 and NFHS-5 respectively. Other demographic

and socio-economic information includes place of residence (rural or urban), education level (No education, primary, secondary or higher), occupation (Unemployed, employed, agriculture), Marital status (Unmarried and Ever_Married), Religion (Hindus, Muslims or others), Caste (SC/ST, OBC or others), wealth Index (poorest, poorer, middle, richer or richest). The lifestyle factors include frequency of Drinking alcohol (yes or no), consumption and Tobacco use (yes or no), and Region (north, center, east, northeast, west, south) in India.

STATISTICAL ANALYSIS

In this study, we used, bivariate, and multivariabel logistic regressions were employed for the data analyses. Descriptive statistics were employed to show how research participants were distributed. Bivariate analyses were conducted to better understand the type of association between explanatory factors and outcome variables. Pearson's Chi-square statistic was used to conduct the association and Student's z-test was used to calculate the significant difference between the 2 survey rounds. Further, the binary logistic regression model was used to evaluate the risk factors for developing Hypertension and estimated odds ratios (ORs) and 95% confidence intervals (CIs) were used to display the regression results. Additionally, the analyses employed suitable sample weights and a 2-tailed P-value of less than 0.05 to verify the statistical significance and we used the ROC curve to evaluate the performance of the Regression model. Data analysis was carried out using the IBM. SPSS (Statistical Package for the Social Sciences) version 26, Bengaluru, Karnataka, India.

MULTIVARIABEL TECHNIQUE FOR DEVELOPING THE STATISTICAL MODEL

Binary logistic regression is estimated to know the odds of getting Hypertension in each category of variables. For this statistical model the dependent variable should have a binary outcome and independent variables can be continuous or categorical. The following binary logistic regression model has been used in this study.

$$log \left(\frac{p}{1-p} \right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n$$

Define $f(x)$ as $= \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n$

Were, $p = \frac{e^{f(x)}}{1+e^{f(x)}}$ & $q = 1 - p$

RESULTS

TABLE 1 PREVALENCE OF HYPERTENSION AMONG MEN IN INDIA BY SELECTED BACKGROUND CHARACTERISTICS AND THEIR ASSOCIATION

Variables	NFHS-4			NFHS-5			
	HTN		Chi-Square (P-value)	HTN		Chi-Square (P-value)	Percentage change (%)
	Prevalence (%)	n		Prevalence (%)	n		
Age group							
15-24	6.7	35712	6480.5 (0.000)	6.9	31070	7364.0 (0.000)	2.99
25-34*	15.7	30791		16.6	27652		5.73
35-44*	24.3	25851		26.7	23712		9.88
45-54*	31.7	19768		35.9	19405		13.25
Place of residency							
Urban*	19.6	35526	143.6 (0.000)	21.8	26420	100.0 (0.000)	11.22
Rural*	16.7	76596		18.9	75419		13.17
Religion							
Hindu*	17.3	83567	273.7 (0.000)	19.6	77211	392.1 (0.000)	13.29
Muslim	15.5	15438		15	12112		-3.23
Other*	22.5	13117		25	12516		11.11
Caste							
SC/ST	17.9	39901	128.01 (0.001)	20.4	38594	48.0 (0.000)	13.97
OBC*	16.3	43434		18.7	39326		14.72
Others*	19.7	22564		20.7	18968		5.08
Educational level							
No education*	19	15007	184.3 (0.000)	22.8	12269	219.7 (0.000)	20.00
Primary*	19.1	14351		23.1	11710		20.94
Secondary*	16.4	65260		18.4	60018		12.20
Higher	20.1	17504		19.5	17842		-2.99
Region							
North	19.5	24584	948.5	20	21134	458.5	2.56

Canter*	13.8	27930	(0.000)	18.8	23242	(0.000)	36.23
East*	14.1	17220		16	15197		13.48
Northeast	24	14555		23.2	14860		-3.33
West*	17.5	12349		16.4	11588		-6.29
South*	19.8	15484		23.2	15818		17.17
Marital status							
Unmarried	8.8	40003	3330.1 (0.000)	9.2	36892	3993.5 (0.000)	4.55
Ever Married*	22.5	72119		25.6	64947		13.78
Occupation							
Employed*	20.7	54062	1317.5 (0.000)	22.9	49491	1801.3 (0.000)	10.63
Unemployed*	10.2	24889		8.8	19241		-13.73
Agriculture*	18.2	32961		21.2	32864		16.48
Wealth index							
Poorest*	13.2	18412	767.7 (0.000)	16.8	19796	325.9 (0.000)	27.27
Poorer*	14.7	23220		18.1	22599		23.13
Middle*	17.4	24331		19.6	21715		12.64
Richer	20.1	23383		21.1	20209		4.98
Richest*	21.9	22776		23.4	17520		6.85
Tobacco							
No*	17.1	72818	47.8 (0.001)	18.1	61850	244.1 (0.000)	5.85
Yes*	18.7	39304		22.1	39989		18.18
Drink alcohol							
No*	15.4	76840	805.1 (0.000)	17	75391	1370.5 (0.000)	10.39
Yes*	22.4	35282		27.5	26448		22.77

* Significant difference in percentage change between NFHS-4 and NFHS-5 (using student z-test) at 5% level of significance

Note: SC: Scheduled Caste ST: Scheduled Tribe OBC: Other Backward Class

Table 1 describes the percentage of prevalence of Hypertension in Men of NFHS-4 and NFHS-5 with various background traits and their association. In this research, every explanatory variable was associated with Hypertension in both rounds. The highest prevalence (31.7% and 35.9%) of Hypertension in men was found in the age-group of 45-54 in both groups and the percentage change was statistically significant. The population in the urban areas had the highest prevalence of hypertension (19.6% and 21.8%), and the percentage shift was statistically significant. In religion with the highest prevalence of hypertension (22.5% and 25.0%) was seen in other religions. Religion-wise, the percentage shift was statistically significant. In terms of caste, the General caste had a

greater chance of hypertension (19.7% and 20.7%) among men, in both rounds of the NFHS survey. The highest prevalence of hypertension (20.1%) was identified in higher educated people, although the highest prevalence of (23.1%) according to NFHS-5 was found in primary educated people. In India, the Northeast has the greatest prevalence of hypertension (24.0% and 23.3%), in both NFHS-4 and 5, and in NFHS-5 south region also shows the highest prevalence and the rise is statistically significant. In Marita status, Ever Married had the highest prevalence (22.5% and 25.6%) of Hypertension, and the percentage change was statistically significant. In terms of occupation,

those who are employees had the highest prevalence of hypertension (20.7% and 22.9%) in both NFHS-4 and NFHS-5. The population with the Richest class had the highest prevalence of hypertension (21.9% and 23.4%), and the percentage change was likewise statistically significant. Those who are taking tobacco have the highest prevalence (18.7% and 22.1%) of Hypertension and the percentage change is also statistically significant alcohol users had the highest prevalence of hypertension (22.4% and 27.5%), and the percentage change was likewise statistically significant.

TABLE 2: ADJUSTED ODDS RATIO FOR AN ASSOCIATION OF COVARIATES WITH HYPERTENSION AMONG MEN IN INDIA, NATIONAL FAMILY HEALTH SURVEY-4 AND NATIONAL FAMILY HEALTH SURVEY-5

	NFHS-4				NFHS-5			
	Exp(B)	95% C.I EXP(B)		p-value	Exp(B)	95% C.I EXP(B)		p-value
Variables		Lower	Upper			Lower	Upper	
Age group								
15-24	1				1			
25-34	2.083	1.948	2.227	0.000	2.104	1.963	2.256	0.000
35-44	3.561	3.311	3.83	0.000	3.667	3.398	3.956	0.000
45-49	5.196	4.823	5.599	0.000	5.836	5.402	6.305	0.000
Place of Residence								
Urban	1				1			
Rural	1.009	0.968	1.052	0.65	0.959	0.918	1.002	0.06
Religion								
Hindu	1				1			
Muslim	0.968	0.912	1.027	0.27	0.806	0.756	0.859	0.000
Other	1.006	0.95	1.066	0.82	1.25	1.18	1.324	0.000
Caste								
SC/ST	1				1			
OBC	0.928	0.89	0.968	0.002	0.93	0.892	0.969	0.001
Other	1	0.952	1.05	0.996	0.991	0.942	1.042	0.71
Education								
Higher	1				1			
No Education	0.804	0.751	0.861	0.001	0.858	0.802	0.919	0.001
Primary	0.86	0.805	0.918	0.000	0.946	0.885	1.011	0.1
Secondary	0.868	0.827	0.911	0.000	0.963	0.918	1.011	0.12
Region								
North	1				1			
Centre	0.731	0.694	0.771	0.001	1.058	1.003	1.116	0.04
East	0.733	0.69	0.779	0.02	0.808	0.758	0.861	0.001
Northeast	1.308	1.229	1.392	0.000	1.085	1.016	1.157	0.000

West	0.87	0.818	0.925	0.002	0.804	0.754	0.858	0.003
South	0.906	0.856	0.959	0.001	1.08	1.021	1.143	0.000
Marital status								
Unmarried	1				1			
Married	1.224	1.154	1.299	0.000	1.217	1.146	1.292	0.000
Wealth Index								
Richest	1				1			
Poorest	0.626	0.582	0.674	0.003	0.7	0.651	0.752	0.000
Poorer	0.673	0.632	0.717	0.000	0.768	0.721	0.819	0.001
Middle	0.808	0.764	0.855	0.000	0.828	0.78	0.878	0.002
Richer	0.944	0.897	0.993	0.001	0.909	0.861	0.961	0.000
Occupation								
Employed	1				1			
Unemployed	0.91	0.86	0.962	0.001	0.832	0.778	0.889	0.000
Agriculture	0.892	0.856	0.929	0.001	0.877	0.843	0.913	0.000
Tobacco								
No	1				1			
Yes	0.954	0.919	0.989	0.02	0.965	0.93	1.002	0.06
Alcohol								
No	1				1			
Yes	1.317	1.269	1.366	0.001	1.419	1.365	1.475	0.000

An analysis using a logistic regression model was conducted to determine which demographic and socioeconomic characteristics were the main causes of hypertension in India. Table 2 displays characteristics, odds ratio, and probability of having hypertension. Except for residence type, religion, and tobacco usage, the majority of the predictor variables showed significant differences and higher odds of Hypertension in both rounds. It was found in NFHS-4 and 5 that the odds of hypertension were higher (OR: 5.20, C.I: 4.82-5.60 and OR: 5.84, C.I: 5.40-6.31) in the 45-54 age group compared to younger age. In the case of education, the lower odds (OR: 0.80, C.I: 0.75-0.86 and OR: 0.86, C.I: 0.80-0.92) were observed in illiterate men compared to higher educated men. Those who are unemployed had lower odds (OR: 0.91, C.I: 0.86-0.96 and OR: 0.83, C.I: 0.78-0.89) of getting hypertension compared to employees which is statistically significant. Men who consume alcohol had higher odds (OR: 1.32, C.I: 1.27-1.37

and OR: 1.42, C.I: 1.37-1.48) of getting hypertension than those who do not consume alcohol. Men who are married had higher odds (OR: 1.22, C.I: 1.15-1.30 and OR: 1.22, C.I: 1.15-1.29) of getting hypertension compared to Unmarried. Caste, wealth index of the household, and geographic region had shown a significant difference in the odds of getting hypertension compared to their reference group.

Table 3 reveals the likely sensitivity and specificity of the model from both NFHS-4 and 5 as 70.0% and 60.3%, respectively. Sensitivity and specificity can be changed based on the needs of the study, and the screening or diagnosis that is required. The area under the Reciever Operating Characteristics (ROC) curve in NFHS-4 (Fig 1) was 70.05% with 95% CI 70.1%–70.9% and in NFHS-5 (Fig 2) 71.1% with 95% C.I 70.7% - 71.5%.

TABLE 3: SENSITIVITY AND SPECIFICITY OF THE MODEL AT DIFFERENT CUT POINTS

NFHS-4			NFHS-5		
Probability (≥)	Sensitivity	Specificity	Probability (≥)	Sensitivity	Specificity
0.084	0.915	0.301	0.083	0.908	0.310
0.086	0.909	0.313	0.088	0.900	0.327

0.096	0.890	0.353	0.094	0.890	0.347
0.101	0.880	0.371	0.121	0.850	0.415
0.137	0.810	0.480	0.126	0.840	0.428
0.142	0.800	0.494	0.145	0.800	0.485
0.146	0.790	0.506	0.150	0.790	0.499
0.172	0.720	0.585	0.170	0.739	0.562
0.175	0.710	0.594	0.176	0.721	0.580
0.178	0.700	0.603	0.176	0.719	0.581
0.182	0.690	0.615	0.182	0.700	0.601
0.185	0.680	0.624	0.186	0.691	0.610
0.187	0.670	0.633	0.187	0.689	0.612
0.190	0.660	0.642	0.189	0.679	0.621
0.193	0.650	0.651	0.196	0.660	0.641
0.196	0.640	0.660	0.196	0.659	0.642
0.199	0.630	0.669	0.203	0.641	0.658
0.202	0.620	0.677	0.203	0.639	0.659
0.204	0.610	0.685	0.208	0.621	0.677
0.206	0.600	0.694	0.208	0.619	0.678
0.239	0.500	0.769	0.235	0.530	0.746
0.293	0.320	0.874	0.244	0.500	0.768
0.268	0.400	0.831	0.298	0.311	0.876

FIGURE 1: RECEIVER OPERATING CHARACTERISTIC CURVE FOR PREVALENCE AND RISK FACTOR OF HYPERTENSION AMONG MEN IN NFHS-4, WITH AREA: 70.5%, 95% CONFIDENCE INTERVAL:70.1% –70.9%.

FIGURE 2: RECEIVER OPERATING CHARACTERISTIC CURVE FOR PREVALENCE AND RISK FACTOR OF HYPERTENSION AMONG MEN IN NFHS-5, WITH AREA: 71.1%, 95% CONFIDENCE INTERVAL:70.7% –71.5%
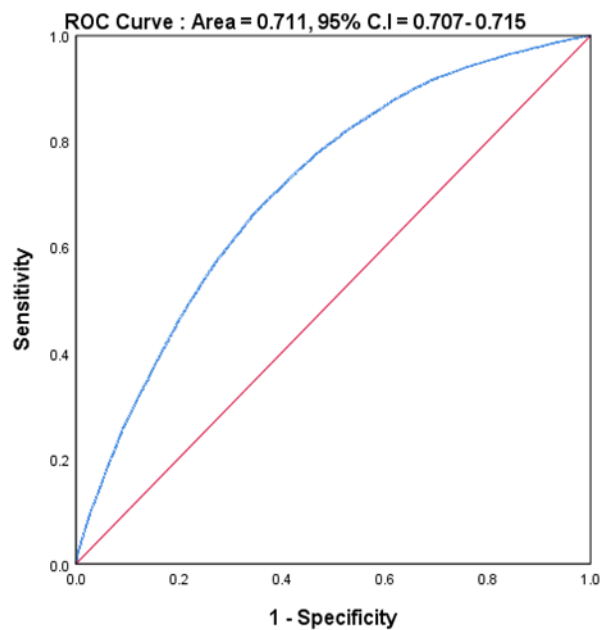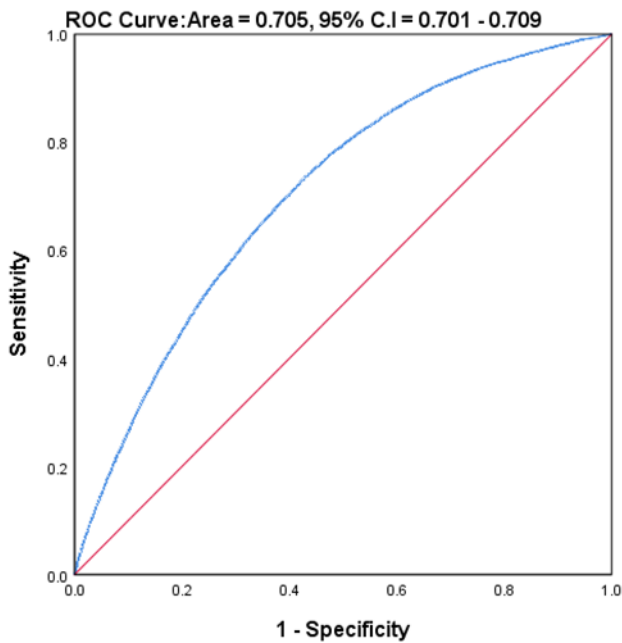
FIGURE 3: PREVALENCE OF HYPERTENSION AMONG MEN IN INDIA AND ITS STATE FROM NFHS-4 AND NFHS-5

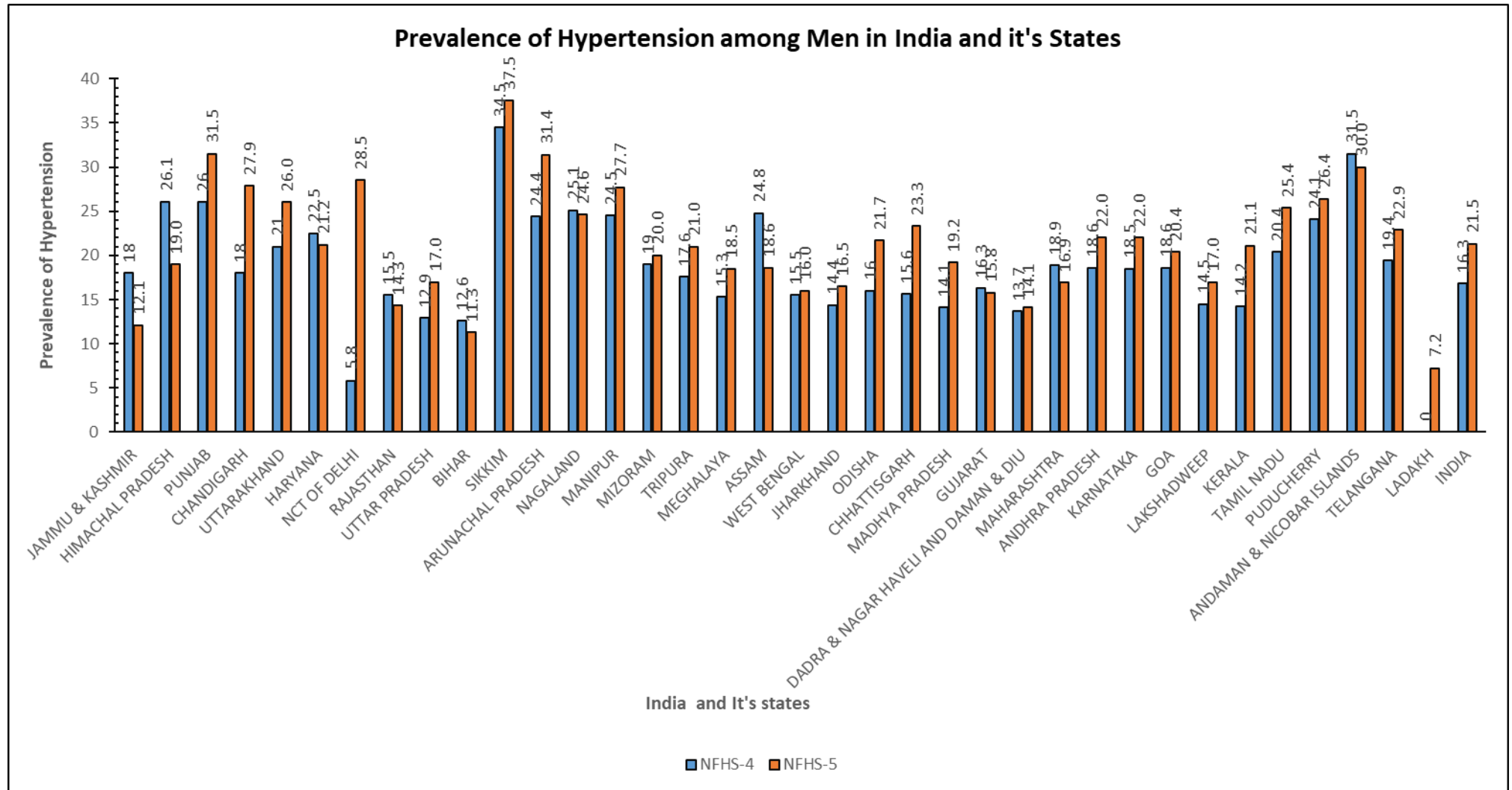Prevalence of Hypertension among Men in India and it's States

Figure 3 shows certain Indian states and union territories (UTs) exhibit a notable fluctuation in the prevalence of hypertension among Men from NFHS-4 to NFHS-5, as depicted in the bar graph. For example, the prevalence of hypertension was rising sharply in Chhattisgarh (15.6% to 23.30%), Kerala (14.2% to 21.10%), Odisha (16% to 21.70%), Madya Pradesh (14.1% to 19.20%), and Uttar Pradesh (12.9% to 17.00%) among the states. The states of Jammu and Kashmir (18% to 12.10%), Himachal Pradesh (26.1% to 19.00%), and Assam (24.8% to 18.60%) are showing a decrease in the prevalence of hypertension. some of the union territories (UTs) are reporting the highest prevalence of Hypertension found in the northern region of Delhi (5.8% to 28.50%) and Chandigarh (18% to 27.90%).

DISCUSSION

This research is an innovative effort to examine changes in the prevalence of hypertension and develop a statistical model for determining risk factors for hypertension among males 15-54 years in India using a nationally representative data set of NFHS-4 and 5. Moreover, the present study has also plotted the prevalence of hypertension by state in India. Targeting men and alcohol use is important when it comes to managing hypertension. The findings of the present study emphasized that the prevalence of Hypertension by all selected background characteristics is much higher in NFHS-4 to NFHS-5.

This present study showed that from NFHS-4 to NFHS-5 the prevalence of hypertension among men in the 15-54 age group was increased from (16.3% to 21.5%) [19]. Which is statistically significant. However, our research revealed that the odds of hypertension were rising as people aged which is statistically significant in both the rounds of NFHS 4 and 5, similar findings were also supported by earlier research [20, 21]. A potential cause for the increased incidence of hypertension in older age groups is a combination of a heavy workload and inactivity. Additionally, the walls of the arteries and aorta thicken with age, which raises blood pressure. In NFHS-4, the prevalence of hypertension was highest in men with higher education levels. This may be because these men mostly hold professional or clerical jobs and are less likely to engage in intense physical activity, have sedentary lifestyles, or consume higher-fat foods [22]. However, the prevalence of Hypertension with higher education in NFHS-5 reduced and this difference was not statistically significant. Previous studies also showed hypertension is higher among well-educated people as compared with illiterate [21, 23].

According to the study, people with employment have a higher chance of hypertension than people without jobs. While workers in farming and production have less exposure to an inactive lifestyle and engage in intense physical activity, professionals have fewer possibilities for physical mobility and lead sedentary lifestyles [3]. Furthermore, there is a statistically significant increase in the prevalence of hypertension among working-class individuals in both NFHS-4 and 5. WHO also supported workplace wellness initiatives as a means of reducing hypertension [24]. The occurrence of hypertension and odds of hypertension in scheduled caste and scheduled tribe is increasing from round 4 to 5. Which was statistically significant. Tribes often have lower levels of educational fulfillment, labor market possibilities, and social flexibility due to their historical exclusion from social and economic chances. Scheduled castes and tribes may be more susceptible to psychological stressors related to their socioeconomic disadvantage as a result of these structural causes. Psychosocial stresses have been linked to the development of chronic illnesses like hypertension using stress-related regulation mechanisms [25, 26].

The higher rate of hypertension in men living in urban areas is a statistically significant result because of their busy lifestyles, decreased physical activity, and stressful environments. It also shows that urban residents' prevalence of hypertension increased from the fourth to the fifth round of the National Family Health Survey. Hypertension of married men was higher in both rounds as well as odds of hypertension are significantly increasing. It may be because of increased responsibilities, a heavier workload, and less time spent on beneficial activities like regular exercise [22, 27]. Additionally, compared to the poorest groups the richest groups in our study had a higher prevalence of hypertension, a finding that has been confirmed by earlier research [21, 22]. NFHS-4 and 5 reported the higher prevalence of Hypertension in the richest group and it is statistically significant. However, in both surveys, it was discovered that using tobacco in particular was highly linked to an increased risk of hypertension. A few passages in the article supported our findings that smoking raises the risk of hypertension [28–30], although other epidemiological research has demonstrated a connection between current smoking with either the same or lower level of blood pressure [31].

Regular alcohol usage, particularly daily alcohol intake, has been linked to considerably increased odds of hypertension. The study also reveals a statistically significant increase in the prevalence of hypertension among alcoholic men in both rounds of the National Family Health Survey. Numerous academic publications backed up our conclusions that there is a significant association between alcohol use and a high prevalence of hypertension [21, 22, 32]. The northeastern and northern states pose the greatest risk from hypertension, followed by a few states in the southern region. High intakes of salt, tobacco, and alcohol have been linked to elevated blood pressure in the northeastern and northern states, according to a prior study [22, 33, 34]. The variation in dietary and cultural patterns amongst states is associated with variations in the prevalence and risk of hypertension at the state level [35]. The logistic regression model developed for healthcare professionals had a likely sensitivity and specificity of 70.0% and 60.3% from NFHS-4 and 5, respectively. However, if needed to meet the goals of the study (for screening or diagnosis), sensitivity and specificity can be changed [Figures 2 and 3].

While the study presents important information about hypertension, it has certain limitations. For example, the results are restricted to men aged 15 to 54. Furthermore, it ignores additional risk factors that may contribute to the high prevalence of hypertension in young adults, such as cholesterol levels, hereditary factors, obesity, stress, and anxiety. In addition, the cross-sectional data employed in this study were unable to explain the temporal link between the explanatory and outcome factors. Using a hierarchical modeling technique could improve regional differences' plausibility and discrimination.

CONCLUSION

This study made an effort to close a significant gap in the national and state studies on hypertension. The findings point to a sharp rise in the prevalence of hypertension in men in NFHS rounds 4 and 5, as well as some of the major risk factors for the disease in India. Consequently, these comparison studies may be useful for medical interventions aimed at slowing the progression of this illness. Apart from leading well-balanced lives and eating a healthy diet, workplace wellness programs for professionals, early detection of hypertension, and educating young people from impoverished communities such as rural areas or minority communities about the importance of health education could all be crucial preventative measures against hypertension. Therefore, it is crucial to concentrate on the prevalence and risk factors throughout India while developing strong health programs and policies for the management of hypertension.

ABBREVIATIONS

NFHS   National Family Health Survey
IIPS   International Institute for Population Sciences
MoHFW   Ministry of Health and Family Welfare
UTs   Union Territories
NCD   Non-communicable diseases
ROC   Receiver operating characteristic curve

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RESEARCH ARTICLE

DEVELOPING A FRAMEWORK FOR THE INDIA PHARMACEUTICAL SUPPLY CHAIN - RISKS ASSESSMENT THROUGH A FMEA APPROACH

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ABSTRACT

In recent years, specifically post COVID-19, pharmaceutical industry has gained a significant place in the healthcare domain. Pharmaceutical companies are important players in the supply chain of drugs. With increasing competition, growing population and changing complexities of type of diseases, the need of pharmaceutical products has swelled over time, making the sector prone to supply chain risks.

The purpose of this paper is to identify and access various risks in the pharmaceutical supply chain in the context of India. To attend this objective, a case of a major pharmaceutical company had been considered. Failure Mode and Effect Analysis (FMEA) has been used to identify and further prioritize these risks. Further Pareto analysis, also called as 80/20 rule, is conducted to identify the risks that are vital. The "80/20" rule suggested prioritizing 17 from 35 potential causes. Second level Pareto analysis identified 6 risk elements out of these 17 elements as most critical. Root cause assessment on these six risks is done through Five Why technique.

The results of this study exhibited that Inventory Planning Issues, Labour Issues, Insufficient Storage Space, Raw Material Availability Issues, Inappropriate Forecasting, Communication Issues were the most critical issues in the pharmaceutical supply chain. The major cause to the eruption of these risks is improper Sales and Operations Planning (S&OP).

This study suggests that the managers of the pharmaceutical supply chain should first understand the various risks in the supply chain that can disrupt the function. Further through prioritization of risks, the losses or the delays in the supply chain can be reduced.

KEYWORDS

Failure Mode and Effect Analysis (FMEA), pharmaceutical supply chain, inventory management, capacity planning, production planning, supply management, communication.

INTRODUCTION

Pharmaceutical products have been significant for ages to treat diseases. The pharmaceutical industry has grown through a long and complex journey from herbal remedies to laboratory made compounds. Over decades, many companies have come up bringing innovations and life-saving medicines. Today this industry has become a multi-billion-dollar global industry. The success of this industry lies not only in creating right medicine but ensuring that it is channelled to the ultimate patient on time. This process includes sourcing of raw material, production, inventory, distribution and delivering the medicines to the patients. This is referred to as the pharmaceutical supply chain. This

supply chain poses challenges and risks. It becomes imperative for the researchers to study these risks and create models that may support supply chain decision makers to design a risk-free supply chain. A supply chain is a network between an organization and its suppliers involved in supplying and distributing a particular product to the ultimate consumer. This network includes completely different activities, people, entities, information, and resources [1]. The supply chain also represents the steps to urge the merchandise or service from its original state to the customer. The measures incorporate moving and reworking raw materials into finished products, transporting them, and distributing them to the end-user. The entities concerned are producers, vendors, storage locations, warehouses, logistics companies, retailers, and distribution centres or outlets [1]. Firms develop supply chains to scale back their prices and stay competitive within the business landscape.

AN OVERVIEW OF THE GLOBAL PHARMACEUTICAL INDUSTRY

The global pharmaceutical market is projected to grow at 5.8% to $1170 billion in FY 2021. The factors such as policies laid down by the government and insurance companies, the attitude of customers, affordability of drugs, and prevalence of diseases affect the size of the pharmaceutical markets [2].

Advancements in medical infrastructure and rising incomes have led to a levelled–up growth trajectory for pharmaceutical companies. Reduction in the prices of drugs and low taxes in the US, regulatory entry barriers being lowered for the new drugs in the US, over 6 % growth in the GDP of India and China, an increase in the chronic disease prevalence due to sedentary lifestyle and widespread population aging are the some of the political, economic, social, technological, legal and environmental factors boosting the pharmaceutical market [2].

The restraints faced by the pharmaceutical industry in the launch of significant new products that are high priced are due to high failure rates, the massive cost of development of the new product, and diminishing returns on investments [2].

THE INDIAN PHARMACEUTICAL INDUSTRY

India's pharmaceutical industry is the third-largest producer (by volume) of drugs in the world and manufactures 60% of vaccines globally [3]. India has emerged out to become a global provider when it comes to generic drugs. India

exports its pharmaceutical products to over 200 countries worldwide, including developed countries like the US, Western Europe, Japan, and Australia. These countries especially have a very highly regulated market [3]. The Indian pharmaceutical sector supplies fulfil fifty percent of global demands for various vaccines. Twenty-five percent of all the medical requirements in the UK and 40 percent of the market for generic drugs is met by the Indian pharmaceutical sector supplies [4]. The US $ 100 billion is the expected mark up to which the Indian pharmaceutical sector would grow, while the US $ 25 billion is the expected mark up to which the Indian medical device market would grow by 2025. From the US $ 19.14 billion in FY 2019, pharmaceutical exports from India have risen to the US $ 13.69 billion in FY 2020 (Jan 2020). Thirty percent of the US $ 70 – India captures 80 billion Market of US generics by volume, which accounts for approximately 10 percent by value. India enjoys the luxury of exporting drug formulations, intermediates, bulk drugs, biologicals, surgical, and Ayush & herbal products [4]. Because of the availability of a workforce that is highly professional and technological developments, India has a solid manufacturing base. And because of communication and network development, the marketing and distribution system is also robust [3].

The domestic turnover, however, has increased 9.8% from Rs. 129015 crores in 2018 to Rs. 1.4 lakh crores in 2019. The projected growth over the next five years is 9 – 12% for medicine spending, which would lead India to the list of top 10 countries in medical expenditures. To reduce costs and healthcare expenses, the Indian government has taken many steps. The primary focus is the rapid introduction of generic drugs in the market [4].

CURRENT STATE AND THE CHALLENGES IN THE PHARMACEUTICAL SUPPLY CHAIN & LOGISTICS

A few generic challenges that a pharmaceutical industry faces are product line expansion to beat generic and non – brand manufacturers, smaller spans for new product development, and their approval. Further launching new innovative pharmaceutical products, continual quality improvements, and maintaining a global supply network for a more significant number of manufacturing plants, distribution and sales channels [5]. The liberalized FDI limits are being implemented with minimal attention given to the investments in research and development within the country. . The link between academics and the industry is weak. The expenditure on healthcare by the Indian households is puny. A significant threat to the

pharmaceutical industry is posed by manufacturing fake medicines or low–quality medicines. Apart from this, the undue pressure exercised by the government over pharmaceutical manufacturing companies to regulate price as per the Drug Price Control Order hamper the profitability of the companies. Small business companies face a threat from the new MRP-based excise duty regime [3].

The industry lacks a stable pricing and policy environment. The domestic pricing policy in India changes frequently and unexpectedly. Hence there are many uncertainties in the background for investments and innovations. To build a more robust platform for pharmaceutical companies, Indian regulators and the industry stakeholders should improve communications [6].

The Indian pharmaceutical market, though, depicts some unique characteristics.

- Essentially, it is the branded generics that reign the markets.
- Because of their early investments in the market and formulation development capabilities, many local players enjoy dominating positions over the market.
- Due to intense competition, the prices are low [7].

Since not much attention is paid to the supply chain by the pharmaceutical companies, the visibility is relatively low. The continual improvement concepts are not practiced in the industry. There is much of an acceptance of the current service levels when it comes to the logistic services.

Companies usually turn towards logistics service providers to overcome the negligence in collaborations between warehouse managing systems and Information Technology (IT) integration capability.

The pharmaceutical supply chain can get a lot more complex and need to be highly standardized and regulated. Increased competitive pressure, integration of IT, cost containment, managing regulatory changes, improving quality of service, and supply chain visibility are some of the biggest challenges posed in the pharmaceutical supply chains in the years to come. Investments by the pharmaceutical companies in new and advanced technologies would bring about greater flexibility, ensure the quality of products is maintained, and increase customer satisfaction. Above all, the production

lead time would be reduced, increasing the overall responsiveness [8].

The challenges faced by pharmaceutical companies are collaboration concerns, making the supply chains proactive, controlling temperature, maintaining standards, and imparting flexibility to the supply chain [9]. The effective alterations (increase or decrease) within the aggregate production or the ability to make rapid switches in the output of a particular product to another, as a result of response to the changes in customer demand, reflects the flexibility or agility in a supply chain.

Managers need to make their decisions by balancing the trade-offs between forecasts, stock levels, planning, procuring, financing, and marketing strategies to achieve their goals. Inaccurate forward forecasts, increased lead times, and reduction in optimum target inventory result in unnecessary increments in supply chain costs that need to be addressed within a pharmaceutical supply chain. Developing collaborative partnerships with various stakeholders, investing in advanced technology and IT could provide relief. These can help provide comprehensive insights which would lead to effective decision-making.

This research work is directed to study this supply chain and further identify the risks in the supply chain. With this as the core, the research questions that this study aims to answer are as follows:

Research question 1: What are the various risks that impact and disrupt the pharmaceutical supply chain?

Research question 2: From the pharmaceutical supply chain identified, which are those risks that are the most critical in the system and what are the root causes to the risks identified?

LITERATURE REVIEW

Pharmaceutical companies face risk mainly from supply and suppliers. Most of reported risks were related to supply and supplier issues. Further financial risks, regulatory issues are other risks that disrupt the supply chain in this sector [10]. A study presented the SWOT analysis of the Indian pharmaceutical industry where varying regulatory requirements across domestic and export markets, Increased competition, Poor supplier service and

Uncertainty in demand are identified as the major threats [11].

The pharmaceutical industry consists of enormous research and development-based MNCs mainly focusing on branded products. Their focus is generic manufacturers, producing over the counter as well as out–of–patent ethical commodities, local manufacturers, which make the branded products under contracts/licenses as well as generic products, along with biotech and drug discovery companies and new emergent institutes which do not have manufacturing capability [12].

The planning and management of all the tasks that come under sourcing, procurement, conversion, and logistics are defined as supply chain management by The Council of Supply Chain Management Professionals [13]. The supply chain is that link that connects the market to the development of a new product. Supply chains are required to be continuously improved to improve their operational efficiencies and reduce costs.

Supply Chain Management incorporates processes like managing customer service, demand, the flow of material, and distribution to improve the Production of a good or service. It is a combination and coordination of business activities that control the flow of material and information from supplier to customer and back again [14].

Systematically and strategically coordinated business functions have tactical interdependence within the organization itself and with all its business partners to achieve improvements in the organization's performance. Material handling, storage, warehousing, picking and packaging, inventory management, transportation, logistics, and distribution are typical management system [5]. Earlier, pharmaceutical companies did not pay much attention to supply chain management, but now, they have altered their way of conducting business due to

competitive advantage. A pharmaceutical supply chain comprises primary manufacturers, secondary manufacturers, distribution centres or warehouses, wholesalers, retailers, or hospitals [15].

A FUNCTIONAL LAYOUT OF A PHARMACEUTICAL SUPPLY CHAIN

A functional view of a supply chain consists of three levels: execution, planning, network, and execution. Planning is of inventory planning and forecasting of pharmaceutical requirements. Network-level has connections between suppliers, manufacturers, distributors, and customers. Transportation and order processing are part of the execution phase [16].

The materials that constitute chemicals that construct the molecules are manufactured by primary manufacturers [15].

Primary manufacturers formulate and manufacture active pharmaceutical ingredients (API) and other inactive materials in the standard dosage forms. These APIs are then converted, filled and packed, by secondary manufacturers, in different Stock Keeping Unit (SKU) configurations. In other words, secondary manufacturers do further process on these primary constituents and, ultimately, their packaging. Finished pharmaceutical SKUs are then moved from manufactures' stores further [8].

The pharmaceutical supply chain also incorporates other secondary drug manufacturing centres, the primary and specific other local distribution centres, the customer contact zones, including hospitals, clinics, and pharmacies, and transhipment of these drugs between the regional distribution centers as shown in Figure 1 [15].

Supply Chain Management is mainly responsible for maintaining consistency, reliability, and continuous improvement within the workflows in any organization [5].

FIGURE 1 PHARMACEUTICAL SUPPLY CHAIN SOURCE: [17]
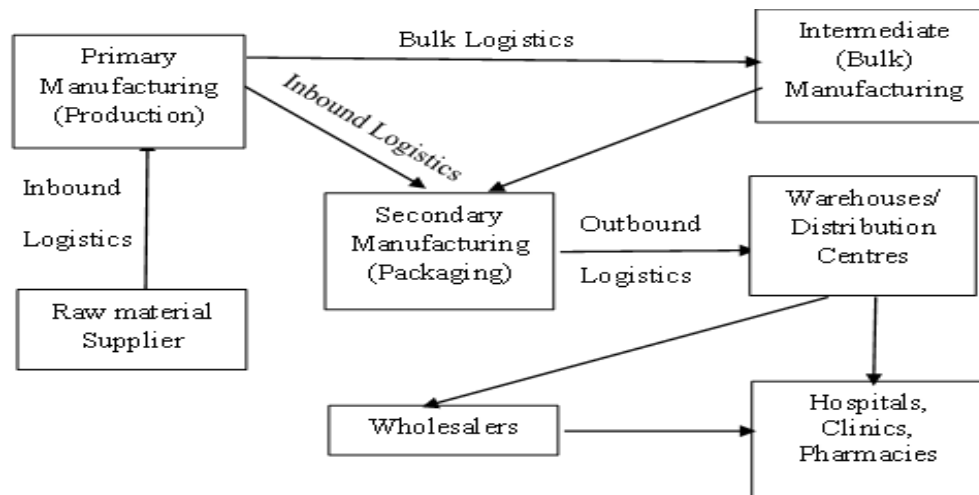
The operational decisions in the pharmaceutical industry are usually based on product strategy rather than market strategy. These operational decisions could be enlisted as Production of a derivative product at one facility, centralization of Production or reduction in the production facilities, identification of distribution centres, designing an optimal distribution network, etc. [18]. The tactical decisions include the decisions on the extent of optimization of the material flows and the time frame. The motive behind these decisions is minimizing the total costs and fulfilling the demand [19]. The typical business process adopted by various companies of this sector begins with demand management, inventory management, distribution requirement planning, secondary production planning, and scheduling, primary manufacturing campaign planning.

Demand management – based on historical data, market or customer intelligence, and trend analysis, forward forecasts are developed (typically 3 – 24 months).

Inventory management and distribution requirement planning – is the forward forecasted demand is imposed over the appropriate distribution centres or warehouses. The inventory of finished products available is assessed, and upstream orders are placed to the secondary production facilities if required.

Secondary production planning and scheduling – orders received are first planned using Manufacturing Resource Planning tools such as strategic business plan, sales & operation plan (S&OP), master production scheduling, Materials requirement planning, etc., and then scheduled in detail.

Primary manufacturing campaign planning – The final inventory management and production planning is carried out at this stage according to which product manufacturing takes place at the manufacturing facility [20].

PHARMACEUTICAL SUPPLY CHAIN RISKS

A risk can be said to be a disruption, vulnerability, uncertainty, disaster, peril, or a hazard, and any event which causes or has a potential to cause trouble, thus affecting the efficient management of the supply chain network can be broadly termed as a Supply Chain risk [21]. Supply chain risks can be broadly classified as organizational, network, and other environmental risks about natural and artificial disasters [22].

They can also arise due to physical, economic, social, political, or legal environment and affect the supply chain outcome variables. It is not very easy to predict these with certainty [22].

Supply chain risks can also be categorized as macro-level risks, Demand management risks, Supply management risks, Product/service management risks, and Information management risks.

Here, the **Macro level risks** arise due to natural disasters, epidemics, political unrest, terror activities, government impositions, lack of human resources.

Product/service management risks involve costs incurred due to either inventory holding or underutilizing the existing capacities.

Information management risks occur when demand forecasts are erroneous, or information sharing and IT systems fail or get distorted [23].

A pharmaceutical product manufacturing company converts the raw materials it procures into final products. In this process it encompasses designing of their product, selecting the raw materials for conversion to products and sequencing the unit operations and procedures that the raw materials undergo to form the product.

The demand in the market needs to be catered to effectively and efficiently by a manufacturing company. Thus, a manufacturing company needs to pay significant attention to the lead times.

The first risk encountered by pharmaceutical companies is a raw material shortage. So, to reduce the lead times, the causes of raw material shortages and their consequences need to be taken care of in the first place [24].

Pharmaceutical supply chain risks are primarily associated with discontinuity of product or shortages in the product supplies, poor performance, errors in dispensing of products, technological errors, etc.

If the risks are not mitigated timely, they can destroy public health confidence, impact the health and safety of a patient, the company's reputation, and thereby a decrease in profit margin and shareholder value [12].

Though it is impossible to do away with the supply chain risks encountered in the day–to–day operations of a pharmaceutical company, it is possible for these companies to build an environment to make their supply chain more responsive to risk mitigation [25].

The challenges in a pharmaceutical supply chain mainly arise due to adopting either a market-focused strategy or a product-focused strategy. There are innumerable decisions that help the company sustain and perform in the market as well as maintain a competitive advantage: Production of a particular derivative product at one specific facility, centralization of output in a specific manufacturing facility, reduction of manufacturing facilities, identifying the distribution centres and optimizing the distribution network [5].

The process of manufacturing has become more complex and dynamic and has increased uncertainty because of global sourcing and distribution, which has brought in international integration and interdependence. The pharmaceutical supply chains have thus become far lengthier, complex, more vulnerable, less predictable, and thereby riskier. These supply chains are, therefore, more prone to disruptions [26].

The supply chain risks encountered by the pharmaceutical companies can be divided into the following categories [26]:

* Supplier selection risks range from Supply and supplier issue, Partnership with supplier, Raw material quality, Ordering cycle time to Information systems.

* Organizational and Strategic risks range from Technology development, Flexibility in delivering, Flexible quantities, Organization & process to Mergers and acquisition.

* Financial risks range from Tax payable changes, Currency rate, Financial risks, Tariff policies changes, Cash flow to Interest rates.

* Logistic risks range from Transportation quality, Delivery reliability to Timely delivery

* Market Risks range from Market, Consumer's taste to Demand.

Environmental risks range from Natural disaster & terrorism, Political issues, Sanction to Regulations.

RESEARCH GAP

The pharmaceutical industry has grown significantly over the past few years and still is at its peak. The drivers of growth of the industry can be traced back to its investments in innovative Research & development, infrastructure development, strong manufacturing of drugs, and creating strong demand in the market.

The industry is venturing into developing more and more complex generic drugs, which form an extensive product portfolio in domestic and global markets.

It has also made substantial infrastructural development when it comes to establishing US – FDA compliant plants. The highest number of US – FDA compliant plants outside the US are owned by India.

India has by now gained expertise in the manufacturing of low–cost generic drugs, which are patented and are now moving towards the complete end–to–end manufacturing.

Several schemes have come up that increase the demand domestically by increasing domestic healthcare spending. In the current scenario, the contribution towards the growth of pharmaceutical industries is dependent on:

- Increase in healthcare financing products

- Rising demands of generics

- Increased outsourcing activities

- Increase in demand for emerging market segments

The pharmaceutical industries have been frequently studied on their issues regarding demand uncertainties for existing drugs which might be due to the competitive environment in the market, delays in the launch of new products due to new medications being in pipelines, inefficient process development, improper yield optimization, long cycle times, ineffective capacity planning, improper network designs affecting the logistic networks, wrong plant design, etc. [20].

Pharmaceutical companies are now struggling with more significant problems like quality and regulatory issues, product proliferation issues, supply chain fragmentation, and infrastructure gaps.

These factors ultimately boil down to an assessment of downstream process issues such as procurement, manufacturing, logistics, pricing regulations, vendor selection and management, centralization/ decentralization decisions, complex unequipped distribution networks, inefficient transport, storage, power infrastructure, and underdeveloped infrastructure technology.

These factors need to be studied carefully and closely. The issues cropping up in these processes lead to varied impacts on the business. They can cause disruptions, making the company extremely vulnerable, uncertain, and may result in a more significant aspect of turning into a disaster, peril, or hazard.

These risks need to be studied in depth to make a supply chain resilient. A supply chain should be such that it can stay prepared for any events that are unexpected and effectively be able to respond and recover from any such events. They should be such that they can bounce back to their original functioning quickly and grow to better levels of performance.

For this, these risks need to be identified in the first place. This should be the prime focal point. A long–term perspective should be kept in mind of making the supply chain more proactive, more prepared, and more flexible towards the potential threats.

The risks need to be systematically laid out and assessed for their impacts on the firm's business. Quantification of these risks is essential to measure their effects. Only once the risks are quantified it possible to build a mitigation strategy to eliminate or control these risk factors.

The companies need to prioritize what issues they need to cater to on an immediate basis and what problems can be dealt with later. For this, they would have to identify the criticality and the probability of the risk factors. Based on this, the company would then decide whether to avoid, accept, reduce, control, or transfer the risk.

To sum up, researchers over the globe have been focussing on working on the risks encountered by the supply chains under various industry domains, including the pharmaceutical industry. The literature for various risks posed to the supply chain operations is easily acquirable as well as easily available over various platforms. The gap lies in the redressal of these risk factors.

A detailed evaluation of the risk factors needs to be carried out in order to formulate risk mitigation strategies. This would be the area of study of this research paper.

Other significant research gaps through literature review are identified in Table 1.

TABLE 1 RESEARCH GAPS

Objectives of the paper	Research gap	Authors
The paper aims at systematically reviewing the research on management in the pharmaceutical supply chain.	Authors suggest future research directions in supply chain integration in the pharmaceutical on topics of growing academic and corporate interest.	[27]

The paper aims at identifying the performance indicators of the resilient pharmaceutical supply chain and further predict the resilience level for a certain time period in the context of Bangladesh.	This research work considered only 12 indicators of the supply chain. Authors suggested more indicators should be analysed to develop the model.	[28]
The study aims to explore the downstream pharmaceutical supply chain (PSC) and provides insight to the delivery process of medicines and associated operational inefficiencies.	Since the study focussed only on the downstream domain of the pharmaceutical supply chain, it excluded those specialists operating within the upstream and central supply chain.	[29]
This study aims to access, analyse and highlight opportunities and problems of the Indian pharmaceutical sector.	The authors suggested further research interviews with experts in identifying and analysing the problems in pharmaceutical sector.	[30]

MATERIAL AND METHODS

RESEARCH FRAMEWORK:

FIGURE 2: RESEARCH FRAMEWORK
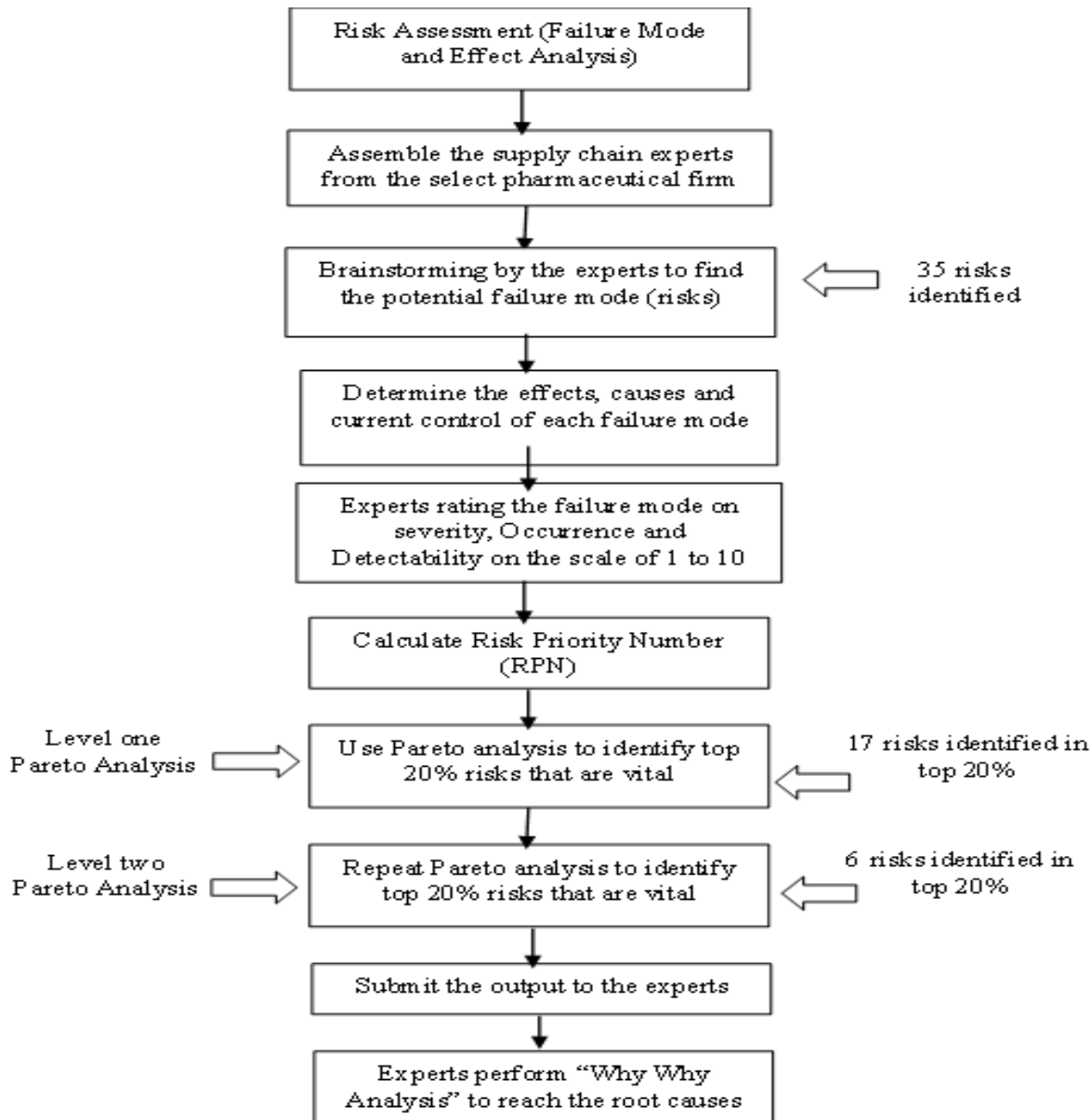
The research study carried out would give a holistic view of the risks a pharmaceutical supply chain typically encounters. These potential threats need to be minimized. In other words, these potential threats need to be prevented before they actually happen. These threats need to be identified, addressed, and monitored. The study seeks to gain an in-depth knowledge of the pharmaceutical supply chain functions and operations. The process flows within the supply chain of the pharmaceutical company are bound to have certainvulnerabilities, uncertainties, or activities, which have the potential to cause a disaster, peril or a hazard, or disruption.

These activities or events termed as risk need to be identified in order to ensure the smooth functioning of an organization. For an organization to be able to survive in a situation of crisis, keeping up its business along with gaining confidence amongst its stakeholders, mitigation of these risks is extremely necessary.

In the subsequent research work, the risk parameters with a view to quantifying these risks will be studied. This quantification would be the basis for any further analysis. The study identifies all possible failures in the design of a particular supply chain of the pharmaceutical company. These failures are assigned priority depending upon either their seriousness, their frequency, their detectability, or the consequences of these failures. The purpose is the identification of these risks in order to lay a foundation for further study on the means to either eliminate or reduce the impact of these. The severity of the risk is calculated in the subsequent stages of the research study.

This study also acts as a tool for implementing continuous improvements within the supply chain functions and operations. This research study also gives a deep insight into the performance of the sample firm. It would help to judge a company's strategic, tactical and operational decision–making capacity. The study would also address the pharmaceutical supply chain issues such as:

1. Counterfeiting issues

2. Manufacturing issues – raw material issues, quality issues, production planning issues, improper labelling, packaging

3. Transporting issues – mishandling, improper temperature controls, improper mode of shipping

4. Storage and warehousing issues - mishandling, improper temperature controlling

5. Raw material supplier issue – poor quality, high levels of an impurity, improper labelling, packaging

The company might use this data for making further alterations in their strategies or developing a new mitigation plan altogether.

DATA COLLECTION METHOD & DATA COLLECTION

For identification of supply chain risks in the supply chain, a detailed investigation of literature was done. The publications in the literature analyzed for this study range from 2010 to 2023 and are related to various subjects relevant to supply chain management, the expansion of the pharmaceutical business, and its problems, especially in the Indian context. Only studies that directly addressed issues in pharmaceutical supply chains regarding risk management and associated operation challenges were included; excluded are those that were neither relevant to the topic of study nor conducted within the set time frame. The risks identified were further validated by supply chain experts. The data collection instrument considered for this research report in the preparation of a questionnaire suitable for a case study method. An intensive investigation of the particular unit under consideration was carried out. A pharmaceutical company was selected to study the supply chain risks. Further, the selected unit is studied intensively. The respondents were the supply chain professionals from the pharmaceutical company who were interviewed in order to tap the company's data in the FMEA template and validate the risks identified through review of literature. Based on the study, a template of a questionnaire called the FMEA or Failure Mode and Effect Analysis was formulated.

The FMEA or the Failure Mode and Effect Analysis was formulated by enlisting all the risks or synonymously called potential failures. All of these come from various functions of the entire Supply Chain of the sample company and might cause serious implications as enlisted (potential failure effects). In order to quantify these risks, their Severity (S), Occurrence (O), and Detectability (D) need numerically measured on a predefined scale. Apart from this, all the probable causes of the failure and means to control these failures need to be recorded. The Risk Priority Number (RPN), which is the product of S, O, D, is thereby calculated for the risk assessment, followed by a recommendation of actions to reduce the occurrence of or prevent these failures.

Further Pareto analysis, also called as 80/20 rule, is conducted to identify the risks that are vital. Second level Pareto analysis is further conducted to prioritize the most critical elements. These risks are then subjected to Five Why technique to find the root cause of the vital risk elements.

DATA ANALYSIS & INTERPRETATION

The purpose or objective of carrying out the Failure Mode and Effect Analysis was to discover the risks in the Pharmaceutical Supply Chain of the subject company. Once the process of detection of these risks is complete, the next step is to assess these risks and prioritize them. Post the assessment and prioritization, and these risks then need to be mitigated. For this, they either need to be accepted as they are, avoided, transferred, or shared or reduced. This should then be followed by monitoring and control of these risks so that they don't turn into hazards for the smooth operation of the organization. The risk identification was made by an extensive literature review, post which the FMEA data collection sheet was formulated. This sheet then facilitated the assessment of each of the risks of the subject company by evaluating its severity, frequency of occurrence, and detectability.

The Failure Mode and Effect Analysis sheet not only tells us the severity, occurrence, and detectability of potential failures (risks) but also the current controls being employed in order to prevent or detect these failures or risks. Based on these controls being used currently, actions are recommended so as to reduce the occurrence of these failures or risks. Hence, the first step after obtaining the data is to analyze the current controls and recommend actions keeping in mind the long–term resolution of these risks

TABLE 2 FAILURE MODE AND EFFECT ANALYSIS OF THE SUPPLY CHAIN OF PHARMACEUTICAL FIRM

Process Step/ Input	Potential Failure Mode	Potential failure Effects	Severity S (1 - 10)	Potential Causes	Occurrence O (1 - 10)	Current Controls	Detectability D	RPN S*O*D	Recommended Action
PROCUREMENT/ SUPPLY SIDE	Raw material supply problems	Production disruption	6	Partnership issues with supplier	2	Engagements	2	24	VRM (Vendor Relationship Management)
				Raw material availability issues	4	Sales and Operations planning	5	120	Effective Sales and Operations planning, Safety stocks, and Norms.
				Raw material quality issues	3	Quality Parameters	1	18	Quality and R&D interventions if frequent issues.
				Inappropriate Ordering cycle time	2	Order Management	3	36	Strengthening Planning Process
				Inappropriate forecasting	4	Forecast Accuracy	5	120	Reduce Bias and improve the consensus process.
				Contract and agreement issues	2	Legal Checks	1	12	Legal Intervention
				Issues with Certificate of Good Manufacturing Practices	1	Regulatory Checks	1	6	Regulatory Intervention
				Delivery reliability issues	3	Logistics OTIF	5	90	Logistics metric review and alternate vendors
				Technological issues	1	Engagements	1	6	IT interventions
				Communication issues	4	Engagements	5	120	Strengthening Planning Process and engagements
				Processing equipment failure	2	Engagements	2	24	Manufacturing and Technology interventions
MANUFACTURING	Production failure	Inadequate product quality	8	Raw material shortage	4	Sufficiency logic	1	32	The planning process, PR>PO>Delivery
		Non - adherence to	8	Inappropriate packaging material	7	Sufficiency logic	1	56	The planning process, PR>PO>Delivery

	the production plan		Improper packaging quality	2	Quality Parameters	2	32	Quality and R&D interventions if frequent issues. Alternate Vendor.
			Inventory planning issues	5	Sufficiency logic	4	160	The planning process, PR>PO>Delivery
	Production of rejects/ Non - compliant batch	8	Insufficient storage space	6	Capacity Metric	3	144	Floor layout and Push/Pull balancing
			Technological issues	2	Reactive, Operations Halts	6	96	Predictive Maintenance Logics
			Labor issues	4	Attendance logs	5	160	Contracting and alternate vendor
DISTRIBUTION	**Poor warehousing** Increased inventory carrying costs	4	Underutilization of floor & cubic space	4	Warehousing Metric	2	32	WMS implementation
			Inventory planning issues	4	Inventory Metric	2	32	Optimized Inventory Norms
	Customer loss	4	Labor productivity issues	4	Attendance logs	5	80	People Productivity metric. Log-based.
			Inappropriate material handling	2	Damage Metric	2	16	Process and SOP management
			Poor inventory turnover	5	Inventory Turns metric	2	40	Optimized Inventory Norms
	High warehousing costs	4	Prolonged order filling time	4	SLA metric	4	64	Process and SOP management
			Documentation issues	2	Order Processing Metric	4	32	Process and SOP management
			Excessive stock-outs	3	Service level Metric	1	12	Optimized Inventory Norms
			Overstocking	6	DOH and Ageing	1	24	The planning process and adherence
	Logistic failure Increased logistics costs	6	Rate negotiation issues	2	Logistics comparisons	2	24	Reverse auctions
			Inefficient carrier evaluation and selection	4	Manual Intervention	4	96	Load optimizer and recommender
			Vehicle scheduling issues	2	call based	4	48	Integrated solutions for calls
	Customer dissatisfaction	6	Route planning issues	3	Customer SLA	4	72	Vehicle and route optimizer
			Freight consolidation issues	4	Customer SLA	4	96	Load optimizer
	Sales loss	6	Improper shipment scheduling	3	Customer SLA	4	72	TMS, E-POD, digital customer feedback
			Inappropriate material handling	1	Customer SLA	4	24	TMS, E-POD, digital customer feedback
			In-transit damage issues	2	Damage Metric	2	24	Process and SOP management

On the basis of the scores assigned to severity, frequency of occurrence, and detectability of each of the tabulated risks, a Risk Priority Number (RPN) was generated. This number further facilitated to prioritization of the risks in the Pharmaceutical Supply Chain of the subject company. In order to prioritize the potential causes that were responsible for the failure of Pharmaceutical Supply Chain functions, the Pareto Analysis method was used. For the application of this analysis tool, the Risk Priority Number (RPN) was arranged in the descending order that is the largest Risk Priority Number (RPN) was put on the top of the list while the smallest Risk Priority Number (RPN) was placed at the bottom. This was followed by the calculation of a cumulative percentage and the plotting of a graph as shown in Figure 3. The "80/20" rule suggested prioritizing 17 from 35 potential causes.

FIGURE 3 FIRST LEVEL PARETO ANALISIS
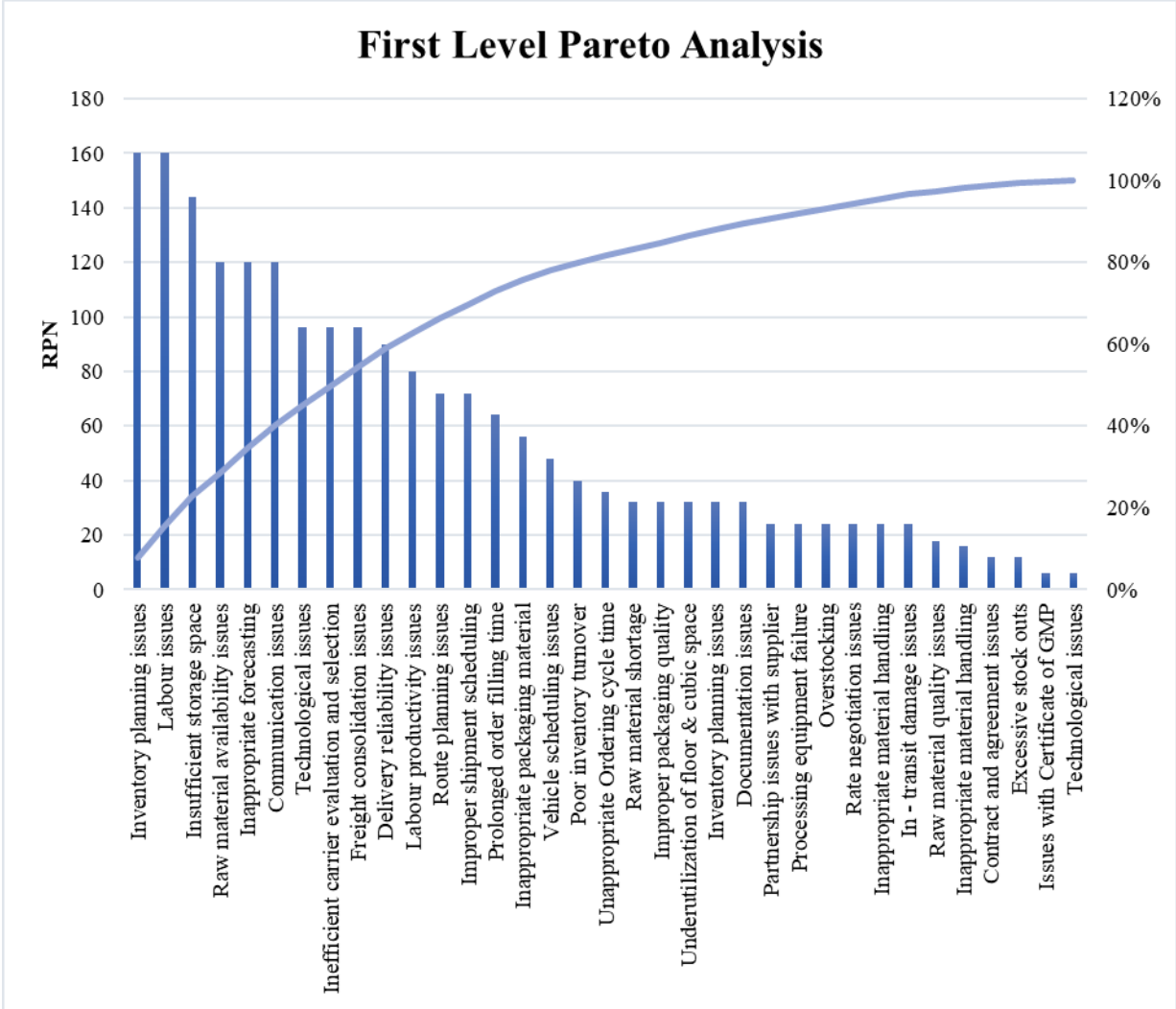
FIGURE 4 SECOND LEVEL PARETO ANALYSIS
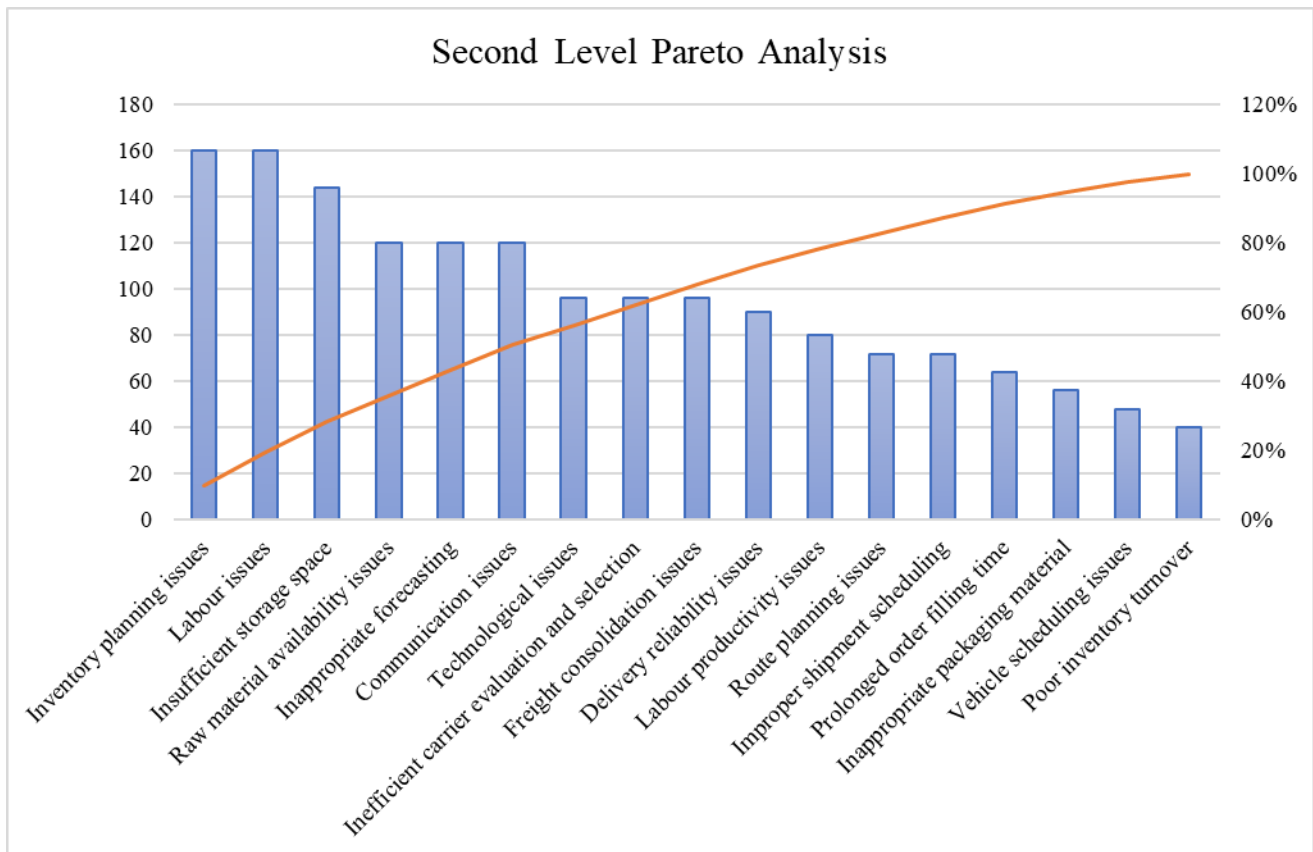
For further ease of analysis, 6 out of these 17 causes were further prioritized using the Pareto Principle as shown in Figure 4. Since the ratio may not always be 80/20, the ratio used for the second analysis is "50/50" This set of risks as prioritized in the Pareto analysis is used further by an Extended 5 Why Analysis technique to identify the root cause of the potential problems.

EXTENDED 5 WHY ANALYSIS

The Five Whys technique is a humble but influential way to troubleshoot problems by exploring cause-and-effect relationships [31]. Top six potential causes of failure of Pharmaceutical Supply Chain functions, namely – Inventory Planning Issues, Labour Issues, Insufficient Storage Space, Raw Material Availability Issues, Inappropriate Forecasting, Communication Issues, were considered for this analysis. To find a root cause of failure of Pharmaceutical Supply Chain functions, the "5 Why?" technique is used.

FIGURE 5: EXTENDED FIVE WHY ANALYSIS
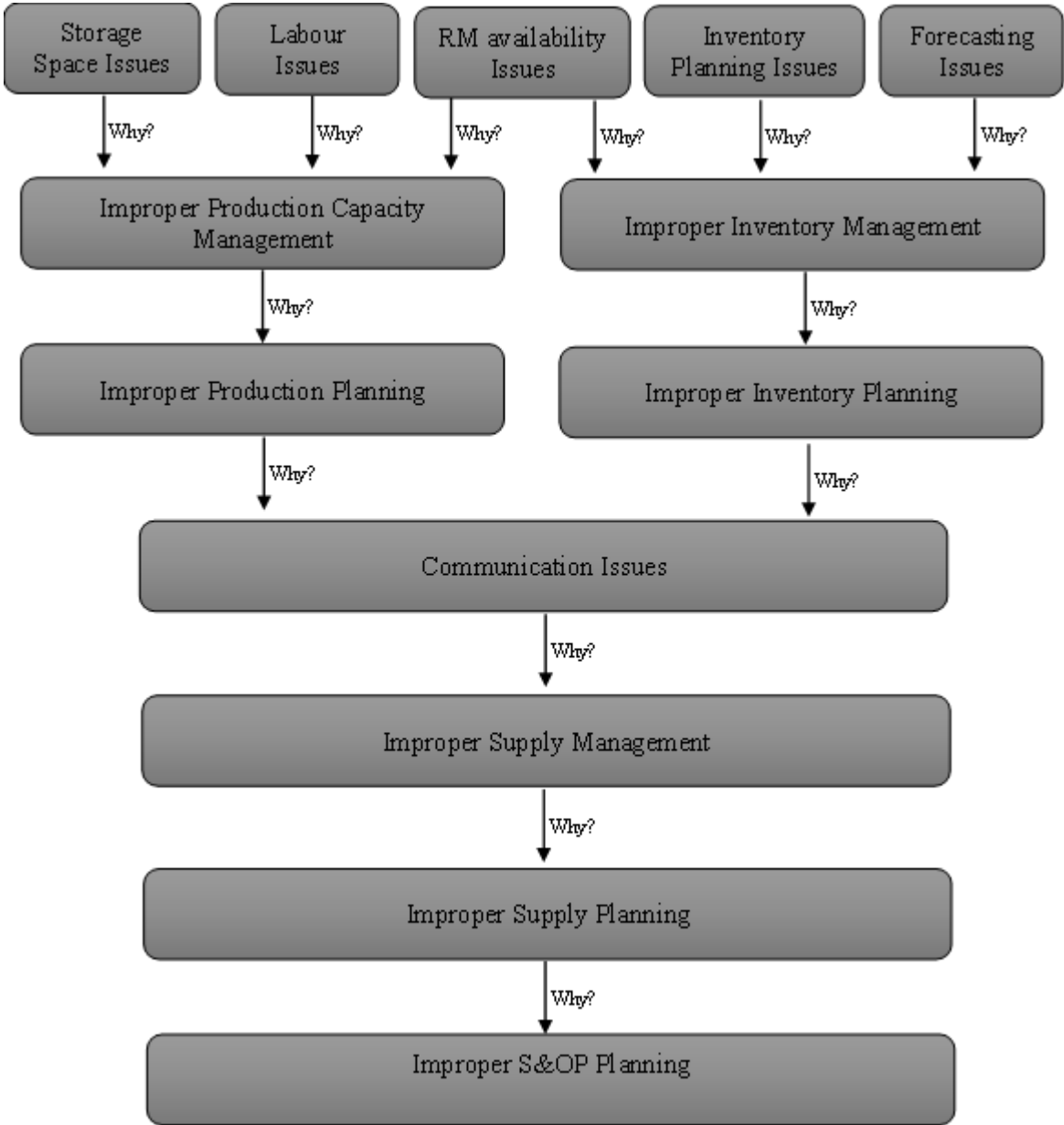
RESULTS & FINDINGS

FMEA and further 5Why analysis lead to the dominant cause of disruption the supply chain. Storage space issues and labor issues arose due to improper production capacity management, while the inventor planning issues and forecasting issues arose due to improper inventory management. Nevertheless, both improper inventory management and improper production capacity management were responsible for issues related to the unavailability of RM (Although improper inventory management does not directly cause forecasting issues, the issues related to improper forecasts can be curbed using an effective and efficient inventory management system).

Improper production capacity management and improper inventory management can be traced back to being caused by improper production planning and improper inventory planning, respectively. These, in turn, arise due to the lack of healthy communication while planning.

While the paper [29] highlights financial, communication, waste and complexity issues were the major concerns, this research work has extended the findings to improper Sales and Operations Planning disrupting the pharmaceutical supply chain.

The communication issues arise out of improper supply management because of improper supply planning, which

in turn happens due to either the communication issues or improper planning during the Sales and Operations Planning (S&OP) meetings.

DISCUSSION AND CONCLUSION

It is noted that S&OP process is the root cause to other supply chain issues in the pharmaceutical firm. Hence S&OP meetings may support proper planning of the supply chain. Pre – S&OP meetings should be aimed at the identification of gaps between the demand to be fulfilled and the supply. It should provide a means for conflict resolution among the two so as to keep up to the commitments and efficiency of both marketing as well as operations/ production functions. The executive meeting mostly revolves around making decisions and courses of action as well as coming out with a feasible and reinforce able plan. The actions recommended for effective Sales & Operations Planning thus come from the above process. Supply and supplier planning need to be improved. Since supplier stands at the start of any supply chain, the proper planning and collaboration with supplier is needed. Communication is identified as the next root cause to supply chain mismanagement. The information flow can be automated with the use of technology to avoid any misleading or incomplete information movement in the chain. The data gathered should most importantly be relevant.

- The relevant data should be clearly communicated during demand planning.

- A feasible demand plan needs to be laid out.

- This needs to be effectively communicated further for supply planning.

- Supply planning needs to consider both capacity planning as well as inventory panning.

- Based on these two factors, a feasible supply plan needs to be developed.

- It is extremely important that the inputs from the sales team in the form of the demand plan and outputs derived from the supply plan by the Operations/ Production team should be in line with no gaps. This is what needs to be ensured in a pre – S&OP meeting, while the executive meeting needs to issue a consensus plan, make decisions and review the KPIs Source [32].

LIMITATIONS AND SCOPE FOR FUTURE STUDY

This study is confined to a single pharmaceutical firm in India. Further FMEA used has an inherent limitation of subjective analysis rather than quantitative analysis. This might create acute bias from the side of the respondents. The study would help in the identification of the processes which require eliminating waste and encouraging other best practices within a supply chain. It would bring about transparency and visibility in the operability of various supply chain functions. A complex supply chain has the bane of consuming more energy and time in ensuring everything is working at a potential that is optimum. This study would simplify the risk monitoring tasks and, with continual improvements, would give leaner supply chains. The research may further be done to explore the impact of downstream members of supply chain on the pharmaceutical firms.

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RESEARCH ARTICLE

PSYCHOSOCIAL IMPACT OF THE COVID-19 PANDEMIC ON EMPLOYEES

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ABSTRACT

COVID-19 has been impacting the physical, mental, and social well-being of employees worldwide. While psychological support is being offered to the frontline workers, other working populations are often neglected. Moreover, although several research papers about this topic are available internationally, no independent study on this subject has yet been conducted among workers in the Middle East. The main objective of this research is to study the psychosocial impact of COVID-19 on employees in the Sultanate of Oman. Primary data was collected from 97 employees using snowball and convenience sampling techniques and analyzed using descriptive statistics and Chi-square analyses along with post-hoc tests. Findings indicated that various workplace, family, and health-related issues arising out of COVID-19 have significantly impacted the psychosocial condition of workers. Non-payment of bonuses had a high impact on non-managerial cadres. Increased medical expenses for family members had a high impact on those in the younger age group. We recommend that the psychosocial condition of workers is recognized as clinically relevant, and that psychosocial support be made available to all workers. The theoretical implications of this research are related to the cognitive theory of anxiety and attribution theory, while practical implications include the impact of COVID-19 on the psychosocial condition of workers. This research is relevant to the Asian as well as global scenarios, as the COVID-19 situation has affected workers alike, worldwide.

KEYWORDS

Psychosocial impact, Occupational health, Worker well-being, Mental health, COVID-19, Pandemic, Stress, Anxiety.

INTRODUCTION

Occupational well-being is a public health concept referring to the prevention of illness in workers, whether such illness is physical, mental, or social in nature, and requires assuring the greatest degree of not only physical well-being but more importantly social and mental well-being among all categories of employees [1]. Occupational health involves a dynamic, ever-changing balance between a worker and his/her working environment. The question arises as to whether the present COVID-19 pandemic has affected occupational health and hygiene, particularly in terms of the mental well-being of employees. Available literature supports the necessity of studying the impact of this unprecedented pandemic fall-out on the often-neglected area of mental health as a factor that influences both social and work environments. This research intends to identify and establish the prevalence of psychosocial conditions affecting the mental and social well-being of employees in the Sultanate of Oman as a result of the

rapidly changing impact of the pandemic. The COVID-19 pandemic has been by far the most impactful outbreak of infectious disease witnessed in recent history, impinging on the lives of millions around the world. The outbreak has had an unprecedented domino effect on global economies and social and political activities [2, 3], affecting the physical, social, and mental well-being of all population groups regardless of social strata. This research aims to highlight how the COVID-19 pandemic has affected the mental and social well-being of workers in Oman and associated variables. This work attains significance in the light of COVID-19 affecting the whole world alike irrespective of geography or the economic condition of the nation.

HEALTH RISK ASSESSMENT AND HIERARCHY OF CONTROLS AT WORKPLACES

The current situation calls for all workplaces to conduct health risk assessments to determine the possibility of exposure to implementing measures based on a hierarchy of risk controls, viz. elimination, substitution, engineering, administration, PPE (personal protective equipment), and community protective equipment [4]. In the case of dealing with COVID-19, the first three controls in the hierarchy are difficult to implement; both elimination and substitution can only be achieved through remote work solutions, while engineering controls require isolating workers by putting up physical barriers. In the absence of the first three controls, the focus lies on the stringent application of the fourth control, i.e., administrative measures, such as physical distancing, encouraging hand washing with a recommended hand wash, sanitizing, seating with two-meter spacing, and restricting the number of people permitted within the workplace. However, the measure claimed to be the least effective of the hierarchy of controls has, in actuality, been found to be the most effective, namely mandating the wearing of masks in all public spaces, whether in the workplace or elsewhere. While any risk assessment process can help to evaluate whether to keep the workplace closed or re-open or downscale the work activities, it may also aid in assessing the capacity of the organization to put effective control measures in place, while still ensuring compliance with local laws and recommendations by national regulatory bodies—such as the Ministry of Health and Ministry of Manpower in Oman—and international regulations by the WHO. A health risk assessment enables one to determine if a facility is a high, medium, or low risk before deciding whether employees should remain working on the premises or whether work-from-home options are applicable.

Moreover, based on the results of such risk assessments and the changing epidemiological situation, organizations develop action plans to prevent and mitigate COVID-19-related losses as part of their business continuity processes.

PROBLEM NARRATION

The atmosphere of uncertainty and fear arising out of COVID-19 has resulted in an increased frequency of nervous breakdowns, mental disorders, domestic violence, and suicide, irrespective of the strata of the population or the economic strength of the nation. But initially, there were some miscalculations made. After COVID-19 was declared as the global pandemic [5], in the immediate aftermath, initial reactions were of disbelief, unpreparedness, and a strong sense of denial in which many individuals worldwide supposed that the consequences of the outbreak could not affect them or would be restricted to people of poorer social and economic circumstances or those living in third-world countries. But it proved to be incorrect. Though the first cases of suicide related to COVID-19 were reported in India and Bangladesh, in the early months of the pandemic [6, 7], in Japan too, COVID-19 has led to a spike in suicides [8]. Concerning occupational health, besides physical suffering and symptoms, COVID-19 patients have reported mental and social challenges associated with exposure to the virus. These include anxiety, fear of falling ill and dying, being socially excluded or ostracized, being placed in quarantine, increased medical expenses, and losing one's livelihood. These myriad feelings, fears, and experiences have also resulted in an increased prevalence of loneliness among the general population [9]. Moreover, additional variants of the virus due to mutations have become resistant to available treatment, while severe shortages of health resources such as hospital beds, ventilators, oxygen capacitors, PPE kits for front-line workers, and testing facilities have worsened the situation. These factors could lead to an increased risk of psychiatric illnesses such as post-traumatic stress disorder (PTSD) along with other conditions impacting mental health (10). This impact seems to be more among both the general public and workers with pre-existing psychiatric disorders [11]. Thus, these findings underline the urgent need to focus on people's well-being during the ongoing COVID-19 crisis.

LITERATURE REVIEW

According to [12] a disaster or crisis of sufficient magnitude may precipitate the development of PTSD, anxiety, and depression in the population. In terms of COVID-19, as weeks have progressed into months, various mutations of

the SARS-CoV-2 virus have created waves of infections resulting in community transmission [13]. This worsening situation has brought about increased rates of anxiety, depression, suicide, and pandemic fatigue, forcing governments to close international borders and impose national lockdowns and curfews. These measures have, in turn, led to increased loneliness, social isolation, and uncertainty [14, 15]. Moreover, the mental health implications of the pandemic have been exacerbated for those with pre-existing mental illnesses, as well as a result of the lack of mental health infrastructure and the overwhelming information deluge on social media, often fraught with misinformation [16, 17 too concluded that the constant barrage of catastrophic information reported on various media platforms, as well as the ongoing stress of living with the pandemic, is affecting both the mental and emotional well-being of the public. The available literature on the psychosocial impact of COVID-19 describes the increased prevalence of psychosocial stress, anxiety, anger, depression, and PTSD in the general population [18, 19, 20]. As regards the mental health of the public, the main psychological impact of the pandemic to date appears to be elevated levels of stress and anxiety. However, with the introduction of a new measure that people have not witnessed before – quarantine – the levels of loneliness, depression, self-harm, and suicidal tendencies too are expected to rise [13]. The working class, a large proportion of the general population, has been suffering from psychosocial problems after the onset of COVID-19. Various activities at the workplace and various situations in the workers' families were affected by the pandemic. Even slight changes in their health too created stress and anxiety because of fear of COVID-19. Below three sub-sections of the literature review highlight the impact of changes in workplace-related situations, family-related situations, and health-related situations caused by COVID-19 on the psychosocial condition of the working class which led to the formulation of hypotheses.

IMPACT OF CHANGES AT WORKPLACE ON PSYCHOSOCIAL CONDITION OF WORKERS

The emerging literature on occupational health consequences of COVID-19 has identified the occurrence of pandemic anxiety syndrome among workers due to changes at the workplace as a result of COVID-19 [21]. The pandemic has had a severe effect on the working population. Some lost jobs and their livelihoods, some faced salary reductions, and others have had to accept transfers to remote locations. These situations have impacted the psychosocial condition of both men and

women, as according to [17] women too have suffered increased isolation and despair due to COVID-19 job losses. The impact of COVID-19 on the working population has been very harsh developing even suicidal tendencies. [22] initially forecast an increase in suicide cases, a repercussion arising as much from the economic downturn following the COVID-19 pandemic as the outbreak itself. The health and safety of workers has become an utmost important aspect of the HRM function. [23] studied various issues including health and safety, or in other words, the well-being of the workers at the workplace after the COVID-19 situation. Their study included assessing the challenges of remote working, employees' well-being, downsizing employees, and resilience of the institution during the pandemic. The resilience of the institutions was dependent on the resilience of the workforce and the article concluded that it is a challenging task and varies with the age group of the employees. The study [24] conducted literature review in the areas of work and organizational psychology concerning the emerging changes in the workplace. They concluded that financial measures at the workplace such as reduction of resources, cost cutting, etc. have negatively impacted the mental health of workers. Another group of researchers [25] in their literature review found that when close contact with a person infected by COVID-19 happens at the workplace, it affects the mental well-being of the workers. The fear of the spread of infection from people at the workplace will have an adverse effect on employee well-being [26, 27, 28] in their study on the impact of COVID-19 on the mental well-being of workers in the fashion retail stores in Spain, observed that the changes at the workplace and greater environment have been attributed to workers developing ongoing stress, and a sense of fatigue and a detached attitude towards work. [29] conducted a literature review on the psychological condition of workers linked to workplace factors that were changed after COVID-19 and concluded that they can result in worsening the mental health of workers. [30] conducted studies among German and Swiss employees and found that changes made due to COVID-19 have impacted work life. According to [31] various aspects related to the workplace such as salary deduction have shown adverse impacts on employee engagement which is a psychological condition more than a physical condition.

H1: Workplace-related situations arising out of the COVID-19 crisis have not impacted the psychosocial condition of workers in the Sultanate of Oman

IMPACT OF CHANGES IN FAMILY-RELATED SITUATIONS ON PSYCHOSOCIAL CONDITION OF WORKERS

This pandemic has disturbed the family life as well. A study from the Canadian Perspectives Survey Series has identified a rise in family-related stress due to the COVID-19 pandemic in adults [32] that could increase the risk of domestic violence and child abuse [30]. Specifically, there is emerging evidence that the pandemic has caused psychosocial stress in the general population [33] as well as among children and adolescents (34), although the effect on parental psychosocial stress has yet to be determined. According to [30] the COVID-19-influenced changes in private life have impacted the mental condition of the workers.

During the Pandemic, disruptions in school schedules, child-care, and work-from-home routines, the financial impact of being laid off present challenges and risks to families' mental health [35]. The financial burden and financial deprivation affect families. The effects of job loss and or unemployment have a ripple effect on the immediate family and in many cases the dependent family [36]. In a study involving the effects of quarantine on medical students' mental well-being and learning behaviors, it was observed that students felt emotionally detached from family, friends, and their social circle and an overall reduction in their work performance and study period [37].

H2: Family-related situations arising out of COVID-19 crisis have not impacted the psychosocial condition of workers

IMPACT OF CHANGES IN HEALTH SITUATION ON PSYCHOSOCIAL CONDITION OF WORKERS

Another psychosocial impact of COVID-19 has been the rise of a mental state known as pandemic fatigue, as a result of behavioral changes attributed to the pandemic [38]. Symptoms of anxiety and depression are common among both COVID-19 patients and survivors [9]. Apart from severe uncomfortable physical symptoms, COVID-19 disease can lead to psychological complications, such as restlessness, delirium, and agitation. People with pre-existing mental and physical disorders too are vulnerable to COVID-19 (SARS-CoV-2) infection and may stand at a higher health risk and even death [38' 39] surveyed Canadian social workers and found that employees are concerned about their personal health and reported that they felt stressed due to health concerns arising out of the COVID-19 situation. [25] in their extensive literature review concluded that the mental health of the front-line workers was amplified by the ongoing media coverage of the

death and carnage due to the pandemic. Such misinformation added to the mental agony when someone is affected by any small illness. A lot of misinformation about health causes stress particularly, when the employees are working from home and get some health issues and in such cases, misinformation could be stressful [40]. Similarly, several studies corroborate that misinformation on social media during the pandemic can cause a psychological impact [8; 41].

H3: Health-related situations arising out of COVID-19 crisis have not impacted the psychosocial condition of workers

The available literature on the impact of COVID-19 on the psychosocial condition of workers indicates that though literature is available on this topic, most of it confines to frontline employees and healthcare workers but not to the managers and other categories of workers [29, 42, 43, 39, 2].

This is aptly taken care of in this research which covered both managerial and non-managerial cadres of all other categories of workers.

RESEARCH OBJECTIVE

The objective of this study is to evaluate the impact of the ongoing COVID-19 pandemic on the psychosocial condition of employees in the Sultanate of Oman.

METHODOLOGY

This primary research is based on the data collected from employees in the Sultanate of Oman through a self-administered questionnaire. The informed consent form was embedded in the questionnaire which assured that no personal data will be collected, the data will be used for research purposes only and can be made available to the subjects (respondents) upon request. The questionnaire was reviewed for integrity and ethics by the committee of experts. Data were analyzed using the SPSS platform (version 17.0). Descriptive statistics were used to explain the effect of the COVID-19 pandemic on the employees' psychosocial conditions. A Chi-squared test of independence was conducted to evaluate associations between the respondents' demographic characteristics and their mental conditions [44]. A post-hoc analysis was conducted with the help of Cramer's V value to determine

the strength of the association wherever a statistically significant relationship was identified [45].

SAMPLING

As sampling frames were not available, a random sampling technique could not be used [46]. As such, it was decided to use non-probability sampling techniques. Of the non-probability sampling techniques available, a snowball sampling technique was chosen as it was difficult to identify employees who faced difficult situations at the workplace and home or those who faced health issues due to COVID-19 [47]. The idea was that those who encountered such situations might know of others who had faced similar situations. The sample was drawn from the overall population comprising all employees in Oman [48]. The sample size consisted of 97 employees working in both private and public sectors in Oman and both managerial and non-managerial cadres.

DATA SCREENING

Data regarding the psychosocial impact of situations that had arisen due to COVID-19 was collected from the employees. A total of six common workplace situations, seven family-related issues, and six health-related issues were presented to each respondent. Subsequently, the respondents were presented with the aforementioned situations and were asked to identify the psychosocial condition that they had experienced due to these changes. Four components of psychosocial conditions were identified, including feeling 'anxious', 'angry', 'stressed', and 'sad or depressed' [9, 49, 21]. They were also given an option of "ignored", which indicates that the given change was either ignored by the respondent or did not impact the respondent's psychosocial state. As indicated in the limitations section, most of the employees who faced these situations or issues had already left the country, and those who were currently working might not have faced some of these situations. Hence, it was decided to screen out those who had not faced the given situations because their psychosocial condition may not have been impacted as a result [50]. Thus, some of the given situations did not apply to up to 50 percent of the respondents. After the screening, only those subjects for whom each situation was applicable were considered during the analysis to determine the frequency of psychosocial conditions arising as a result of the situation.

VALIDITY AND RELIABILITY OF THE QUESTIONNAIRE

The questionnaire was subjected to reliability and validity tests. A Cronbach's value of 0.868 indicated the high reliability of the instrument used [51]. In addition, a face validity test was conducted to ensure that the instrument measured what it is supposed to measure, i.e., the psychosocial impact of COVID-19 on employees [48].

RESEARCH FRAMEWORK

CHART 1: RESEARCH FRAMEWORK OF THE IMPACT OF COVID-19 ON THE PSYCHOSOCIAL CONDITION OF WORKERS
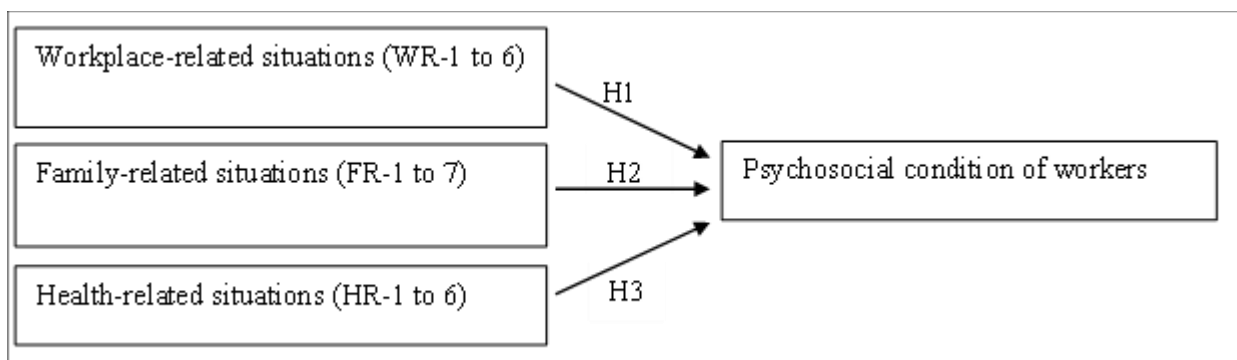
Chart 1 presents the proposed research framework for this current research. Various COVID-19-influenced factors grouped into workplace-related (WR), family-related (FR), and health-related (HR) have impacted the psychosocial condition of the workers. The WR factor has 6 variables, the FR factor has 7 variables, and the HR factor has 6 variables. The applicability of these variables is presented in Tables 2, 6, and 10 respectively, their impact on the psychosocial condition of workers is demonstrated in Tables 3, 7, and 11 respectively and the hypotheses are tested through chi-square Goodness-of-Fit tests and presented in tables 4, 8 and 12 respectively. The association between the impact and the demography of the respondents is presented in tables 5, 9, and 13 respectively.

RESULTS AND DISCUSSION

DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

Out of the 97 respondents, 18.6 percent were 21–30 years of age, 48.5 percent were 31–40 years, and 32.0 percent were over 40 years of age. With regards to job position, 53.6 percent and 46.4 percent of the respondents were employed in non-managerial and managerial roles, respectively. With two missing values, 55.8 percent of the respondents represented the manufacturing sector whereas 44.2 percent were employed in the service sector (Table 1).

WORKPLACE-RELATED SITUATIONS

67 percent of the respondents indicated that they faced salary deductions since the COVID-19 pandemic had begun, 49.5 percent were transferred to other locations, 76.3 percent had not received their bonuses, 57.7 percent were forced to go on long leave without pay, 64.9 percent had other benefits such as their phone allowances stopped, and 75.3 percent had been subject to organization-imposed travel restrictions (Table 2). All of these situations were found to have impacted their psychosocial condition and mental well-being, as will be empirically proven in subsequent sections of this research.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE

Variable		n	%
Age group	21–30 years	18	18.6
	31–40 years	47	48.5
	41–50 years	21	21.6
	Above 50 years	11	11.3
Position	Non-managerial	52	53.6
	Managerial	45	46.4
Sector*	Production / Manufacturing	53	55.8
	Service	42	44.2

* Two values missing

TABLE 2: CHANGES IN WORKPLACE-RELATED SITUATIONS DUE TO COVID-19

Situation		Applicable		Not applicable		Total	
		n	%	n	%	n	%
WR-1	Salary deduction	65	67.0	32	33.0	97	100.0
WR-2	Transfer from work location	48	49.5	49	50.5	97	100.0
WR-3	Non-payment of bonus	74	76.3	23	23.7	97	100.0
WR-4	Forced long leave without salary	56	57.7	41	42.3	97	100.0
WR-5	Deduction of benefits	63	64.9	34	35.1	97	100.0
WR-6	Travel restrictions by organization	73	75.3	24	24.7	97	100.0

These findings complement the findings of [52] which indicate that the COVID-19 pandemic has, without a doubt, significantly impacted the working environment. The drop in the expatriate population in Oman over 2020 and 2021, when waves of infections were peaking, is a clear indicator of job losses (More than 215,000, 2021), particularly because the country had previously boasted a large expatriate population at the start of the pandemic in December 2019, representing nearly 46% of the total population [38]. Currently, the expatriate population makes up only 38.8 percent of the population, clearly indicating that many expatriates have left the country as a result of the ensuing financial crisis and loss of jobs due to the pandemic [53].

The occurrence or threat of a job loss has a cascading psychosocial effect, not only on the worker in question but on his/her entire family, as will be demonstrated subsequently. Moreover, the loss of income and productivity suffered by businesses due to lockdowns and restrictions on movement has been transferred to workers in the way of salary deductions, non-payment of bonuses for the preceding year, and reductions in allowances. Similarly, in the USA, despite front-line staff such as

healthcare workers facing considerable risk to their health and safety while performing their duties, laws in Washington have reportedly placed restrictions on the ability of the local government to provide bonuses to employees based on work already completed. The reason is that, because the employees have already been paid for previous work, public funds cannot be used in the way of bonuses [54].

IMPACT OF CHANGES IN WORKPLACE-RELATED SITUATIONS ON PSYCHOSOCIAL CONDITION OF WORKERS

Table 3 presents the frequency of psychosocial conditions experienced by employees due to the occurrence of workplace-related situations brought about by COVID-19. Overall, these situations were found to substantially affect the psychosocial condition of the employees. Except for travel restrictions which affected only 76.7 percent of respondents, all other situations appeared to have had a large impact on the psychosocial condition of the employees. Salary deductions were found to have caused

psychosocial conditions among 95.4 percent of respondents, while 94.6, 91.7, 85.7, and 85.1 percent were psychosocially affected by forced long leaves without pay, workplace transfers, benefit deductions, and non-payment of bonuses, respectively.

HYPOTHESIS TESTING – H1

The null hypothesis (H1) that workplace-related situations arising out of COVID-19 have not impacted the psychosocial condition of the workers is tested using the Chi-square Goodness-of-Fit test. As indicated in Table 4 below, statistically significant and very high chi-square values (p<0.0005) suggest that the hypothesis be rejected and conclude that the workplace-related situations arising out of COVID-19 have resulted in the workers experiencing psychosocial problems such as anxiety, anger, stress, and depression. Thus, it can be concluded that the changes that happened at the workplace due to COVID-19 have impacted the psychosocial condition of the workers.

TABLE 3: IMPACT OF CHANGES IN WORKPLACE-RELATED SITUATIONS ON PSYCHOSOCIAL CONDITION OF WORKERS

Situation	Psychosocial condition – n (%)						
	Anxious (a)	Angry (b)	Stressed (c)	Sad or depressed (d)	Psychosocial condition (a to d)	Ignored	Total
WR-1	17 (26.2)	13 (20.0)	17 (26.2)	15 (23.1)	62 (95.4)	3 (4.6)	65 (100.0)
WR-2	11 (22.9)	14 (29.2)	14 (29.2)	5 (10.4)	44 (91.7)	4 (8.3)	48 (100.0)
WR-3	10 (13.5)	22 (29.7)	13 (17.6)	18 (24.3)	63 (85.1)	11 (14.9)	74 (100.0)
WR-4	4 (7.1)	20 (35.7)	18 (32.1)	11 (19.6)	53 (94.6)	3 (5.4)	56 (100.0)
WR-5	10 (15.9)	18 (28.6)	19 (30.2)	7 (11.1)	54 (85.7)	9 (14.3)	63 (100.0)
WR-6	17 (23.3)	13 (17.8)	11 (15.1)	15 (20.5)	56 (76.7)	17 (23.3)	73 (100.0)

TABLE 4: RESULTS OF CHI-SQUARE GOODNESS-OF-FIT TESTS

Variable	Total who faced this situation	Experienced psychosocial problems	Did not experience psychosocial problems	Chi-square	df	p-value
WR-1	65	62	3	53.554	1	.000
WR-2	48	44	4	33.333	1	.000
WR-3	74	63	11	36.541	1	.000
WR-4	56	53	3	44.643	1	.000
WR-5	63	54	9	32.143	1	.000
WR-6	73	56	17	20.836	1	.000

These findings correspond with a recent report focusing on the impact of COVID-19 on suicidal tendencies among people in the USA [20]. According to the report, physical distancing policies, mandatory lockdowns and curfews, isolation, quarantine periods, and anxiety over getting sick, along with an absence or reduction in productive activity and loss of income leading to fear of the future, have all influenced the mental health of citizens at large and workers in particular [29] too presented similar results. According to them, the workplace environment can play a defining role in either moderating or worsening the mental health of workers during the current pandemic.

ASSOCIATION OF IMPACT WITH DEMOGRAPHY OF THE RESPONDENTS

Table 5 presents the association between the employees' demographic characteristics and the psychosocial condition experienced due to changes in workplace situations. The psychosocial condition experienced due to the non-payment of bonus (WR-3) was found to be significantly associated with the age group of the respondents (p = 0.012); moreover, the effect size indicated a strong association between these two variables (Cramer's V = 0.385). A contingency table analysis indicated that employees aged 21–30 years and those above 50 years old more frequently experienced psychosocial conditions related to the non-payment of bonuses. Similarly, psychosocial conditions experienced due to the non-payment of bonuses were strongly linked with job position (Cramer's V = 0.289), an association that was also statistically significant (p = 0.013). Post-hoc tests indicated that employees in non-managerial positions experienced a greater frequency of psychosocial conditions due to non-payment of bonuses compared to those in managerial positions.

TABLE 5: X² TESTS OF INDEPENDENCE ALONG WITH POST-HOC TESTS

Variable	Demographic variable	p-value	Effect size (Cramer's V)	Contingency table analysis (Cross tabulation)
WR-3	Age group	0.012 Significant	0.385 Strong	Experienced psychosocial problems: 21–30 years; Above 50 years Ignored: 31–50 years
WR-3	Position	0.013 Significant	0.289 Strong	Experienced psychosocial problems: Non-managerial position Ignored: Managerial position

The study [55] made similar conclusions and indicated that the impact of financial deductions was greater on the portion of the workforce under 40 years of age. The non-payment of employee bonuses and employee compensation has been an ongoing source of discussion in several countries during the course of this pandemic.

FAMILY-RELATED SITUATIONS

Overall, 49.5 percent of the respondents indicated that their families had been obliged to move back to their home country after this pandemic. In addition, 55.7 percent faced difficulties due to overdue school fees for their children, 58.8 percent had to bear medical expenses for aged or ailing parents, 72.2 percent faced financial difficulties due to overdue mortgages or loan payments, 62.9 percent reported the job loss of at least one family member, and 56.7 percent had lost loved ones. In addition, 64.9 percent of the respondents indicated that they or a family member had been compelled to return to a working environment despite the presence of one or more reported cases of COVID-19 (Table 6).

TABLE 6: CHANGES IN FAMILY-RELATED SITUATIONS DUE TO COVID-19

Situation		Applicable		Not applicable		Total	
		n	%	n	%	n	%
FR-1	Family moved back to home country	48	49.5	49	50.5	97	100.0
FR-2	Overdue school fees for children	54	55.7	43	44.3	97	100.0
FR-3	Medical expenditures for parents	57	58.8	40	41.2	97	100.0
FR-4	Loss of life of a loved one	55	56.7	42	43.3	97	100.0

FR-5	A family member had to return to work where COVID-19 was reported	63	64.9	34	35.1		97	100.0
FR-6	Overdue mortgage or loan	70	72.2	27	27.8		97	100.0
FR-7	Job loss of a family member	61	62.9	36	37.1		97	100.0

These findings are in line with conclusions offered by [56] during a survey of parents in Pennsylvania and Texas, USA. The researchers reported that working-class respondents depended largely on their income to meet household expenditures, which includes providing education for children and meeting health expenses for their dependents. Although some parents coped well, it was clear that parental stress emerged as an area of concern . [57] conducted comparable research to assess levels of pandemic-related stress in Germany during the current pandemic to gain a better idea of the challenges faced by parents. Several respondents had to deal with workplace issues such as transitioning to remote or online work while attending to their children who were also transitioning to home-schooling, all the while maintaining physical distancing, curfews, and lock-downs; these factors were found to have a profound and complex impact on families, further compounded by economic difficulties and job losses. A similar finding was reported in another study which indicated that the closure of schools and businesses created a sense of social isolation and added financial distress to those affected [58].

IMPACT OF CHANGES IN FAMILY-RELATED SITUATIONS ON PSYCHOSOCIAL CONDITION OF WORKERS

Table 7 shows the frequency of psychosocial conditions experienced by the employees due to the occurrence of family issues as a result of COVID-19. It can be observed that almost all of the respondents (>90 percent) experienced some degree of psychosocial distress (i.e., at least one psychosocial condition). Specifically, psychosocial conditions were reported by 93.8 percent of employees whose respective families had been obliged to move back to their home country due to COVID-19, with almost half of the affected sample (43.8 percent) feeling anxious as a result. Furthermore, 94.4 percent of the respondents developed psychosocial conditions due to overdue school fees; within this segment, the majority felt angry (25.9 percent) and stressed (37.0 percent). The analysis revealed that anger and stress were the most common psychosocial conditions brought about due to other family issues related to COVID-19, except for the loss of a loved one, which unsurprisingly had a greater portion of the respondents feeling sad or depressed (38.2 percent).

TABLE 7: IMPACT OF CHANGES IN FAMILY-RELATED SITUATIONS ON PSYCHOSOCIAL CONDITION OF WORKERS

Situation	Psychosocial condition – n (%)						
	Anxious (a)	Angry (b)	Stressed (c)	Sad or depressed (d)	Psychosocial condition (a to d)	Ignored	Total
FR-1	21 (43.8)	7 (14.6)	8 (16.7)	9 (18.8)	45 (93.8)	3 (6.3)	48 (100.0)
FR-2	10 (18.5)	14 (25.9)	20 (37.0)	7 (13.0)	51 (94.4)	3 (5.6)	54 (100.0)
FR-3	9 (15.8)	12 (21.1)	21 (36.8)	8 (14.0)	50 (87.7)	7 (12.3)	57 (100.0)
FR-4	6 (10.9)	13 (23.6)	12 (21.8)	21 (38.2)	52 (94.5)	3 (5.5)	55 (100.0)
FR-5	9 (14.3)	17 (27.0)	22 (34.9)	12 (19.0)	60 (95.2)	3 (4.8)	63 (100.0)
FR-6	11 (15.7)	17 (24.3)	25 (35.7)	13 (18.6)	66 (94.3)	4 (5.7)	70 (100.0)
FR-7	13 (21.3)	15 (24.6)	17 (27.9)	14 (23.0)	59 (96.7)	2 (3.3)	61 (100.0)

HYPOTHESIS TESTING – H2

The second null hypothesis (H2) – family-related situations arising out of COVID-19 have not impacted the psychosocial condition of the workers, was tested using the Chi-square Goodness-of-Fit test (Table 8). The null hypothesis will be rejected as the chi-square values of all situations are high and statistically significant ($p<0.0005$). This finding indicates that the family-related situations arising out of COVID-19 have resulted in the workers experiencing psychosocial problems such as anxiety, anger, stress, and depression. Thus, it can be concluded that the changes that happened in the family set-up due to COVID-19 have impacted the psychosocial condition of the workers.

TABLE 8: RESULTS OF CHI-SQUARE GOODNESS-OF-FIT TESTS

Variable	Total who faced this situation	Experienced psychosocial problems	Did not experience psychosocial problems	Chi-square	df	p-value
FR-1	48	45	3	36.750	1	.000
FR-2	54	51	3	42.667	1	.000
FR-3	57	50	7	32.439	1	.000
FR-4	55	52	3	43.655	1	.000
FR-5	63	60	3	51.571	1	.000
FR-6	70	66	4	54.914	1	.000
FR-7	61	59	2	53.262	1	.000

During the pandemic, the predominant anxieties expressed by the expatriate workforce in Oman have been related to geographical distance from their families and continual travel restrictions [59]. The findings of the current research regarding the impact of COVID-19 on employees in Oman are supplemented by information sourced from existing literature. The World Bank predicted that economic activity in the MENA region (Middle East and North Africa) was expected to fall by over 4 percent in 2020, as tourism, and exports were severely disrupted by the pandemic [60]. A researcher and writer dedicated to migrant rights, [59] reported that, in some cases, employers have been unable to pay compensation and benefits to outgoing employees. The Canadian Perspectives Survey indicated that financial insecurities resulting from changes in working conditions—much like those described in our survey—were the primary cause of increases in family stress [32].

ASSOCIATION OF IMPACT WITH DEMOGRAPHY OF THE RESPONDENTS

Table 9 highlights associations between the employees' demographic characteristics and the psychosocial condition experienced due to changes in family setup. Psychosocial conditions experienced due to medical expenditures for aged/ailing parents were found to be associated with the age group. This association was both statistically significant ($p = 0.024$) and strong (Cramer's V = 0.408). The contingency table analysis revealed that employees aged 21–30 years and those above 50 years more frequently experienced psychosocial conditions related to medical expenditures for aged/ailing parents compared to employees in other age groups. In addition, there was an association between age group and psychosocial conditions experienced due to the return of a family member to a workplace where a COVID-19 case had been detected, with employees in younger age groups more frequently experiencing some form of psychosocial distress as a result of this situation (Cramer's V = 0.439; $p = 0.007$).

TABLE 9: X^2 TESTS OF INDEPENDENCE ALONG WITH POST-HOC TESTS

Variable	Demographic variable	p-value	Effect size (Cramer's V)	Contingency table analysis (Cross tabulation)
FR-3	Age group	0.024 Significant	0.408 Strong	Experienced psychosocial problem: 21–30 years; Above 50 years Ignored: 31–50 years
FR-5	Age group	0.007 Significant	0.439 Strong	Experienced psychosocial problem: 21 to 30 years; 31 to 40 years; Above 50 years Ignored: 41 to 50 years

Similarly, according to [61] a postdoctoral fellow working on community-based aging projects at the Harvard Joint Center for Housing Studies, job losses arising from COVID-19 can lead to economic hardship and/or exacerbate the illness of caregivers due to stress, thereby disrupting the process of care for the aged or elderly.

HEALTH-RELATED SITUATIONS

Of the 97 employees approached in this research, 66.0 percent had suffered from fever and flu since the beginning of the pandemic, 45.4 percent had experienced heart-related illness, and 43.3 percent had experienced lung-related illness. Breathlessness, throat infections, and loss of sense of smell were reported by 42.3, 56.7, and 41.2 percent of the respondents, respectively (Table 10).

TABLE 10: HEALTH-RELATED SITUATIONS EXPERIENCED DURING THE COVID-19 PERIOD

Situation		Applicable		Not applicable		Total	
		n	%	n	%	n	%
HR-1	Fever and flu	64	66.0	33	34.0	97	100.0
HR-2	Heart-related illness	44	45.4	53	54.6	97	100.0
HR-3	Lung-related illness	42	43.3	55	56.7	97	100.0
HR-4	Breathlessness	41	42.3	56	57.7	97	100.0
HR-5	Throat infection	55	56.7	42	43.3	97	100.0
HR-6	Loss of smell	40	41.2	57	58.8	97	100.0

The literature shows that, as the pandemic unfolded, many people began experiencing health conditions similar to that of COVID-19 [35]; moreover, COVID-19 has had a cascading effect on other health problems [62]. The current pandemic has overwhelmed healthcare systems globally with a knock-on effect on the time, resources, and health personnel available to diagnose and treat other diseases; this has led to people avoiding seeking medical help for other health problems due to the imminent threat of contracting COVID-19. Furthermore, the overwhelming influx of information concerning the symptoms and psychological effects of COVID-19 has further fueled anxiety over acquiring the illness, even in the context of normal health concerns.

IMPACT OF CHANGES IN HEALTH ON PSYCHOSOCIAL CONDITION OF WORKERS

Table 11 displays the frequency of psychosocial conditions experienced by the employees concerning the occurrence of health issues arising due to the COVID-19 pandemic. For the most part, minor health problems such as fever/flu and throat infections were more frequently ignored (14.1 and 9.1 percent, respectively). In contrast, other health problems related to the heart, lungs, and loss of sensitivity to smell were less frequently ignored (2.3, 4.8, and 2.5 percent, respectively). Nevertheless, the majority of the respondents were either anxious (ranging from 14.3–35.0 percent of respondents) or stressed (ranging from 34.5–50.0 percent of respondents) by health issues brought about by the COVID-19 pandemic.

TABLE 11: IMPACT OF CHANGES IN HEALTH ON PSYCHOSOCIAL CONDITION OF WORKERS

Situation	Psychosocial condition- n (%)						
	Anxious (a)	Angry (b)	Stressed (c)	Sad or depressed (d)	Psychosocial condition (a to d)	Ignored	Total
HR-1	13 (20.3)	4 (6.3)	32 (50.0)	6 (9.4)	55 (85.9)	9 (14.1)	64 (100.0)
HR-2	12 (27.3)	4 (9.1)	20 (45.5)	7 (15.9)	43 (97.7)	1 (2.3)	44 (100.0)
HR-3	6 (14.3)	7 (16.7)	20 (47.6)	7 (16.7)	40 (95.2)	2 (4.8)	42 (100.0)
HP-4	10 (24.4)	6 (14.6)	16 (39.0)	8 (19.5)	40 (97.6)	1 (2.4)	41 (100.0)

HR-5	17 (30.9)	4 (7.3)	19 (34.5)	10 (18.2)	50 (90.9)	5 (9.1)	55 (100.0)
HR-6	14 (35.0)	3 (7.5)	14 (35.0)	8 (20.0)	39 (97.5)	1 (2.5)	40 (100.0)

HYPOTHESIS TESTING – H3

Null hypothesis (H3) that health-related situations arising out of COVID-19 have not impacted the psychosocial condition of the workers is tested using Chi-square Goodness-of-Fit test. As indicated in Table 12 below, statistically significant and very high chi-square values (p<0.0005) suggest that the hypothesis be rejected and conclude that the health-related situations arising out of COVID-19 have resulted in the workers experiencing psychosocial problems such as anxiety, anger, stress, and depression. Thus, it can be concluded that the health-related issues that the workers experienced during COVID-19 have impacted their psychosocial condition.

TABLE 12: RESULTS OF CHI-SQUARE GOODNESS-OF-FIT TESTS

Variable	Total who faced this situation	Experienced psychosocial problems	Did not experience psychosocial problems	Chi-square	df	p-value
HR-1	64	55	9	33.063	1	.000
HR-2	44	43	1	40.091	1	.000
HR-3	42	40	2	34.381	1	.000
HP-4	41	40	1	37.098	1	.000
HR-5	55	50	5	36.818	1	.000
HR-6	40	39	1	36.100	1	.000

According to Jane Webber, an expert in trauma counseling at Kean University in New Jersey, the current pandemic has resulted in many people existing in a constant state of fear and heightened state of arousal, akin to the experiences of war veterans or those forced to live in conflict zones (3), with a decade-long experience of working with military veterans suffering from PTSD, calls this a "chronic threat response", where the affected person remains in a continued state of hyper-arousal as a survival mechanism. Although some degree of anxiety concerning symptoms of illness is natural, people may experience overwhelming fear and anxiety during a pandemic in light of their exposure to the continual news cycle, especially if some of their symptoms correspond to those commonly seen in COVID-19 cases [63]. Anxiety is considered a leading cause of chest pain and other physical symptoms and increases fear of infection. The National Alliance on Mental Health reports that most people with anxiety experience one or more symptoms, ranging from a sense of apprehension or dread to feeling jumpy, restless, or irritable to outright panic attacks.

ASSOCIATION OF IMPACT WITH DEMOGRAPHY OF THE RESPONDENTS

Table 13 presents associations between the employees' demographic characteristics and the psychosocial condition experienced due to changes in health. Psychosocial conditions experienced due to throat infections were found to be significantly associated with job position ($p = 0.010$). The effect size supported a strong association between these two variables (Cramer's V = 0.373). The contingency table analysis indicated that employees in non-managerial positions more frequently felt psychosocial distress compared to employees in managerial positions.

TABLE 13: X² TESTS OF INDEPENDENCE ALONG WITH POST-HOC TESTS

Variable	Demographic variable	p-value	Effect size (Cramer's V)	Contingency table analysis (Cross tabulation)
HR-5	Position	0.010 Significant	0.373 Strong	Experienced psychosocial problem: Non-managerial position Ignored: Managerial positions

The current pandemic and related factors have resulted in the rise of a phenomenon known as 'COVID-19 anxiety syndrome', the symptoms of which mimic those of other mental health conditions, including stress, anxiety, and PTSD. This phenomenon has been exacerbated by continuous widespread media coverage as the world has waged war on this invisible threat. Despite the recent rollout of vaccinations and reports of decreases in the number of infections, some people nevertheless continue to experience this syndrome, which was first said to manifest as curfews and lockdowns restricted outside access due to fear of transmission, frequent checking for symptoms despite not being in a high-risk environment and avoiding social or community engagements [30].

CONCLUSION

The emergence of the COVID-19 pandemic as a global crisis over the past few years has drastically impacted all dimensions of human life, including employment. Above all, the working class has been the worst-hit segment of society, an outcome that is intertwined with other societal components. The current research was conducted to identify the impact of COVID-19 on the psychosocial conditions of employees in Oman. Over the course of the last two years, a great many expatriate employees in Oman, many of whom faced difficult situations arising out of COVID-19, have left the country. Those struggling to continue in their jobs have faced various adverse situations, including salary deductions, the loss of previously granted benefits, and even forced long leave without pay. Moreover, COVID-19 has impacted various dimensions of potential family-related stress, in the form of the migration of families to their home countries, struggles to pay mortgages or expenses related to children's schooling and the care of elderly or ailing parents, and the loss of near ones. These situations have caused immense psychosocial distress among workers in Oman, particularly younger employees and those in non-managerial positions. Thus, it can be concluded that the COVID-19 pandemic has contributed to significant, quantifiable levels of psychosocial distress among employees in Oman, and therefore needs to be recognized as clinically relevant. It is imperative that further research be conducted to evaluate the psychosocial effects of COVID-19 on people in general, and employees in particular, not just at the micro level within specific firms, but also at the macro level at the industry and global level.

While a lot is being done to ensure the physical health of employees, it remains crucial that psychosocial support also be made available to all workers in Oman. Hence, the authors recommend that comprehensive risk assessments be performed to help identify and mitigate COVID-19-related occupational hazards to mental health to determine the possibility of exposure to implementing an appropriate area- and activity-specific hierarchy of risk controls. In the case of reducing COVID-19 transmission, the first three hierarchies of controls have not been effective because the elimination of the virus is currently not guaranteed. Substitution fits into the same category, although engineering controls such as isolating workers by putting up barricades have been implemented. In the absence of the non-availability of the first three controls, what is practiced is the stringent application of administrative controls. However, mandates regarding the wearing of masks in all public spaces, be it in the workplace or other social environments, remain the most effective measure. Similar controls may be necessary to ensure the mental well-being of the workforce.

PRACTICAL IMPLICATIONS OF THE STUDY

The practical implications of this study include the identification and application of a hierarchy of controls at the workplace to prevent untoward anxiety during the ongoing COVID-19 pandemic. This must be communicated widely to the working community. The findings of this study are important in the current scenario, as while the virus cannot be completely eliminated, it is socioeconomically imperative that work should continue in the vast majority of offices, factories, and other work environments. Thus, this study highlights the importance of the mental well-being of the working population, an area that should not be neglected while addressing the current pandemic.

THEORETICAL IMPLICATIONS OF THE STUDY

In this research, we have attempted to capture the response of employees in Oman toward unfavorable conditions arising out of the ongoing COVID-19 situation. Accordingly, this study has addressed certain theoretical aspects related to the mental health and psychosocial condition of employees. According to the cognitive theory, anxiety, fear, anger, and depression are the primary psychosocial conditions of an employee [64] and these are addressed in this research. The attribution theory by [65] explains the individuals' perception of and given responses to certain common experiences, issues, and situations arising as a result of the current pandemic.

LIMITATIONS OF THE STUDY

This study included employees working in industrial establishments such as construction and manufacturing firms as well as those working in service industries, such as hospitals, hotels, restaurants, hypermarkets, and educational institutions. Overall, the sample included in the study consisted of workers engaged in both the private and public sectors in the Sultanate of Oman. However, the population surveyed was restricted to employees who had access to digital platforms and could respond to the questionnaire, and thus could not include grass-root employees in menial roles such as drivers, gardeners, etc. As a significant number of affected employees had left Oman in the wake of the economic impact of the pandemic (More than 215,000 expat workers left Oman, 2021), [66] coupled with the ramifications of the pre-existing economic crisis as a result of declining oil prices [66] this research is limited to only those workers affected by the COVID-19 pandemic who had remained in Oman.

FUTURE SCOPE

This study can be extended to other countries within the Middle East region. Moreover, similar research can be conducted in the near future within the same population, as many workers are now returning to Oman as the situation stabilizes and the adverse effects of the pandemic are coming under control. Further, the study can also be conducted among the subsection of the workforce that left Oman due to COVID-19 prior to this study.

COMPETING INTERESTS

The authors declare no competing interests.

DATA AVAILABILITY STATEMENT

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

INFORMED CONSENT:

Informed consent was obtained from all participants and/or their legal guardians.

ETHICAL APPROVAL

All procedures performed in this study were in accordance with the ethical standards of the College. The questionnaire was reviewed and approved by the Academic Integrity and Ethics Committee of Modern College of Business and Science, as per the MCBS Policy Manual, 2018.

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HEALTH TRENDS AND ITS IMPLICATIONS DURING THE COVID-19 PANDEMIC IN CENTRAL VISAYAS, PHILIPPINES

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ABSTRACT

The effects of the Covid-19 pandemic have underscored for the Philippines, in particular, and all countries in general, the importance of a resilient health care system to be able to manage health emergencies and disasters. The study aimed to do a situational analysis of the health sector during the COVID-19 pandemic in the Central Visayas, Philippines. The study collected data from national government agencies in the Philippines. The article identifies gaps in the health care system which may have affected not only COVID-19 outcomes but other health indicators which was highlighted due to the pandemic. The study provides health managers and policymakers information that could be used to promote reforms in the health sector to be able to manage future pandemics and health emergencies both in local and national levels.

KEYWORDS

COVID-19; health sector; pandemic; health indicators; health system; Philippines

INTRODUCTION

People all over the world are confronted with a broad and varied range of risks related to health emergencies and disasters which includes infectious disease outbreaks such as epidemics or pandemics. The health, societal, and economic costs of these incidents can be devastating, both in the short and long term. The assessment and management of hazards and vulnerabilities related to a pandemic is crucial to protect people's health, to ensure local, national health security, and to build the resilience of communities, and health systems. During health emergencies and disasters, the health sector has a central role in managing the risks and reducing the consequences during a pandemic. But it can only fulfil these responsibilities with a whole-of-government and whole-of-society approach.

From 2012 to 2017, the World Health Organization (WHO) recorded more than 1,200 outbreaks in 168 countries, including those due to new or re-emerging infectious diseases. In 2018, a further 352 infectious disease events, including Middle East respiratory syndrome coronavirus (MERS-CoV) and Ebola virus disease (EVD), were tracked by WHO [1]. The most recent and devastating of these outbreaks is the Coronavirus disease (COVID-19). The COVID-19 pandemic is a major worldwide health threat and has quickly spread around the world with 175 987 176 confirmed cases, including 3 811 156 deaths worldwide as of the June 15, 2021 [2]. COVID-19 is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which spreads the same way as other coronaviruses, mainly through person-to-person contact. Infections range from mild to deadly [3]. COVID-19 is increasing day by day severely affecting a large population in the world [4].

Densely populated areas of countries and highly mobile populations are affected mostly showing larger transmission growth [5]. COVID-19 pandemic has damaged human lives and health. It exposes the weak health infrastructure of the countries of the world affecting the world economy.

In the Philippines there are already existing gaps and inequities in the health care system and delivery in the Philippines which could be overwhelmed during health emergencies and disasters. Thus, all of these perennial challenges in the Philippine health care system highlights the imperative to scale up risk and evidenced informed actions to reduce hazards, exposures and vulnerabilities, and build capacities to protect public health from emergencies and disasters.

In the Philippines, the first case of Covid-19 was reported on January 30, 2020. Since that time there has been a steady increase of cases and as of this writing, there are already 1 327 431 confirmed cases with 22 963 deaths [6]. One of the strategies implemented by the Philippine government are strict community quarantines which involves a temporary suspension of classes, work-from-home, and skeletal or limited workers, and restriction of the population to their homes. It allows only essential services like health care, food supply, medicines, and banking during the community quarantine.

In the case of the Philippines, total cumulative COVID-19 cases are rising day by day showing major concerns, but their recovery rate is also increasing showing good effect of control measures. Due to the COVID-19 epidemic commercial and industrial sectors are fully or partly closed in the country causing a lesser job with a lesser amount of salary and cash flow. This issue can turn into lower GDP growth. The country may face a post-COVID-19 economic recovery problem [7].

In relation to the health sector, the rising number of cases of COVID-19 infections on a daily basis is a serious concern as there are limits to hospital care capacity for patients with serious symptoms (e.g. difficulty in breathing). Should the number of infected people rapidly rise, there may come a time when the health care resources will be overwhelmed. Transport and border restrictions introduced by community quarantine measures have universally impacted health services access and delivery as well. Surveys conducted by different organizations indicated decreased access to

basic services such as food and access to health facilities in the earlier stage of the pandemic [8]. Care seeking behaviors in both health care providers and patients have also changed as a result of quarantine measures and the fear of contracting COVID-19. This change would affect preventive health programs and management of non-COVID-19 diseases. The pandemic has also affected not only the physical health of the people but also their mental health. Studies showed that Filipino respondents reported high levels of depression, anxiety, and stress during the COVID-19 pandemic [10,11].

On the supply and services side, the measures to contain COVID-19 have siphoned away significant manpower and essential resources to the community. Those areas operating with a lean health care team, task-shifting were noted to be common, with staff performing additional duties related to COVID-19 on top of their usual role [12]. Despite the huge number of health professionals that the country produces every year, there is still a shortage of health workforce employed to meet the standard requirement for the country's growing population during the pandemic [13]. A large factor of this is the continuous out migration of health professionals. The outbreak of the COVID-19 pandemic that resulted in a sudden spike in health service requirements exposed the long-standing vulnerabilities of Human Resources for Health. The inadequate number of health personnel provided by the health system has constrained the country's ability to effectively respond to the overwhelming demand for health services during this time of pandemic. The pandemic also highlights the deficiency in specific areas of medical training and expertise as evident in the lack of gerontologists and geriatricians to meet the unique needs of the large number of COVID-19-infected older people [14].

The effects of the COVID-19 pandemic have underscored for the Philippines, in particular, and all countries in general, the importance of a resilient health care system to be able to manage health emergencies and disasters. Thus, in order to address the current and emergent pandemics, there is a need to revisit the existing health system and ultimately to future proof one of the central actors during such a crisis, the health sector. This study aimed to conduct a situational analysis specifically on the health sector in Central Visayas during the COVID-19 pandemic using selected health indicators.

MATERIALS AND METHODS

DATA COLLECTION

The study utilized a descriptive survey focusing on the review of records and data on identified indicators for the health sector. The study collected the most recent available information on life expectancy among Southeast Asian countries, as well as regional data on all-cause mortality rate, maternal mortality ratio, infant mortality rate, stunting rate, COVID-19 incidence rate, death rate, positivity rate, hospital beds, primary health care facilities, and health human resources. The data collection tool utilized the Review of Records (ROR) checklist that indicates the different data to be collected from existing validated reports and published information as well those requested from the Department of Health Regional Office 7. The present study was conducted in Central Visayas (Region 7) in the Philippines. It is located at the central part of the Visayas island group in the Philippines with a land area of 15,875 km². It is bordered by the Visayan Sea and the province of Masbate in the north, Mindanao Sea in the south, Negros Occidental in the west, and the island of Leyte in the east. It consists of four (4) provinces, namely: Cebu, Bohol, Negros Oriental and Siquijor. It includes three (3) independent cities, namely: Cebu City, Mandaue City, and Lapu-Lapu City. Cebu City is its regional center.

DATA ANALYSIS

Analysis of data focused on the comparative evaluation of the findings based on trends and profiles from other provinces within the region and other countries. The data were also compared with existing standards to determine possible gaps and factors that may have implications with the COVID-19 pandemic management and outcomes. The data were presented in graphs and tables to show possible trends and comparisons based on standards.

ETHICS APPROVAL OF RESEARCH

The research was approved by the Cebu Normal University Research Ethics Committee before data collection commenced. There was no identifiable human information included in the study and data were from public records and aggregated to ensure anonymity.

RESULTS AND DISCUSSION

HEALTH TRENDS IN THE PHILIPPINES AND CENTRAL VISAYAS

As shown in Figure 1, the current life expectancy for Philippines in 2021 is 71.41 years, a 0.18% increase from 2020. The life expectancy for Philippines in 2020 was 71.28 years, a 0.18% increase from 2019. Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

FIGURE 1. LIFE EXPECTANCY OF SOUTHEAST ASIAN COUNTRIES
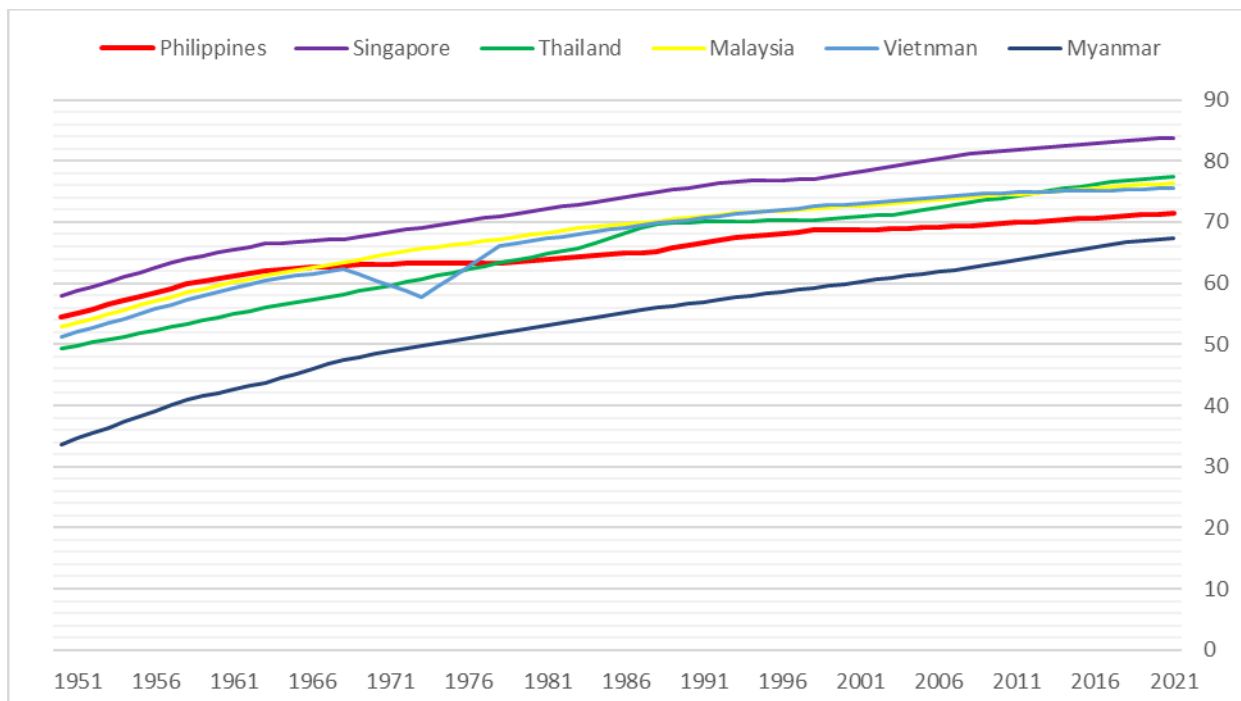
A comparison of the life expectancy of the Philippines with other ASEAN countries shows that the Philippines has the 2nd lowest life expectancy at 71.41, the highest is Singapore with 83.8 and the lowest is Myanmar at 67.37. Mortality and fertility trends are also changing. Although life expectancy has increased in all of the region's countries, there have been substantial differences in the rate of improvement. Since the 1950s, most countries have seen continual increases in life expectancy. Political regimes and a history of conflict have hampered growth in certain countries such as Myanmar and Vietnam [15]. Life expectancy improvements have slowed which has been mostly due to modest progress in adult mortality reduction [16]. Economic conditions play a significant role in determining the overall health and well-being of a population. The Philippines faces challenges such as income inequality, poverty, and limited access to quality healthcare, which can impact life expectancy. Socioeconomic factors can affect healthcare access, nutrition, education, and overall living conditions. Evidence suggests that having more health-care resources and having a greater level of socioeconomic advantage increases life expectancy [17]. In certain nations, social, political, and economic progress has resulted in significant health advances, whereas in others, minor changes have occurred. Furthermore, there is evidence that future projections of life expectancy will be affected due to the COVID-19 pandemic. Some Southeast Asian countries have made substantial progress in controlling infectious diseases like malaria, tuberculosis, and HIV/AIDS. In the case of the Philippines, certain infectious diseases, inadequate sanitation, and limited access to clean water may contribute to a higher disease burden and lower life expectancy. Cultural attitudes toward seeking healthcare, health education, and preventive measures may also influence health-seeking behavior and affect life expectancy. A study analyzing 29 countries showed that the COVID-19 pandemic led to losses in life expectancy in 27 countries, with large losses of life expectancy of >1 year in 11 countries for males and 8 among females [18].

The all-cause mortality rate for Cebu province is 3.27 per 1,000 population in 2020, which has the highest increase of 224% since 2019 (Figure 2). Cebu City is 3.47 per 1,000 population in 2020, a decrease by 33% since 2019. Generally, there is a 21% increase in the all-cause mortality rate of Central Visayas. Disparities in health trends are observed across regional, urban– rural and socioeconomic status [19]. These disparities could be explained due to lack of health infrastructure and human resources in certain localities compared to highly urbanized areas. The cities usually have specialized health facilities and health professionals which could manage severe forms of the disease. Furthermore, variations across socioeconomic status are strongly associated with maternal education, regional location and access to health services [20].

FIGURE 2. ALL-CAUSE MORTALITY RATE IN CENTRAL VISAYAS
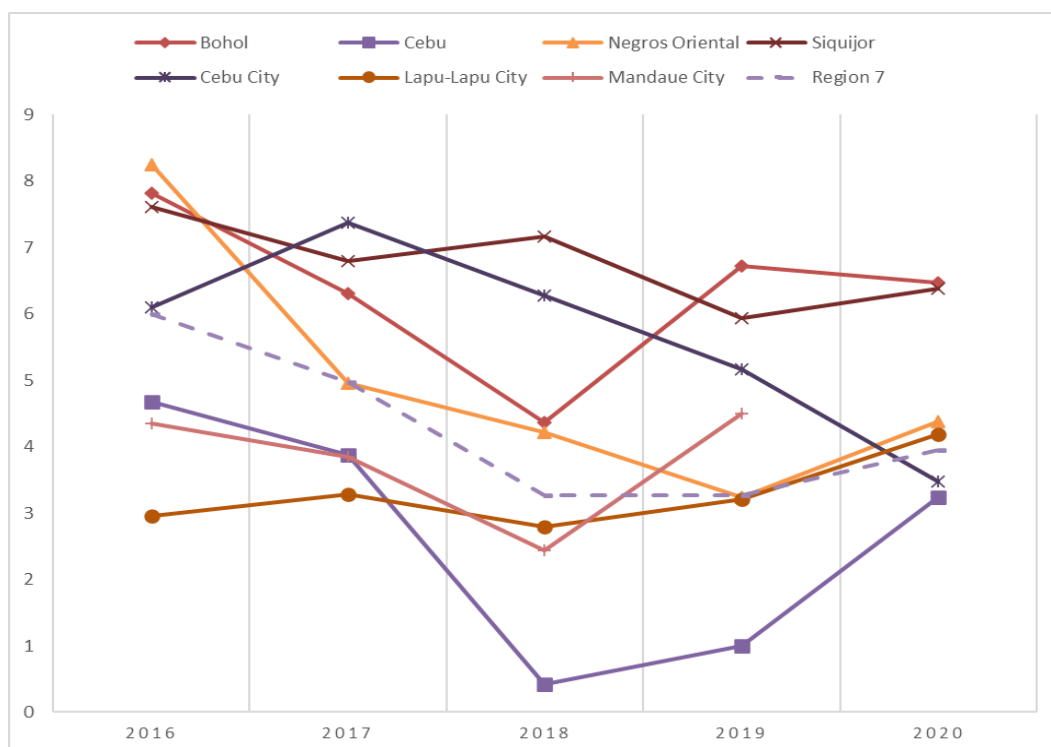
Note. Mortality Rate = Total Deaths divided by Total Population x 1000

As seen in Figure 3, the maternal mortality ratio for Bohol province is 20 per 100,000 livebirths in 2020, which has the highest increase of 114% since 2019. Mandaue City is 30 per 100,000 livebirths in 2020, a decrease of 16% since 2019. Furthermore, Siquijor has zero maternal deaths since 2017. Generally, there is a 2% increase in the maternal mortality ratio of Central Visayas. The maternal mortality ratio reflects the capacity of health systems to effectively prevent and address the complications occurring during pregnancy and childbirth. Common causes of maternal deaths are hemorrhage, sepsis, obstructed labor, hypertensive disorders in pregnancy, and complications of unsafe abortion. Insufficient healthcare facilities, healthcare workforce shortages, and challenges in healthcare delivery systems could affect these outcomes. For example, there

are some provinces such as Siquijor that have adequate number of midwives and nurses which could significantly improve maternal mortality outcomes.

The infant mortality rate for Lapu-Lapu City is 8 per 1,000 livebirths in 2020, which has the highest increase of 64% since 2019 (Figure 4). Siquijor is 4 per 100,000 livebirths in 2020, a decrease by 29% since 2019. Generally, there is a 9% decrease in the infant mortality rate of Central Visayas. Infant mortality rate is measure of human infant deaths in a group younger than one year of age. It is an important indicator of the overall physical health of a community. Preserving the lives of newborns has been a long-standing issue in public health, social policy, and humanitarian endeavors.

FIGURE 3. MATERNAL MORTALITY RATIO IN CENTRAL VISAYAS
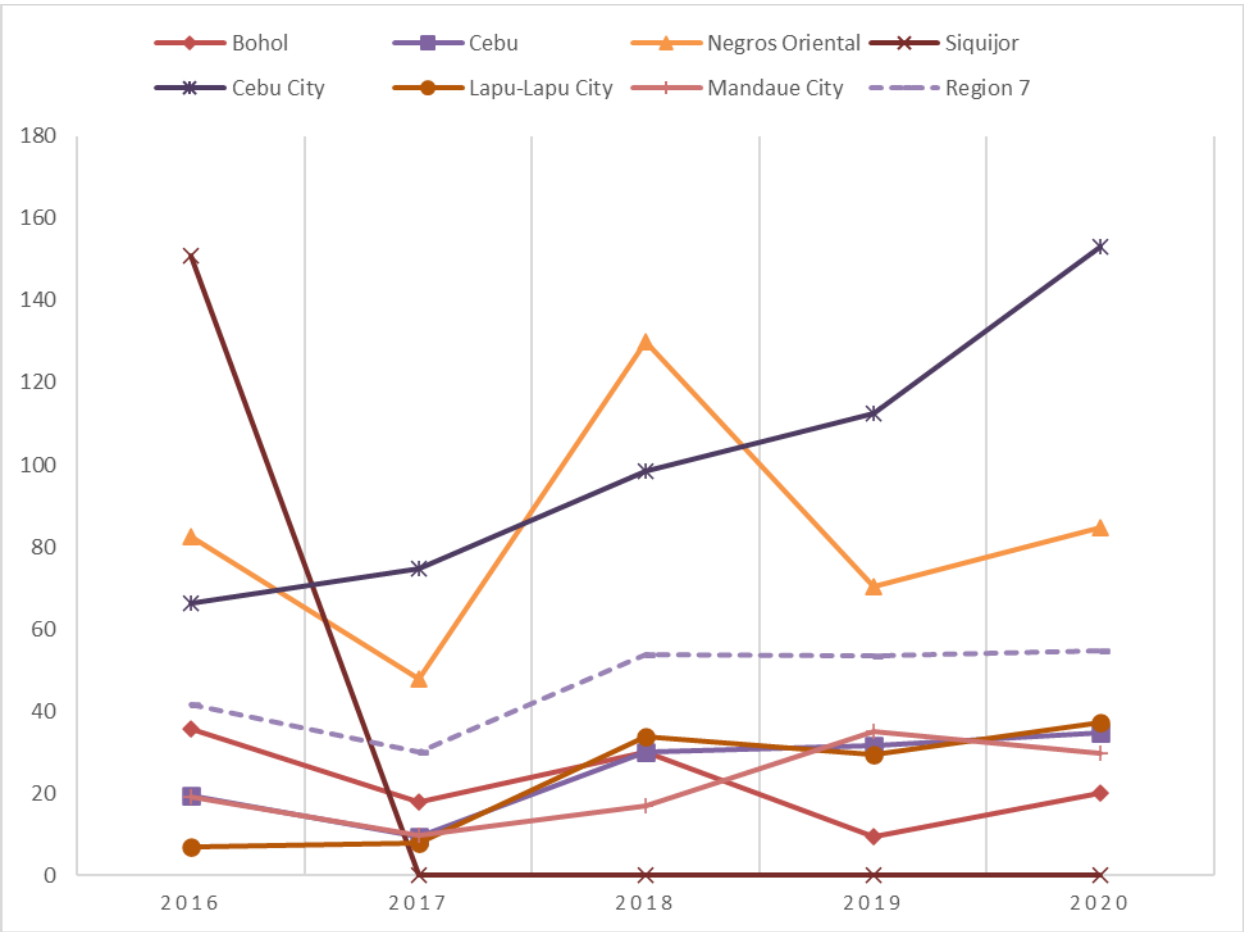
Note. Maternal Mortality Ratio = Total Maternal Deaths divided by Livebirth x 100,000

FIGURE 4. INFANT MORTALITY RATE IN CENTRAL VISAYAS
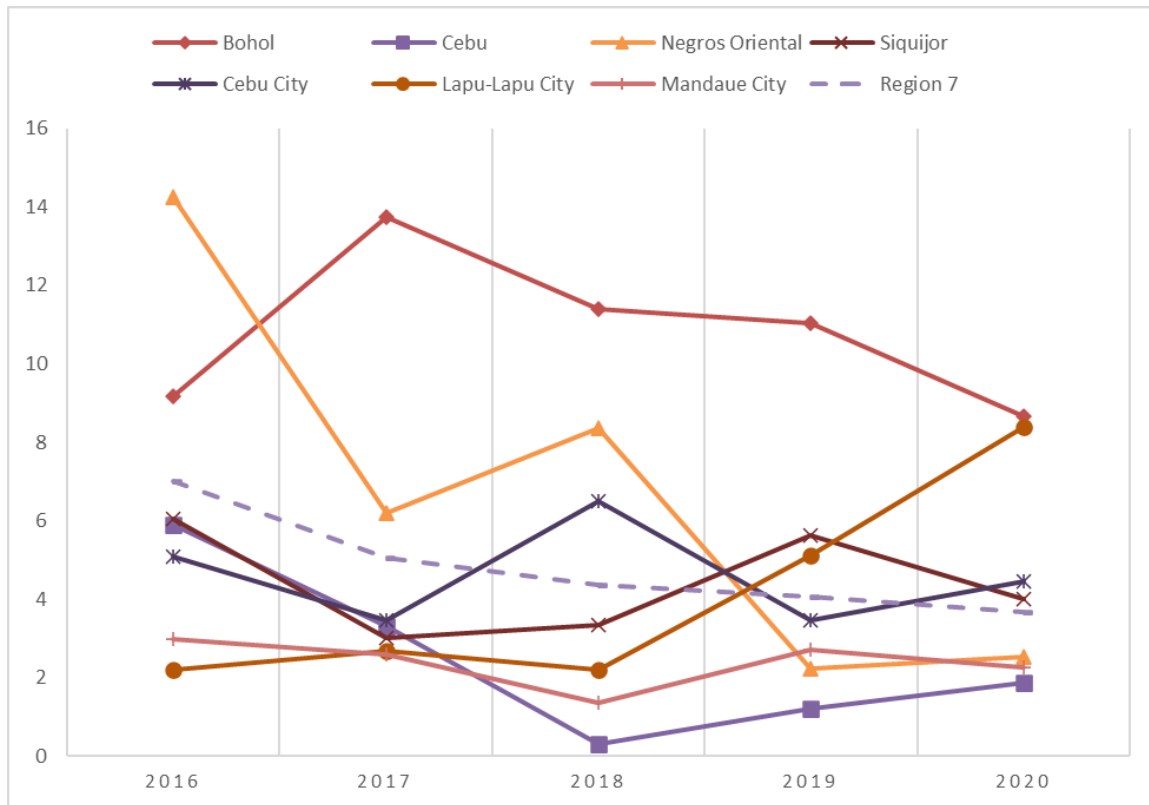
Note. Infant Mortality Rate = Total Infant death divided by Livebirths x 1,000

High infant mortality rates and maternal mortality ratio are generally indicative of unmet human health needs in sanitation, medical care, nutrition, and education, all of which may have been affected by the pandemic. Globally, the COVID-19 pandemic has disrupted family planning and maternal and newborn health services, and these indirect consequences in the Philippines may dramatically increase or slow the improvement in the annual maternal and infant mortality in 2020 as compared to pre-COVID years [21].

The stunting rate for Mandaue City is 11.3% in 2020, which has the highest increase of 265% since 2019 (Figure 5). Siquijor is 6.1% in 2020, a decrease of 29% since 2019. Generally, there is a 10% decrease in the stunting rate of Central Visayas.

FIGURE 5. STUNTING RATE IN CENTRAL VISAYAS
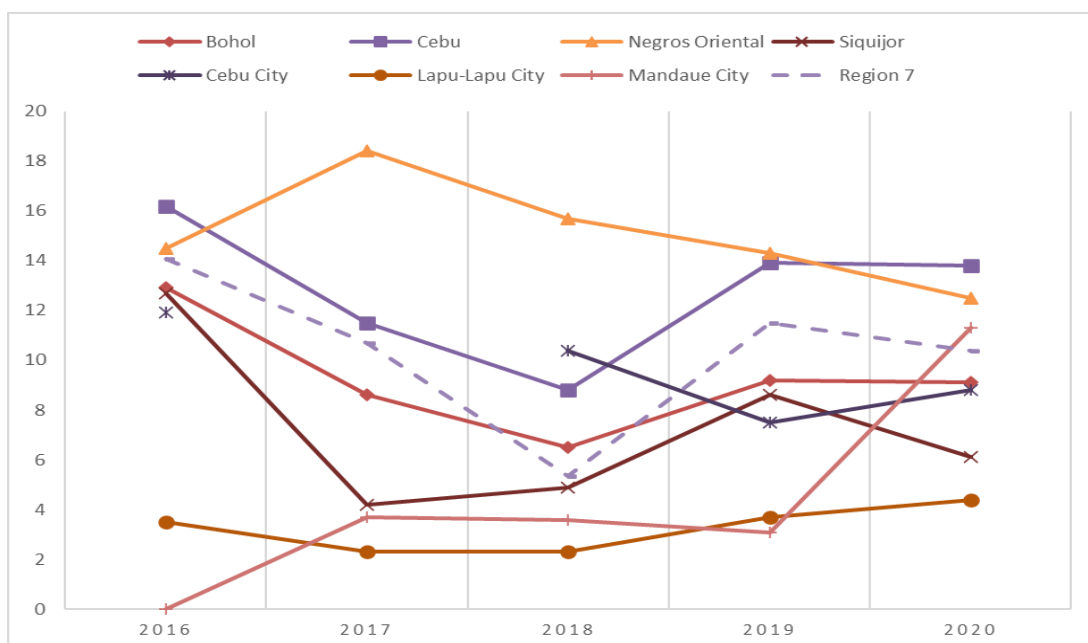
Stunting is the impaired growth and development that children experience from poor nutrition, repeated infection, and inadequate psychosocial stimulation. Children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median. Several factors could affect stunting, including improvements in maternal and paternal education, household socioeconomic status, sanitation conditions, maternal health services access, and family planning [22]. Moreover, the mental health impact, social isolation, the economic crisis, as well as interruptions in food and health systems caused by the COVID-19 epidemic, threaten to increase undernutrition in low- and middle-income nations, which includes the Philippines [23,24,25].

COVID-19 TRENDS

Cebu has the highest number of cases (32,678; Figure 6), death rate (3%; Figure 7), and has experienced several surges in cases since the start of the COVID-19 pandemic. This indicates higher transmission level of SARS-CoV-2 in this area. Moreover, Cebu's death rate is higher than the national cumulative death rate of 1.5% [26]. Strategies implemented by the national and local government are strict community quarantines which involves a temporary suspension of classes, work-from-home, and skeletal or limited workers, and restriction of the population to their homes. It allows only essential services like health care, food supply, medicines, and banking during the community quarantine.

FIGURE 6. COVID-19 EPIDEMIC CURVE IN CENTRAL VISAYAS
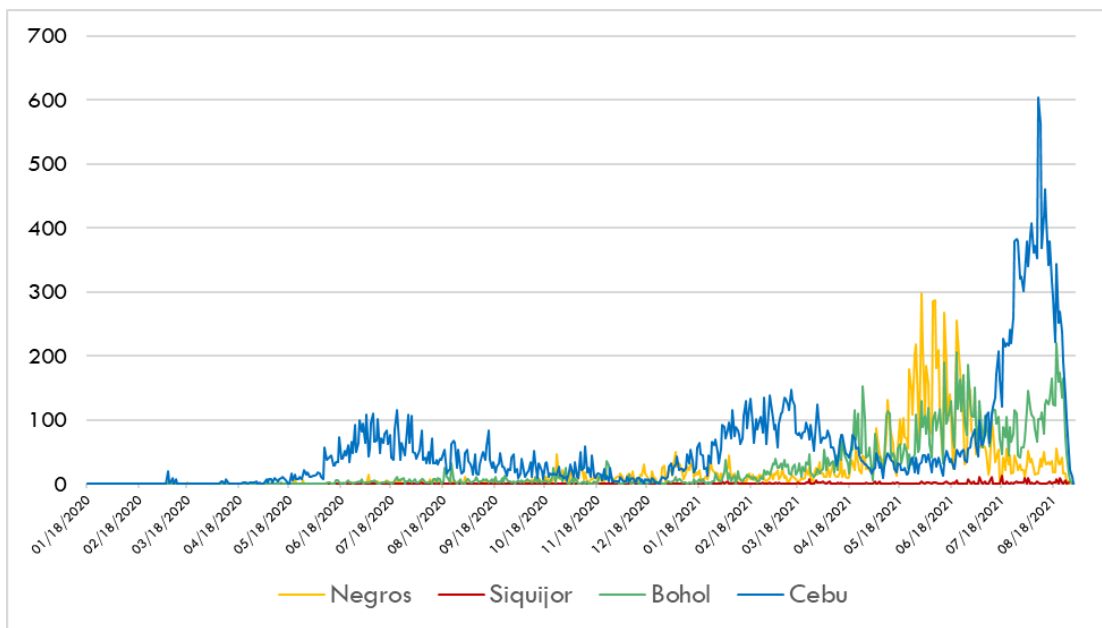
Note. Data as of September 1, 2021

FIGURE 7. COVID-19 DEATH RATE IN CENTRAL VISAYAS
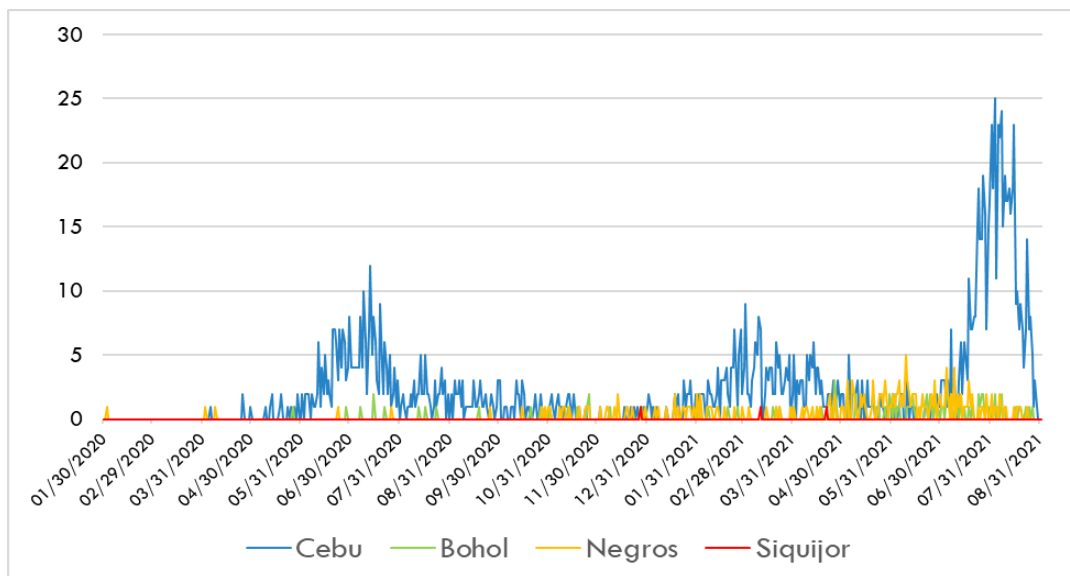
Note. Data as of September 1, 2021

The decision to impose, extend or lift a community quarantine in provinces, highly urbanized cities and independent component cities were determined by the Inter Agency Task Force (IATF) and Office of the President. Regional IATFs and their respective LGUs can decide for their component municipalities within their provinces, but the degree of stringency cannot be lower than what was recommended at the provincial level. LGUs are not to declare their own community quarantine measure without concurrence with their respective regional IATFs. As a result, across different localities and regions, the level of stringency may greatly differ. Siquijor has the lowest number of cases (401), death rate (1%). Death rates at low levels and in small

geographical regions, can be sensitive to minor fluctuations (e.g. one versus two deaths).

As seen in Figure 8, the cumulative positivity rate of Central Visayas is 9.74% and the highest rate of 51% was on April 24, 2020. The WHO has recommended a standard of a positivity rate of 5% for 2 weeks to consider the pandemic is under control. The percent positive will be high if the number of positive tests is too high, or if the number of total tests is too low [27]. A higher percent positive suggests higher transmission and that there are likely more people with coronavirus in the community who have not been tested yet. This is also influenced by surveillance system performance, testing policy and laboratory capacity [3].

FIGURE 8. COVID-19 TESTING TRENDS IN CENTRAL VISAYAS
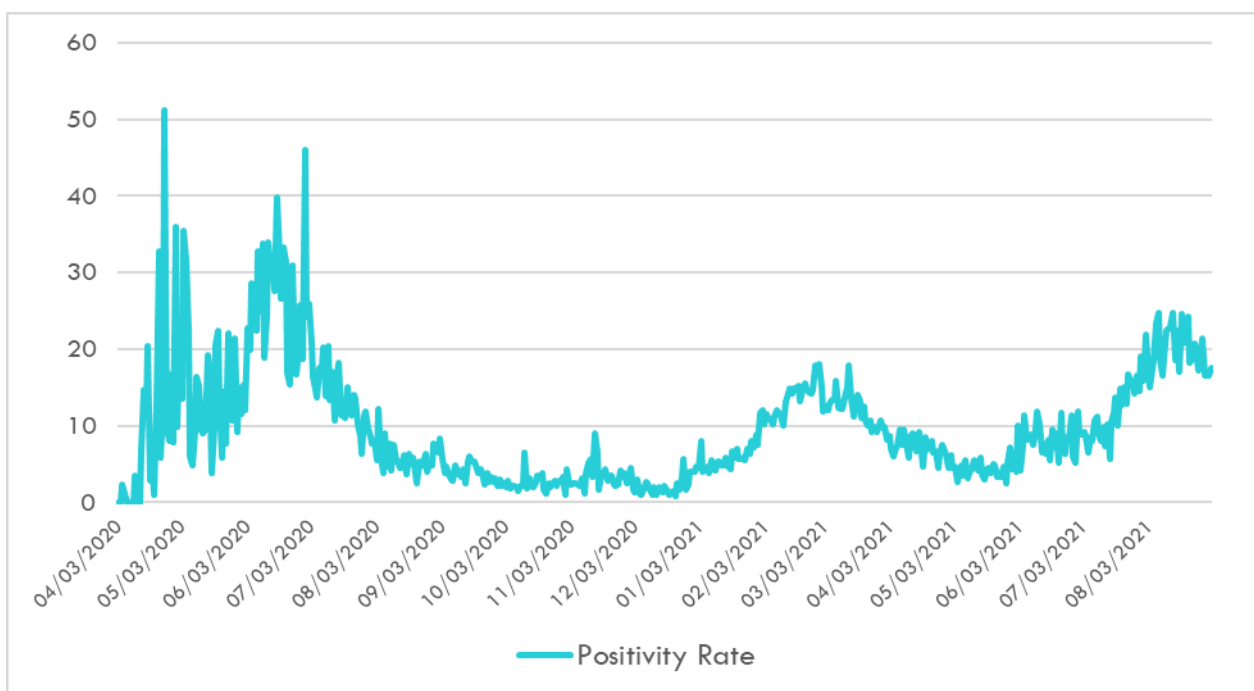
Note. Data as of September 1, 2021

Early in the outbreak, testing focused more on symptomatic patients who seek care, so milder and asymptomatic cases are less likely to be detected, leading to overestimation of positivity rate and death rates; this overestimation may decrease as testing and active case finding increase [3]. Despite the alarming rise in COVID-19 cases, testing and contact tracing of suspected COVID-19 cases remained behind target [28]. The government fell short of its goal of doing 30,000 polymerase chain reaction (PCR) tests by the end of May 2020 and 50,000 by the end of June 2020. Currently, the Philippines has yet to implement random testing and surveillance due to limited capacity and resources. Among Southeast Asian countries, SARS-CoV-2 has been successfully controlled or eliminated due to Singapore and Vietnam's comprehensive surveillance

strategy to detect and contain as many cases as possible [29].

HEALTH CARE CAPACITY

Capacity standards provides the number of health infrastructure and workers required to attain the objectives of the health system and meet population needs. As seen in Table 1, in terms of the capacity of the health care system to meet the health needs of the population, the hospital beds to population ratio in Region 7 is 1:1198, which is lower than the ideal ratio of 1:1000. The province of Cebu still needs around 2,701 beds to meet the ideal ratio. Only Cebu City (2,132) and Mandaue City (297) have more than enough hospital beds given the concentration of hospitals, especially private health facilities, in these areas. Moreover,

majority of the tertiary hospitals in the region (71%) is concentrated in Cebu while there is none in Siquijor. Health facilities may become congested, and this problem is exacerbated by the limited capacities of primary care providers to provide quality preventive and primary care.

There is also lack of health personnel, equipment, supplies and other resources needed to provide quality care in the communities, Therefore, even management of primary cases is being referred to higher level facilities which adds to the congestion of the hospitals.

TABLE 1. HOSPITAL BEDS IN CENTRAL VISAYAS

Province/ City	Estimated 2020 Population	No. of Hospital Bed Capacity				Bed Requirement	Surplus/(Gap)
		Gov't	Private	Total	Current Bed to Population Ratio		
Bohol	1,365,108	505	586	1091	1251	1365	-274
Cebu	3,226,286	225	300	525	6145	3226	-2,701
Negros Oriental	1,406,275	350	400	750	1875	1406	-656
Siquijor	100,456	75	0	75	1339	100	-25
Cebu City	1,012,802	798	2347	3145	322	1013	2,132
Lapu-Lapu City	398,110	50	260	310	1284	398	-88
Mandaue City	448,009	50	695	745	601	448	297
Central Visayas	**7,957,046**	**2053**	**4588**	**6641**	**1198**	**7957**	**-1,316**

Note. General hospitals only

The impact of the COVID−19 pandemic has affected hospitals beginning March 2020. The capacity of hospital beds was at the verge of coming under great pressure. There is a shift of regular beds to specific COVID-19 beds due to special hygiene measures, and the increased need for Intensive Care [30].

As seen in Table 2, for primary health care facilities, there were not enough rural health units/city health offices, as shown by the RHU to population ratio of 1:34,747 for Region 7 compared to the ideal 1:20,000 ratio. Cebu province had

the biggest gap in RHUs (-106). Only Siquijor had more than enough RHUs (7) to serve its population.

Moreover, Region 7 did not have enough barangay health stations (BHS) to adhere to the ideal of 1:5,000 BHS to population ratio. Specifically, there are gaps in the number of BHS in Cebu Province (-619) and the three cities of Cebu (-123), Mandaue (-53), and Lapu-Lapu (-51). The rest of the provinces have more than enough BHS to serve its population.

TABLE 2. PRIMARY HEALTH CARE FACILITIES IN CENTRAL VISAYAS

Area	Total Population	RHU/CHO to Pop Ratio	No. of RHUs/CHOs	RHU/ CHO Needed	Surplus/ (Gap)	BHS to Pop Ratio	No. of BHS	BHS Needed	Surplus/ (Gap)
Bohol	1,365,108	13,001	105	68	37	2,585	528	273	255
Cebu	3,226,286	58,660	55	161	-106	124,088	26	645	-619
Negros Oriental	1,406,275	28,126	50	70	-20	2,807	501	281	220
Siquijor	100,456	8,371	12	5	7	1,522	66	20	46
Cebu City	1,012,802	202,560	5	51	-46	12,660	80	203	-123
Lapu-Lapu City	448,009	448,009	1	22	-21	11,487	39	90	-51
Mandaue City	398,110	398,110	1	20	-19	14,745	27	80	-53
Central Visayas	7,957,046	34,747	229	398	-169	6,280	1,267	1,591	-324

Moreover, the Local Government Code mandates that all barangays (native Filipino term for a village and the smallest administrative division in the Philippines) should have at least one (1) barangay health station (BHS), but about 50% of the total barangays in the country do not have a BHS [31]. Half of Filipinos do not have access to a nearby primary care facility or one that patients can reach within 30 minutes.

Primary health care (PHC) is the initial point of contact for individuals, families, and communities into the healthcare system. PHC ensures that people receive comprehensive and continuous care, ranging from promotion, prevention, treatment, rehabilitation, and palliation [32]. Ideally, it should be delivered in communities closer to the people [1]. This is a crucial component during pandemics since they are the ones that will be the first lines of defense for prevention of transmission within the community. More importantly, PHC leads to better health outcomes. Meta-analyses show that the supply of PCP and continuity of care reduce all-cause

mortality [33]. Primary care interventions, such as the use of community health workers (CHWs) reduce maternal, child and neonatal mortality in low and middle-income countries [34, 35]. Furthermore, variations in access to services are frequently caused by social, economic, and geographic constraints, resulting in disparity in health outcomes [19]. The poor are frequently located in rural and difficult-to-reach places, making it difficult for them to access health care when they need it.

As seen in Table 3, for the health human resources, Region 7 does not have enough physicians and midwives but have more than enough nurses. Cebu province has the biggest gap for physicians (-138) and midwives (-481) while for the three cities of Cebu, Mandaue, and Lapu-Lapu, have gaps for physicians, nurses, and midwives. The other provinces have more than enough health professionals for their population. Estimates are limited by the unavailability of data for private health facilities.

TABLE 3. HEALTH HUMAN RESOURCES IN CENTRAL VISAYAS

Area	Total Population	Physicians	Nurses	Midwives	Physician needed	Nurse needed	Midwives needed	Physicians Surplus/ Gap	Nurses Surplus/ Gap	Midwives Surplus/ Gap
Bohol	1,365,108	73	535	505	68.3	136.5	273.0	5	398	232
Cebu	3,226,286	23	496	164	161.3	322.6	645.3	-138	173	-481
Negros Oriental	1,406,275	49	373	422	70.3	140.6	281.3	-21	232	141
Siquijor	100,456	7	53	53	5.0	10.0	20.1	2	43	33
Cebu City	1,012,802	32	84	108	50.6	101.3	202.6	-19	-17	-95
Lapu-Lapu City	448,009	9	32	44	22.4	44.8	89.6	-13	-13	-46
Mandaue City	398,110	4	35	34	19.9	39.8	79.6	-16	-5	-46
Central Visayas	**7,957,046**	**197**	**1608**	**1,330**	**397.9**	**795.7**	**1,591.4**	**-201**	**812**	**-261**

In response to the COVID19 pandemic, provincial targets established by the DOH include at least: one epidemiology and surveillance officer for every 100,000 population, one contact tracing personnel for every 800 population, Barangay Health Emergency Response Teams (BHERT) for every 1,000 population, and 10 trained testing staff [31]. Moreover, one reason for this shortage may be because the Philippines has been exporting human resources for health around the globe and to richer nations due to weak local economic conditions [15]. Among the key factors that push health professionals to migrate are insufficient salary, frustrations on job security, non-recognition, and

unfavorable work conditions. Another concern is that health human resources are spread inequitably across various areas of the country; most are concentrated in highly urbanized areas. Although the financial benefits of this strategy appear to be substantial, equity concerns about the negative effects of international trade in health services and workforce migration on national health systems have surfaced, particularly in terms of widening disparities in the rural–urban or public–private mix. During the COVID-19 pandemic, one of the numerous challenges connected to health human resources that has been identified is a scarcity of medical supplies and equipment,

which has resulted in a number of deaths among health care professionals [36]. As the COVID-19 situation worsens, healthcare personnel have reported a lack of personal protective equipment (PPE), supply chain problems, higher workload, psychological distress, stigmatization, and lack of incentives [37,38].

CONCLUSIONS

The outbreak of the COVID 19 pandemic that resulted in a sudden spike in health service requirements exposed the long-standing vulnerabilities of health human resources in particular, and the country's health system in general. The inadequate number of health personnel and facilities provided by the health system has constrained the country's ability to effectively respond to the overwhelming demand for health services before and during the pandemic. It is important to underscore the long-standing issues related to the HRH such as low pay, high turn-over rate of trained personnel and out migration of the country's experienced health professionals. PHC as an approach to achieving community health, pinpoint the persistent need for national level public health interventions to be targeted to community health and social determinants of health as well as individual health, with the assumptions that good community-level health care and holistic development can redound to good national health outcomes. Enhanced healthcare investment could strengthen the country's ability to respond to emergencies effectively. Investments in infrastructure, medical equipment, and personnel training can lead to better emergency preparedness, faster response times, and more efficient management of healthcare resources during crises. This can help save lives, reduce the burden on healthcare facilities, and mitigate the negative impacts of future health emergencies.

Therefore, there are preexisting problems in the Philippines' healthcare system and capacity, which might be exacerbated during health emergencies such as pandemics. All of these recurring issues in the Philippine health-care system underline the need to scale up risk-based and evidence-based interventions to minimize risks, and vulnerabilities, as well as strengthen capacity to safeguard public health from health crises.

LIMITATIONS OF THE STUDY
Secondary research data were gathered from international and local sources during the period of data collection that are publicly available or were requested directly from the agency concerned. Accuracy of data was dependent on the data collection methods of the sources, but the authors provided measures to verify data through evaluating the source, content and methods of data collection of the original source. Data gathered is only up to the 3rd quarter of 2021 and may not be able to cover the entire duration of the COVID-19 pandemic in the Philippines.

CONFLICT OF INTEREST
The authors declare no potential conflicts of interest concerning this research.

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RESEARCH ARTICLE

CLUSTERING COUNTRIES OF THE WORLD BASED ON THE TREND OF THE COVID-19 INCIDENCE: AN APPLICATION OF SHAPE-BASED K-MEANS ALGORITHM

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ABSTRACT

BACKGROUND:

The urban Health Commission of Wuhan City, China, issued an emergency notice due to an incidence of viral pneumonia of unknown cause in December 2019. The World Health Organization officially named it the 2019 novel coronavirus. Since the course of the disease is not the same in the countries and regions of the world, and the study of this diversity is an important source of information for policymakers and researchers. The trend and progress of COVID-19 is more important than the time of its incidence, the current study aims to cluster selected countries of the world based on its incidence and it was done according to the trajectories shape.

METHODS:

The data set analyzed, included new cases of COVID-19(per million people) in 13 countries of the world, which were published on the World Health website from March 2020, to October 2021 monthly then analyzed by the k-means clustering method using Fréchet distance and R software V4.0.5. in addition, clustercrit and kmlshape packages were utilized for trajectory clustering (updated monthly in countries).

RESULT:

Research results show that, 13 countries of the world were classified into 2 clusters with high and low incidence. The cluster with high incidence included 8(62%) countries. The 2 cluster exhibits the highest outlier in COVID-19 incidence. In the analyzed nations, United States and Brazil exhibited the highest incidence rate in clusters 1 and 2, respectively.

CONCLUSION:

The present findings showed that there are 2 patterns in the epidemic of COVID-19. The first pattern includes severe fluctuations and the next pattern includes low fluctuations. The results revealed that the method used in this article has the potential to understand incidence trends regardless of the time of disease onset. Since the Covid-19 infection process experiences fluctuations over time that vary based on when the pandemic began in each country, it's essential to analyze the similarity and shape of infection trends collectively, independent of their starting points.

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INTRODUCTION

The COVID-19 sickness is a usual contagious and widespread infectious disease between humans and animals caused by a virus called severe acute respiratory syndrome coronavirus 2 (SARS-COV-2). This disease was first reported in December 2019 in the city of Wuhan, China, and gradually spread throughout the country and the world and It is generally considered to be under better control in many regions compared to earlier stages of the pandemic. The disease causes serious damage to the respiratory system and sometimes leads to death[1-3].

As of 4:14 pm CET, the World Health Organization (WHO) had recorded a cumulative total of 281,808,270 confirmed cases of COVID-19 globally on December 29, 2021. These cases have been reported from almost 216 countries, all of which have been grappling with the COVID-19 outbreak for the past three years. Accordingly, the statistics indicated a significant heterogeneity among different countries and regions. For instance, the confirmed cases in the USA and Africa by 2021 were 102,287,397 and 7,164,485, respectively. Moreover, Sweden has estimated an incidence rate of COVID-19 at 12,730.79 cases per 100,000 individuals, whereas Norway, its neighboring country, has reported 7,439.44 new cases per 100,000 people in its population [4].

The identification of the sources of these variations may contribute to the potential control and reduction of the burden of the disease.

The incidence rates of COVID-19 cases were different in various parts of the world. The reasons for this heterogeneity could be explained by various factors, including but not limited to different distributions of socio-demographic characteristics[5, 6], the prevalence of main risk factors and major comorbidities [7], environmental factors[8], governments policies[9, 10], health system infrastructures [1], social adherence to protocols[11], Etc. Identification of the origin of these heterogeneities can be important for introducing the best method to prevent the occurrence of future pandemics and the necessary measures to plan and implement the optimal preventive approaches[5, 6].

Given that health systems possess rich datasets; data mining is an efficient method to discover the hidden patterns of large raw data in the field of medicine. Furthermore, prediction and diagnosis systems based on this approach can reduce disease costs, waiting time, and human errors[8, 12]. Additionally, access to valid and timely health information is the cornerstone of public health activities. Therefore, having systems for collecting, analyzing, and disseminating data for experts and policymakers to identify problems and needs, track progress, evaluate the impact of interventions, and make evidence-based decisions about health policies and programs are of utmost importance[13, 14].

The high and continuous prevalence of the COVID-19 disease in various countries around the world and continuation of patients suffering from this disease to this day highlight the importance of researchers and experts paying attention to the different dimensions of this global problem. Therefore, the need to use low-cost and quick-yield solutions to manage resources and facilities in the health and treatment system raises the need to conduct a study with a data mining approach that focuses on macro and multicenter data.

In this regard, the application of new and efficient statistical approaches such as K-means clustering algorithms creates the opportunity to find homogeneous subgroups in the data. In this way, the data points in each cluster are as similar as possible according to the similarity measure such as Euclidean-based distance or correlation-based distance[15].

Therefore, the distance measure selection is an important step in this method. Certain research overlooked the temporal pattern and promptly utilized the cumulative number of COVID-19 cases at a specific moment[9, 16, 17]. Of course, in k-means clustering based on common distances such as Euclidean, the distances are calculated at each fixed point in time, so the paths (trends) with time delay and advance are not placed in the same cluster.

Therefore, considering that the pattern of the outbreak of COVID-19 and the starting point of its epidemic are different in the world and the progress of the phenomenon of COVID-19 is more important than the moment of its

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occurrence, therefore the clustering of the countries of the world according to the similarity and shape of pattern of the COVID-19 incidence in the global level with k-means method using Fréchet distance is important. Therefore, in the current research, we considered the approach of clustering 13 countries of the world globally by using the k-means clustering method based on the shape of the trend of the incidence of COVID-19 using the Frechet distance.

METHODS

DATA SOURCE

In this study cross-sectional, we utilized COVID-19 data sourced from the WHO COVID-19 Online Dashboard (https://github.com/owid-GitHub), spanning from March 2020 to October 2021, at 20 monthly intervals. The dataset consisted of new daily infection cases (per 1,000,000 people) for each country, confirmed by positive PCR tests. Taking into account the varying trends and the distribution of the coronavirus across different nations, we chose countries from five continents that exhibited diverse infection rates. As a result, we analyzed 13 countries with distinct incidence rates.

STATISTICAL METHODS

K-means Clustering Method

The k-means method is a method for cluster analysis with the purpose of dividing *n* observations into *k* clusters *(k ≤ n)* where each observation belongs to the cluster with the closest mean [18].

The k-means clustering method is a hill climbing algorithm that is introduced as a special case of the EM algorithm for iterative convergence[19, 20]. To initialize this method, the number of clusters *(k)* is usually required as input in advance. To reach an optimal partition, the algorithm is successively repeated between the two stages of waiting(E) and maximization(M). These two steps are repeated until stabilization is achieved in cluster assignment. To formulate the k-means algorithm, it is assumed that there is a data set with *n* observations $X = \{x_1. \cdots. x_n\}$ **clustered in** k **groups** $C = \{c_k. K = 1. \cdots. k\}$[21, 22] · In longitudinal data, each observation x_i *(i=1, …,n)* shows a trajectory which is created by values of *ith* observer in different times $\{j = 1. \cdots. t\}$ and is shown by $X_i = \{x_{i1}. x_{i2}. \cdots. x_{it}\}$. x_{it} is the measured value of *ith* subject in the time t. k-means tries to find a partition where the set of distances between each observation and its cluster center is minimal. Suppose that Z_k, which is the average of the

observations belonging to the corresponding cluster, represents the center of the cluster C_k. The square of the distance between Z_k and all observations X_i in the cluster C_k can be defined as the follows:

$$(1) \quad SD(C_K) = \sum_{x_i \in C_k} \|x_i - z_k\|^2$$

The aim of the k-means algorithm is to minimize the sum of squared distances between each observation and the corresponding center in all *k* clusters [23], which is The objective function is expressed as per relation (2).

$$(2) \quad argmin \sum_{k=1}^{K} \sum_{x_i \in C_k} \|x_i - z_k\|^2$$

k-means Clustering under Fréchet Distance (according to shapes of the trajectories)

Fréchet distance was introduced by Morris in 1906 [24]. This distance is a similarity measure for geometric shapes and unlike the Euclidean distance, it considers each trajectory as a curve and is able to identify the clusters according to shape of the trajectories and not their classical distance. The first algorithm for calculating this distance was presented by Alt and Godau in 1995 [25].

Formally, according to two definitions: (1) a reparameterization a of [0,1], a non-decreasing continuous function spanning α: [0,1] → [0,1] with the condition α (0) = 0 and α (1) = 1. (2) Consider a metric space S where a curve f in S is a continuous mapping from the unit interval [0,1] to S.

Consider two given curves f and g located in S. Fréchet distance between two curves f and g in mathematical writing is defined as follows [25-28]:

$$(3) \quad \delta_F(f.g) = \inf\max\{\|f(\alpha(t)) - g(\beta(t))\|\}$$
$$\alpha. \beta \quad t \in [0. 1]$$

where | |.| | is the corresponding norm and is usually the Euclidean norm, and α and β are re-parameterized [0,1]. Considering that the progress of the COVID-19 epidemic in the selected countries has been more important than the moment of its occurrence, we employ the k-means method using the Fréchet distance to clustering selected countries according to the incidence trends similarity[28].

Data preparation, and analysis were done by *R* software (4.0.5), in addition, clustercrit and kmlshape packages were utilized for trajectory clustering (updated monthly in countries).

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We specified the number of desirable clusters according to the Cubic Clustering Criterion (CCC) index and bootstrap value. The CCC and the bootstrapped value (test statistics) can be utilized to determine the optimal number of clusters through the Ward minimum variance method, k-means, or other approaches that focus on minimizing the within-cluster sum of squares. The effectiveness of the CCC is assessed using Monte Carlo methods. Therefore, according to CCC index and bootstrap value=-1.9181 we chose to put the trajectories in 2 clusters.

The Calinski-Harabasz index was employed to assess the model's fit and the optimal number of clusters, yielding a Calinski-Harabasz score of 250.

RESULTS

Figure 1.a shows the trends of the monthly incidence of COVID-19 in 13 countries during 20 months (March, 2020 to October, 2021) by the trends in each cluster, along with the average trends in each cluster in red and green. According to diagram 1.a, 8 countries (62%) belong to the first cluster and 5 countries (38%) belong to the second cluster. Both clusters seem to trend downward over the study period, just there are two different templates.

Figure 1.b and Figure 1.c show the trends of the monthly update of COVID-19 belonging to the first and second clusters, respectively. According to diagram 1.b, in the first cluster, the trend of the incidence of COVID-19 is almost constant until September 2020, and after that the upward trend begins with a moderate slope until we encounter the peak of incidence in this cluster in March 2021. After a short increasing period, the downward trend starts with a relatively steep slope. But in this cluster, after the peak of the incidence of COVID-19 in March 2021, we are facing a downward trend with a steep slope, so that after a sharp decrease in the incidence again in July 2021, the incidence will increase. However, the peak incidence in July 2021 is less intense than in March 2021, and at the end of the period, the incidence in this cluster continues its downward trend.

According to Figure 1.c, the development trend in the second cluster has less fluctuations than the first cluster. So

that from the beginning of the study until August 2020, the trend of incidence is almost constant, and from August 2020 onwards, the upward trend starts with a moderate slope, which continues until May and June 2021, and then the incidence is controlled and the decreasing trend begins.

In addition, by taking a closer look at the trend of the incidence of COVID-19 within each cluster, it is possible to obtain multiple fluctuations in the incidence of COVID-19 in countries. For example, during the study period, the United States had strong incidence peaks compared to Iran and Malaysia, in other words, in the first 8 months of the beginning of the study (from March 2020 to October 2020), the Malaysia and Iran had a relatively stable incidence trend and continued the upward trend of the onset but the upward trend of COVID-19 in America started from the beginning of the study period. In Malaysia and Iran, the first peak was in August 2021, and in America, it was in December 2020 and August 2021, and the intensity of the peak in December 2020 and August 2021 in America was higher than in the two countries of Iran and Malaysia. In the second cluster, Brazil had more peaks compared to India, in other words, Brazil had 3 peaks in July 2020, March 2021 and July 2021, but India had two peaks in September 2020 and May 2021. Of course, the severity of the prevalence of COVID-19 in Brazil was higher than in India.

All clusters seem to show an increased rate in the study period, but there are several different patterns. Based on the fluctuation pattern of the monthly incidence of COVID-19 and the magnitude of the occurrence (increased rate), the first and second clusters can be introduced as clusters with high and low incidence respectively, and in terms of the slope of increase, it can be introduced as clusters with severe and mild increase respectively.

Table 1 contains the clustering list of countries based on the trend of monthly incidence of COVID-19 with the k-means method based on the Figure.

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FIGURE 1. (A) OBSERVED TRAJECTORIES OF MONTHLY COVID-19 INCIDENCE (PER 1,000,000 POPULATION) BY CLUSTER. (B) OBSERVED TRAJECTORIES OF THE MONTHLY INCIDENCE OF COVID-19 (PER 1,000,000 POPULATION) BELONGING TO THE FIRST CLUSTER. (C) OBSERVED TRAJECTORIES OF MONTHLY INCIDENCE OF COVID-19 (PER 1,000,000 POPULATION) BELONGING TO THE SECOND CLUSTER
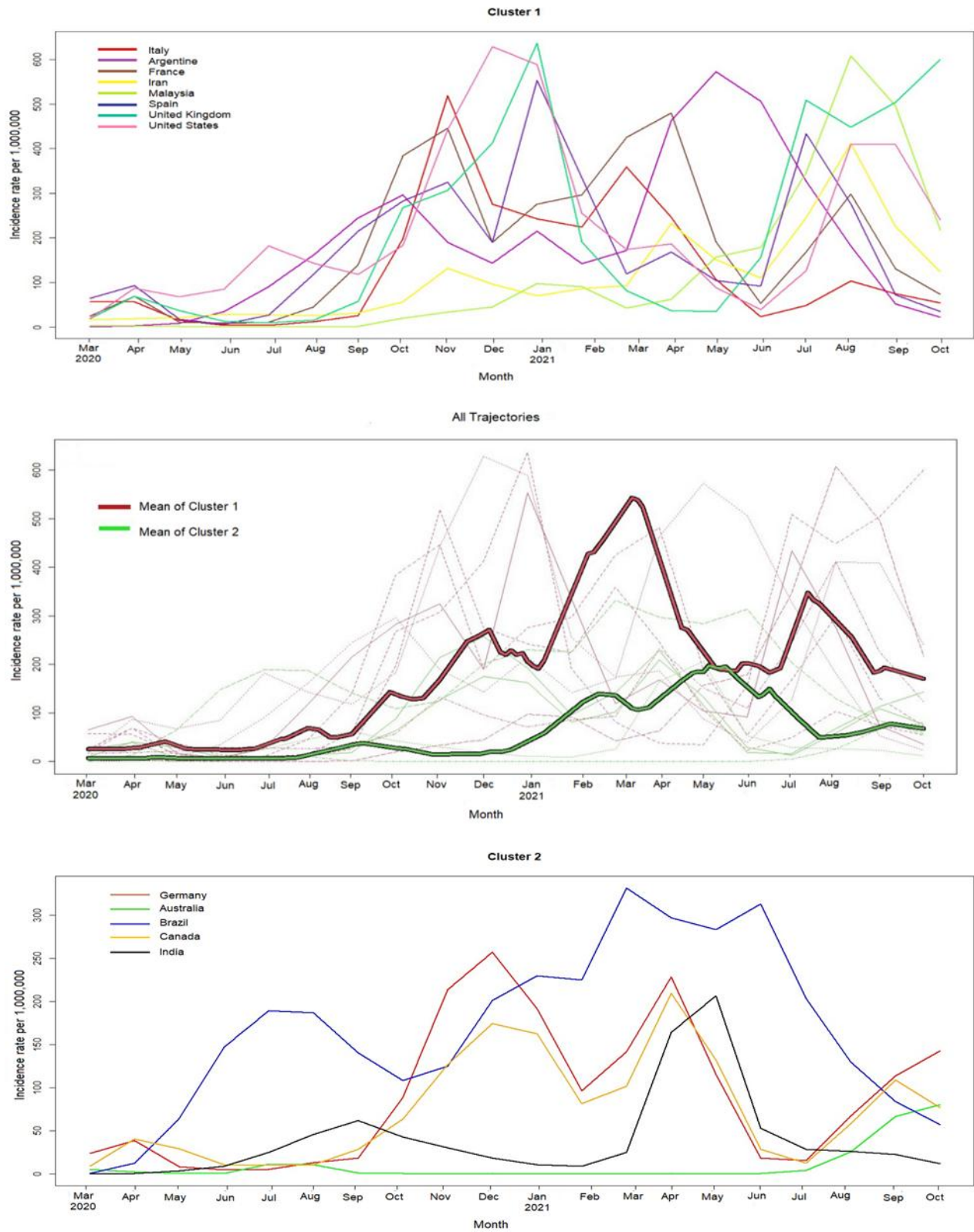
TABLE 1 CONTAINS THE CLUSTERING LIST OF COUNTRIES BASED ON THE TREND OF MONTHLY INCIDENCE OF COVID-19 WITH THE K-MEANS METHOD BASED ON THE FIGURE.

Cluster 1(sever incidence)
Italy, France, United Kingdom, United States, Malaysia, Argentina, Spain, Iran
Cluster 2(mild incidence)
Germany, India, Brazil, Australia, Canada

Figure 2 shows the distribution of the trend of COVID-19 in each cluster using box plots. According to Figure 2.a and Figure 2.b, the highest outlier of the incidence of COVID-19 belongs to cluster 2 (Figure 2.b) and among the countries in cluster 2, it belongs to Brazil. On average, the fluctuations of the incidence of COVID-19 between countries have increased after 7 months from the beginning of the study (September 2020).

In the analyzed nations, United States and Brazil exhibited the highest incidence rate in clusters 1 and 2, respectively, while Iran and Australia demonstrated the lowest incidence rate in those same clusters.

FIGURE 2. THE BOX PLOTS OF MONTHLY INCIDENCE RATE OF COVID-19 IN THE (A) FIRST CLUSTER AND (B) SECOND CLUSTER COUNTRIES DURING THE STUDY PERIOD

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6
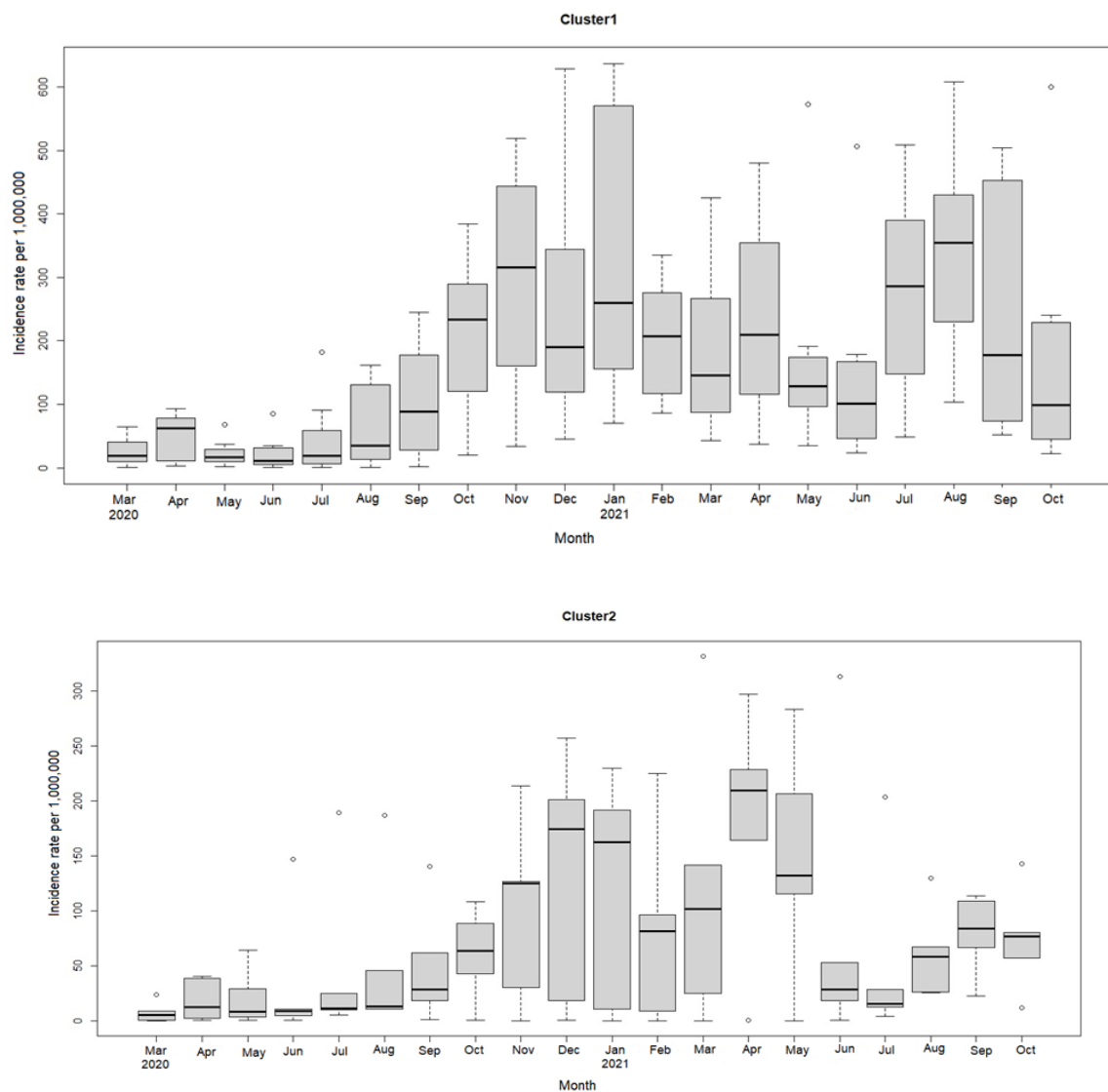
DISCUSSION

In this paper, an efficient clustering method was used, which is based on a modified k-means algorithm, a clustering method that clusters trajectories according to their shape. A prominent feature of this clustering method is that it allows clustering of cases whose trajectories have similar shapes, but their positions have changed in time. In fact, in this method, the development process is more important than the moment of its occurrence in each country. As a result, the clusters were classified according to shape of the trajectories in each country, and the countries with the same trend shape were placed in one cluster.

In this study, investigations were carried out on 13 countries of the world, belonging to the continents of Asia, Europe, America and Asia Pacific.

In this research, it was found that in addition to all the changes in the conditions of 13 countries of the world, the pattern of the spread of the epidemic of Covid-19 follows 2 different paths based on the shape of the paths. However, these patterns are almost like, there are several special features for each that make each one different from the other.

Based on the results, the trend pattern with severe fluctuations in the first cluster including 8 countries (62%) was more than the second cluster including 5 countries (38%). Most of the countries in this cluster are characterized as high- or average-income ones. In fact, the monthly incidence of COVID-19 in some countries of the first cluster in the period from September 2020 to March 2021 has increased sharply after a sharp decrease in the period from June 2021 to July 2021. In addition, the changes within the trajectories in the first cluster are higher than the second cluster. The change in the trend of COVID-19 incidence probably shows the concern in controlling the prevalence of the disease.

In order to clustering the patterns of COVID-19, Zarikas et al used hierarchical clustering of time series studies belonging to 30 countries during the epidemic onset and the next 80 days. Four separate clusters were obtained for the incidence rate. The first and second clusters followed a similar trajectory pattern, strongly increased and stable. The only difference that we observe was in the incidence level. Accordingly, the countries of Italy, France, America,

England, and Spain belonged to the cluster with a severe incidence which was similar to the present study. Zarikas et al failed to take trends and patterns into consideration, and therefore their results failed to apply to policymakers who must regulate their conclusions as a result of novel information [29].

Gohri et al. used the k-means algorithm to cluster the countries of the world. According to the clustering of the incidence of COVID-19, the countries of the world were in three different patterns. The results of the present study were relatively similar to those of Gohri et al. In this regard, the countries of Germany, Australia, Brazil, Canada, and India showed a similar pattern in both studies [6].

Another study conducted by Mahmoudi et al, selected seven different countries and categorized them into three different patterns using a complex fuzzy clustering method. The clustering results of their study showed that the distribution of dispersion in Spain and Italy was almost similar and different from other countries [16]. However, in the present study, the Central European countries had the same pattern as the United States.

Melin et al used self-organizing maps to cluster recoveries, confirmed cases, and deaths associated with COVID-19 and arbitrarily selected four clusters. If several clusters had been collected, our results would have been relatively similar. Take, for instance, the countries of America, France, Italy, England, and Spain, which exhibit a similar pattern in both investigations. In addition, the incidence trend of COVID-19 in Canada, India, Iran, Australia, Argentina, and Malaysia was lower than in these countries [17].

Several studies used a greater number of prospective variables, resulting in different clusters. In Rizvi et al study the data from 89 countries and cross-referencing 18 indicators of environmental conditions and health systems were thoroughly examined. Their K-means algorithm resulted in four clusters. The K-means algorithm they used produced a total of four clusters. Therefore, all high-income countries were included in one cluster regardless of the actual trend of COVID-19[1].

As another attempt to cluster countries based on COVID-19, Pesin et al obtained the optimal clusters from the k-means clustering method and the elbow method. The optimal clusters in these methods were four and three, respectively. Also, the two-stage clustering method was

used for the clustering process. Similar to the results of the present study, in a study using the Elbow method, the countries of England, Brazil, Italy, the USA, and Spain were placed in one cluster, and in the k-means method, the above-mentioned countries belonged to two separate clusters. Obviously, in this study the course of the disease was not considered [30].

Another study by Mahmoudi et al., selected and categorized seven countries. Their ability to choose additional countries was impeded by the complex fuzzy clustering method. Consequently, they were able to identify three distinct patterns through the utilization of this intricate technique. Due to the greater diversity in the selection of countries in our study and taking into account the course of infection, the countries were divided into two clusters [16]. According to our Findings, Central European countries had almost the same pattern as the United States, and the incidence trends of Eastern European countries are close to African, South American, and Asian countries.

CONCLUSION

The results of this research showed that by using the k-means clustering method using Fréchet distance, there are two significant patterns in the epidemic of COVID-19 disease in the countries of the world according to the form of the disease occurrence. The first pattern included severe fluctuations in the incidence. In other words, the incidence of the disease in different months was faced with an upward trend with a steep slope in the next phase and a rapid control and reduction of the incidence of the disease. This process was repeated 2-3 times in the countries belonging to this cluster. The second pattern included low fluctuations in the incidence of the disease with a gentle slope. In other words, in the first stage, the incidence of the disease increases with a gentle slope, and in the next stage, it decreases again with a gentle slope.

While we could have concentrated on cumulative incidence and overall trends, this study emphasizes the significance of examining incidence rate patterns among countries and the subtle distinctions within clusters. Understanding these characteristics and variations is crucial for predicting future trends in monthly COVID-19 incidence and for shaping health and prevention policies. The pandemic's impact in contemporary society has generated a vast amount of data and information. Nonetheless, certain data quality issues persist, yet they still

offer valuable insights. This research addresses various data types from low- and middle-income countries. Despite significant efforts, challenges remain in the registration systems, which is a critical limitation. However, we assure readers that our methodology is sound and minimizes the effects of these challenges.

The objective of this study was to categorize countries globally based on COVID-19 incidence trends using a univariate k-means analysis. However, the observed incidence trajectories for each country during the study period were notably influenced by factors such as vaccination rates, quarantine measures, and national policies. Therefore, to obtain more precise results, we recommend that future research on COVID-19 clustering employing the k-means method consider their shapes and the effects of time-dependent covariates.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The current research project with the code IR.KMU.REC.1400.602 has been approved by the National Ethics Committee in Biomedical Research and the Modeling in Health Research Center of Kerman University of Medical Sciences.

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WORK OVERLOAD, EMOTIONAL EXHAUSTION, EMOTIONAL CONTAGION, AND COMPASSION FATIGUE IN NURSES DURING COVID-19 PANDEMIC: A MODERATED MEDIATION MODEL

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ABSTRACT

OBJECTIVE:

Burnout is stated as a major problem for nurses. The relationship between work overload and burnout, another problem experienced by nurses, has been examined by different authors. However, the effect of mediation and moderation mechanisms that may affect the relationship between work overload and emotional exhaustion in nurses has yet to be clarified to a great extent. This study aims to fill this research gap by examining the mediating role of compassion fatigue and moderating role of emotional contagion in the relationship between work overload and emotional exhaustion.

METHODS:

This descriptive cross-sectional study was conducted in Istanbul, Turkey, with the participation of 330 nurses. The research model was tested with Hayes' PROCESS macro.

RESULTS:

The result shows that the indirect effect of work overload on emotional exhaustion through compassion fatigue is positive and significant (b = 0.335, 95% confidence intervals (CIs) = (0.243, 0.430)). Also, the indirect effect was found to vary depending on emotional contagion (Index of moderated mediation (IMM) = 0.076, 95% CIs = (0.029, 0.132)). In this context, the effect of work overload on emotional exhaustion through compassion fatigue is stronger in nurses with high emotional contagion levels.

CONCLUSIONS:

The study's findings revealed that emotional contagion and compassion fatigue variables are important mechanisms for clarifying the relationship between work overload and the emotional exhaustion of nurses.

KEYWORDS

burnout, compassion fatigue, emotional contagion, nursing, work overload

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INTRODUCTION

Health care focuses on humans, cannot be postponed, and is vital. Additionally, health consumers have limited information about health services, uncertainty about the quality of the health care they will receive, and lack of substitution for health services cause them to exhibit irrational behaviors such as not following medical advice [1]. These situations cause healthcare professionals to work under more difficult conditions than in other sectors. Extraordinary situations that occasionally occur can further increase the difficulties healthcare professionals face. The COVID-19 pandemic is one of the best examples of this. The COVID-19 pandemic has caused many physical and psychological conditions that have affected nurses. One of the main reasons is that nurses have the largest share among the professional groups working in hospitals and are the primary employees responsible for patient care. Many factors, such as changing working conditions, increasing patient admission, insufficient personnel in the face of intensive work, and the increasing number of shifts per person, have increased the nurses' workload both in terms of quality and quantity [2]. While the quantitative part includes burdens related to the amount and duration of work, the qualitative part includes situations that exceed the employee's knowledge, skills, and abilities [3].

One of the negative situations that nurses face is emotional exhaustion. Emotional exhaustion is one of the sub-dimensions of burnout syndrome. Compared to other dimensions (depersonalization and personal accomplishment), it is the central component with the most critical role in the emergence of burnout [4]. Emotional exhaustion is a decrease in emotional and mental energy, which causes the employee to feel tired and overwhelmed due to the constant repetition of specific job demands [5]. Compared to other professions, burnout is most prevalent in the health sector, particularly in medical care providers such as doctors and nurses. The burnout rate in 19% to 30% of employees in general increases to 25% to 75% among healthcare professionals [6].

Furthermore, burnout, defined as an occupational disease, accounts for 8% of occupational disease cases [6]. The complex working environment during the pandemic, increased working hours, increased patient admissions, and increased workloads per nurse make health service delivery very difficult. It is assumed that repeating this troublesome process throughout the pandemic will cause the nurses to constantly feel tired and overwhelmed. This process will have a negative psychological impact on them [7]. The research hypothesis developed in this context is as follows:

Hypothesis 1: Work overload is positively related to emotional exhaustion.

Nurses, whose workload has increased considerably with the pandemic, have cared for more patients than usual; many are COVID-19 patients. Some negative effects on the nurses will be caused by interacting too much with traumatized patients [8]. One of them is compassion fatigue. Composed of the sub-dimensions of secondary trauma and occupational burnout, compassion fatigue is defined as the traumatic stress that occurs due to the nurses' constantly being exposed to the sufferings of the patients. Failure to take adequate measures for nurses exposed to intense working conditions and the suffering of patients triggers compassion fatigue [9]. Therefore, the nurses' compassion fatigue, whose workload has increased considerably during the pandemic, is also likely to increase. The research hypothesis developed in this context is as follows:

Hypothesis 2: Work overload is positively related to compassion fatigue.

Nurses interact with patients requiring intensive care, especially patients at risk of death, increasing their compassion fatigue. Considering that nurses have constantly been dealing with patients who are struggling for life, showing compassion to these patients, and witnessing many deaths during the pandemic, compassion fatigue is inevitable [10]. It is stated that nurses experiencing compassion fatigue face many negative situations, such as lack of motivation, decreased empathy, hopelessness, fear, insomnia, and intention to leave work [11]. Therefore, such negative situations are likely to lead to burnout in nurses. Work overload may have a direct effect on emotional exhaustion, as well as an indirect effect through compassion fatigue. The research hypotheses developed in this context are as follows:

Hypothesis 3: Compassion fatigue is positively related to emotional exhaustion.

Hypothesis 4: Compassion fatigue mediates the relationship between work overload and emotional exhaustion.

Another variable discussed in this research is emotional contagion. Emotional contagion is the effect of triggering stimuli that arise in one individual or group on another individual or group. In other words, it is the process of one

person transferring their emotions and behaviors to another [12]. This phenomenon can occur consciously or unconsciously in which individuals or groups influence each other's behavior [13]. Empathy emerges in the process of individuals and groups influencing each other's emotions and behaviors and transferring them to others. With empathy, people are exposed to another's emotional experience and produce a similar emotional response. Watson's [14] human caring theory emphasizes an empathic relationship between nurses and patients. It is also noted that nurses' compassion fatigue will increase if the necessary precautions are not taken during this empathic relationship between patients and nurses. With the increasing workload during the pandemic, nurses have generally cared for patients who struggle with life and death in intensive care. In this process, they have witnessed the sufferings of the patients and many cases resulting in death. Therefore, it is likely that nurses who are a group with high feelings of empathy are affected by these traumatic cases and that they transfer their emotions and behaviors to their colleagues and affect them as well [15, 16]. The research hypothesis developed in this context is as follows: Hypothesis 5: Emotional contagion moderates the effect of work overload on compassion fatigue, such that this effect is stronger when emotional contagion is high.

Additionally, in this study, the effect of work overload on emotional exhaustion through compassion fatigue is expected to depend on the level of emotional contagion. In this context, the following research hypothesis was developed:

Hypothesis 6: Emotional contagion moderates the indirect effect of work overload on emotional exhaustion, such that this indirect effect is stronger when emotional contagion is high.

In the literature, the relationship between work overload and burnout has been examined in various sectors, especially in the health sector and the nursing sample [17, 18]. However, the effect of mediation and moderation mechanisms that may affect the relationship between work overload and emotional exhaustion in nurses has not been clarified to a great extent. Therefore, the lack of such studies creates a research gap. This study aims to contribute to filling this research gap by examining the mediating role of compassion fatigue and the moderating role of emotional contagion in the relationship between work overload and emotional exhaustion.

METHODS

PARTICIPANTS AND PROCEDURE

This study was designed as an explanatory and cross-sectional. The study was conducted between 18 June 2022 and 13 August 2022 with the participation of 330 nurses in İstanbul, Turkey. In this study, the face-to-face survey method was employed, and the online survey method was preferred in cases where nurses could not be reached due to the COVID-19 pandemic. A questionnaire was sent to 350 nurses who agreed to participate in the study, and 340 nurses (97.1%) completed the questionnaire. Of the 340 questionnaires obtained, ten were excluded from the evaluation according to the recommendations of Tabachnick & Fidell [19] due to more than 50% missing data. Therefore, the data obtained from a total of 330 nurses (170 obtained by online and 160 by face-to-face) were analyzed.

TABLE 1. DEMOGRAPHIC AND PROFESSIONAL CHARACTERISTICS OF NURSES

Variables			n	%	Mean	SD
Sex						
Male			81	24.5		
Female			249	75.5		
Education						
High	school	degree	45	13.6		
Associate		degree	94	28.5		
Bachelor's		degree	152	46.1		
Master's degree			39	11.8		
Income						
Low			183	55.5		
Middle			142	43.2		
High			5	1.3		

Age	32	7.7
Working time in current hospital	6.3	5.5
Working time in the profession	10.7	7.4

Note: SD, Standard deviation; Working time in current hospital (in years); Working time in the profession (in years).

Most of the nurses who participated in the study (75.5%, n = 249) were female, and more than half (57.9%, n = 191) had a bachelor's or higher education degree. The participants had been working in their hospital for an average of 6.3 years and practicing nursing for 10.7 years. In addition, the ages of the participants ranged between 20 and 60 (mean = 32±7.7), and more than half of them (55.5%, n = 183) stated that their monthly income was low.

ETHICAL CONSIDERATIONS

Prior to commencing data collection, the ethics committee approval was obtained from the ethics committee of Nigde Omer Halisdemir University with the decision numbered E-86837521-050.99-199459.

MEASURES

In this study, four scales consisting of forty-eight items were used. Also, seven questions were asked to collect participants' demographic information.

Work overload scale

The work overload scale was developed by Peterson et al. [20] and adapted into Turkish by Derya [21]. This scale has eleven items in one dimension, and the scale response options are in a five-point Likert type. As a result of the Turkish adaptation of the scale, Cronbach's alpha (CA) coefficient was calculated to be 0.86.

Emotional exhaustion scale

Maslach burnout scale was developed by Maslach et al. [22] and adapted into Turkish by Ergin [23]. In this scale, there are three sub-dimensions, "Emotional exhaustion," "Depersonalization," and "Personal accomplishment," and a total of twenty-two items. The "Emotional exhaustion" sub-dimension has nine items that will be used in this study. The response options of the scale are in a five-point Likert type. The CA coefficient for the emotional exhaustion sub-dimension of the scale was calculated to be 0.83.

Compassion fatigue scale

The compassion fatigue scale was developed by Adams et al. [24] and adapted into Turkish by Dinc & Ekinci [25]. The compassion fatigue scale consists of thirteen items and two subscales, and the scale response options are in a ten-point Likert type. The scale can also be used one-dimensionally [24]. As the score increases, the level of compassion fatigue increases. Within the scope of the scale's reliability, the CA coefficient was calculated, and the secondary trauma and occupational burnout sub-dimensions coefficients were calculated to be 0.75 and 0.85, respectively. In addition, the CA coefficient for the overall scale was calculated to be 0.88.

Emotional contagion scale

The emotional contagion scale was developed by Doherty [12] and adapted into Turkish by Akin et al. [26]. The emotional contagion scale consists of fifteen items, and the scale response options are in a five-point Likert type. As a result of the confirmatory factor analysis (CFA) conducted by Akin et al. [26], the scale presented a single-factor structure as in the original. The CA coefficient was calculated within the scale's reliability scope, and the related coefficient (a = 0.75) was considered sufficient [27].

CONTROL VARIABLES

Since gender (Female = 0, Male = 1), age (in years), and working time in the profession (in years) are important factors affecting burnout, they were included in the analysis as control variables [5, 8].

STATISTICAL ANALYSES

CFA was conducted to test the construct validity, and CA coefficients were also calculated to test reliability. PROCESS macro (v4.1), developed by Hayes [28], was used to test the research hypotheses. First, model 4 in PROCESS macro was used to test the indirect effect. Then, model 7 was used to test the moderating effect of emotional contagion on the indirect effect. For a significant effect in the scope of PROCESS macro, 95% confidence intervals (CIs) should not contain zero values. All the analyses processed using the PROCESS macro were conducted with a sample size of 5,000 using the bootstrap technique and 95% CIs. In addition, SPSS 23 program was used for descriptive statistics and correlation analysis.

RESULTS

VALIDITY AND RELIABILITY ANALYSIS RESULTS

As a result of the CFA to test construct validity, we determined that the fit indices were not in the desired range. We excluded the seventh item of the work overload

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scale (I can finish my work on time) because it had a low factor load (b = 0.153; p<0.05). We performed CFA again with the revised model. We observed that the model fit values were in the desired threshold range ($\chi2$ (974) = 2045.18, $\chi2$ /df = 2.100, Comparative fit index = 0.902, Root mean square error of approximation = 0.058, Standardized root mean square residual = 0.068). In addition, we determined that all factor loads of the scales were statistically significant. In addition, we calculated the CA coefficient to test the reliability presented in Table 2. The CA coefficients are above 0.70, indicating that the scales are reliable.

CORRELATION ANALYSIS RESULTS

Table 2 shows the main research variables' mean, standard deviation, correlation, and reliability results.

The results show that work overload positively correlated with emotional exhaustion (r = 0.641, p < 0.01) and compassion fatigue (r = 0.626, p < 0.01). Also, compassion fatigue positively correlated with emotional exhaustion (r = 0.689, p < 0.01).

HYPOTHESES TESTING

Table 3 shows that work overload positively predicted emotional exhaustion and was statistically significant (b = 0.387, p < 0.001). Therefore, H1 is supported. H2 is supported, as regression results show that work overload positively predicted compassion fatigue and was statistically significant (b = 1.454, p < 0.001). H3 is supported based on the results in Table 3 (b = 0.230, p < 0.001), indicating that compassion fatigue positively predicted emotional exhaustion.

TABLE 2. CORRELATIONS, RELIABILITY COEFFICIENTS, AND DESCRIPTIVE STATISTICS OF THE MAIN RESEARCH VARIABLES

Variables	M	SD	1	2	3	4
1. WO	3.13	0.91	**0.861**			
2. CF	4.95	2.13	0.626**	**0.934**		
3. EE	3.03	1.04	0.641**	0.689**	**0.936**	
4. EC	3.56	0.76	0.460**	0.437**	0.364**	**0.913**

Note: WO, Work overload. CF, Compassion fatigue. EE, Emotional exhaustion. EC, Emotional contagion. M, Mean. SD, Standard deviation. ** p < .01. Diagonals (in bold) represent Cronbach's alpha coefficient.

TABLE 3. MEDIATION ANALYSIS RESULTS

Model	Effect	SE	t-value	LLCI	ULCI	Hypotheses results
Mediation Model (Model 4 of the Hayes' PROCESS) Outcome: CF (R2=0.394)						
WO	1.454***	0.104	0.128	1.250	1.658	H2 supported
Gender (Female=0, Male=1)	−0.013	0.223	−0.060	−0.451	0.425	
Age	0.010	0.024	0.433	−0.037	0.058	
Working time in the profession	−0.002	0.025	−0.062	−0.051	0.048	
Outcome: EE (R2=0.553)						
WO	0.387***	0.055	7.001	0.278	0.495	H1 supported
CF	0.230***	0.023	9.876	0.184	0.276	H3 supported
Gender (Female=0, Male=1)	−0.003	0.093	−0.036	−0.187	0.180	
Age	−0.010	0.101	−0.974	−0.030	0.010	
Working time in the profession	0.019	0.011	1.841	−0.001	0.040	
Bootstrapping results of the indirect effect						
WO → CF → EE	0.335	0.047		0.243	0.430	H4 supported

Note: WO, Work overload. EE, Emotional exhaustion. CF, Compassion fatigue. Age (in years). Working time in the profession (in years). LLCI, Lower limit confidence interval. ULCI, Upper limit confidence interval. ***p < .001. Unstandardized effects are reported in the table. Bootstrap sample size = 5,000.

H4 states that compassion fatigue mediates the relationship between work overload and emotional exhaustion. The bootstrapping estimate on the indirect effect of work overload on emotional exhaustion through compassion fatigue is positive and significant because 95% CIs do not include zero (b = 0.335, 95% CIs = (0.243, 0.430)). Therefore, H4 is supported.

Table 4 presents the findings of the moderator role of emotional contagion in the relationship between work overload and compassion fatigue and the moderator role of emotional contagion on the indirect effect of work overload on emotional exhaustion.

H5 states that emotional contagion strengthens the positive relationship between work overload and compassion fatigue. Table 4 shows that the interaction term of work overload × emotional contagion has a positive and significant effect on compassion fatigue (b = 0.328, p < 0.01). Therefore, H5 is supported. The results also show that the conditional effect of work overload on compassion fatigue is positively significant and stronger in the high emotional contagion condition (b = 1.472, p < 0.001). At the same time, it is positively significant but weaker in the low emotional contagion condition (b = 0.971, p < 0.001).

TABLE 4. MODERATED MEDIATION ANALYSIS RESULTS

Model	Effect	SE	t-value	LLCI	ULCI	Hypotheses results
Moderation Model (Model 1 of the Hayes' PROCESS) Outcome: CF (R^2=.0440)						
WO	1.222***	0.111	11.03	1.004	1.435	
EC	0.723***	0.146	4.971	0.437	1.001	
WO x EC	0.328**	0.111	2.962	0.110	0.546	H_5 supported
Gender (Female=0, Male=1)	−0.255	0.226	−1.130	−0.699	0.189	
Age	0.003	0.023	0.140	−0.043	0.049	
Working time in the profession	0.001	0.024	0.018	−0.047	0.048	
Results for conditional effect of WO on CF at different levels of EC						
A Low (-1 SD)	0.971***	0.147	6.613	.682	1.260	
A Medium (Mean)	1.222***	0.111	11.03	1.001	1.440	
A High (+1 SD)	1.472***	0.131	11.21	1.214	1.730	
Moderated Mediation Model (Model 7 of the Hayes' PROCESS)						
Bootstrapping results for the conditional indirect effect (WO → CF → EE) at different levels of EC						
A Low (-1 SD)	0.223	0.042		0.146	0.309	
A Medium (Mean)	0.281	0.041		0.204	0.366	
A High (+1 SD)	0.339	0.050		0.247	0.441	
Index of moderated mediation (IMM)	0.076	0.026		0.029	0.132	H_6 supported

Note: WO, Work overload. EE, Emotional exhaustion. EC, Emotional contagion. CF, Compassion fatigue. Age (in years). Working time in the profession (in years). LLCI, Lower limit confidence interval. ULCI, Upper limit confidence interval. **p<.01, ***p < .001. Unstandardized effects are reported in the table. Bootstrap sample size = 5,000.

FIGURE 1. THE EFFECT OF WORK OVERLOAD ON COMPASSION FATIGUE AT DIFFERENT LEVELS OF EMOTIONAL CONTAGION
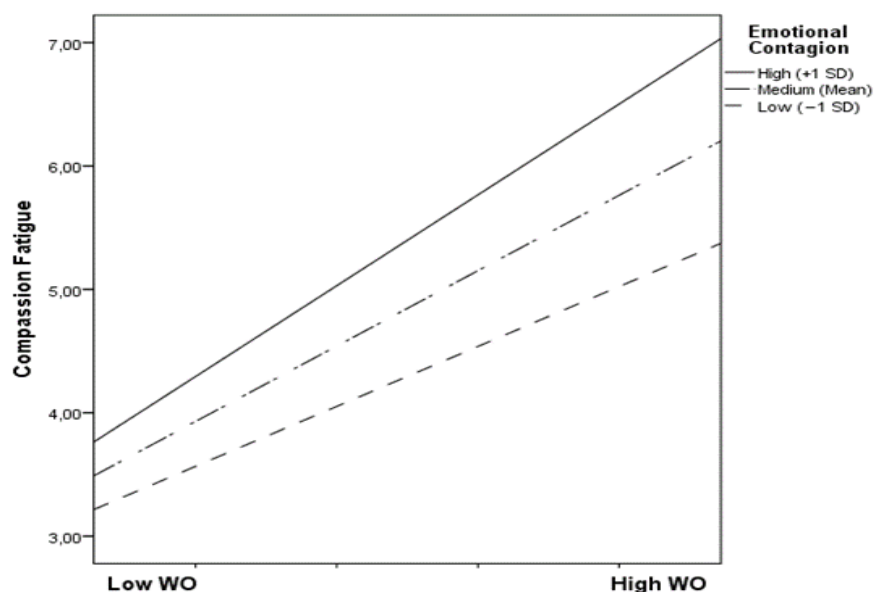
Figure 1 shows the effect of work overload on compassion fatigue at different levels of emotional contagion. As shown in Figure 1, work overload's positive effect on compassion fatigue strengthens as emotional contagion increases.

The index of moderated mediation (IMM) shows that the indirect effect depends on the emotional contagion and changes according to the emotional contagion's value. Hence, mediation is moderated (IMM = 0.076, 95% CIs = (0.029, 0.132)). The bootstrapping results show that the conditional indirect effect is positively significant and strong in the high emotional contagion condition (b = 0.339; 95% CIs = (0.247, 0.441)), while it is positively significant but weaker in the low emotional contagion condition (b = 0.223; 95% CIs = (0.146, 0.309)). Indirect effects at low, medium, and high levels of emotional contagion are statistically different from each other. Consequently, H6 is supported.

DISCUSSION

Various studies conducted in the health sector demonstrate that nurses are exposed to multiple occupational stressors, especially work overload and patients' emotional reactions. Therefore, nurses are at risk of severe distress, burnout, and many mental and physical illnesses [6]. Within the scope of this study, a moderated mediation model was established to test whether work overload has an indirect effect on emotional exhaustion through compassion fatigue and whether emotional contagion moderates this indirect effect. To the best of our knowledge, this is the first study to consider compassion fatigue in the relationship between work overload and emotional exhaustion in nurses.

This study discussed the variable of work overload to explain the emotional exhaustion behavior of nurses. The findings indicate that, as work overload increases, emotional exhaustion increases in nurses. The previous studies support this finding [17, 18]. In the literature, the relationship between compassion fatigue and burnout is generally approached conceptually, and it is stated that burnout results from compassion fatigue [29, 30]. On the other hand, the findings of the limited number of empirical studies support the results of our research [31, 32]. We also discovered that work overload has a positive effect on compassion fatigue. In a qualitative study by Maytum et al. [33] with nurses, 60% of pediatric nurses stated that work overload triggered compassion fatigue. Frank & Karioth

[16] reported a positive correlation between work overload and compassion fatigue in a study conducted with the nurses who served during the hurricane in Florida. The findings of those studies supported our results. In this context, the mediating role of compassion fatigue in the relationship between work overload and emotional exhaustion was tested. The findings indicate that compassion fatigue mediates this relationship. The fact that compassion fatigue mediates this relationship demonstrates that compassion fatigue is noteworthy as an explanatory mechanism in this relationship.

Furthermore, the study's findings indicate that the effect of work overload on compassion fatigue varies according to the emotional contagion levels of nurses. In nurses with high levels of emotional contagion, work overload leads to higher levels of compassion fatigue. In addition, emotional contagion moderates the effect of work overload on emotional exhaustion through compassion fatigue. Therefore, the effect of work overload on emotional exhaustion is stronger in nurses with high emotional contagion levels. Morley [34] stated that employees who can create distance and disconnect between themselves and patients are exposed to less stress. However, this situation is seen as very difficult in nursing practice. The necessary empathic relationship between the nurse and the patient increases compassion fatigue unless conscious steps are taken [14, 15]. Gleichgerrcht & Decety [35] define empathy as the contagious sharing of the other person's emotional state. Therefore, it is stated that this aspect of empathy involves emotional contagion [36]. The study by Shi et al. [37] with 794 oncology nurses concluded that empathy increases compassion fatigue. White's [38] study also reported that emotional contagion increases compassion fatigue. Thus, these results support our findings. Theoretical implications

The findings obtained within the scope of this study have contributed to the enrichment of understanding by offering a different perspective on the definition of the relationship between work overload and emotional exhaustion. Previous research, which has studied the effect of work overload on emotional exhaustion, is also available, and the results support our research findings [17, 18]. However, this study suggested a different perspective for clarifying emotional exhaustion by testing the possibility that work overload may indirectly affect emotional exhaustion through compassion fatigue. In addition, we revealed that both the effect of work overload on compassion fatigue and the indirect effect of work overload on emotional

exhaustion through compassion fatigue vary depending on the emotional contagion levels of nurses. Addressing emotional contagion in clarifying compassion fatigue and emotional exhaustion improves the understanding of these variables. Many authors have already clarified the concept of emotional exhaustion through different variables. However, this study provides a different perspective in clarifying emotional exhaustion, which constitutes its theoretical contribution.

PRACTICAL IMPLICATIONS

The mediating role of compassion fatigue will provide insights for nurses, nursing management, and health organizations in assessing and preventing emotional exhaustion. Although it is impossible to eliminate the work overload during periods of intensive services, such as the COVID-19 pandemic, the interventions for nurses' compassion fatigue may reduce emotional exhaustion. As Powell [39] stated, nurses pay attention to their self-care despite the difficulties they encounter, creating an environment of peers and colleagues who will support them, organizations provide the appropriate consultancy or training services for nurses, and nursing managers evaluate the workload of nurses and if possible, regulating it, and taking measures to create a healthy working environment by including, for example, regular breaks and check-in times, can help to prevent compassion fatigue and thus reducing emotional exhaustion, albeit partially. In addition, nursing managers need to be aware of emotional contagion and not ignore its adverse effects on compassion fatigue and, thus, emotional exhaustion. Otherwise, it will be hard to eliminate the negative consequences of emotional contagion. Also, the Balint Group method's use, which contributes greatly to strengthening the communication between health professionals and patients, increasing the empathy levels of health professionals, and decreasing burnout levels [40], can also contribute to obtaining positive results.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

First, due to the study's cross-sectional design, each variable was measured simultaneously, with no temporal precedence. The causality in the research design is based on past studies and theories. Therefore, causal inferences from the findings of this research should be made carefully. In future studies, adopting longitudinal or experimental research designs within this model's scope will contribute to verifying the research findings. Secondly, the convenience sampling method, one of the nonprobability sampling methods, was used within the scope of the study due to the limitations of the financial, time, and working environment. This method limits the generalizability of the research results and thus limits external validity.

CONCLUSIONS

In summary, this study indicates that work overload is an effective factor in the emotional exhaustion of nurses. Furthermore, the mediation analysis suggests that compassion fatigue may be an important mechanism underlying this relationship. Additionally, examining the conditional indirect effect revealed that work overload moderates the indirect effect of compassion fatigue on emotional exhaustion. This indirect effect will strengthen in parallel to increased nurses' emotional contagion level.

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Work Overload, Emotional Exhaustion, Emotional Contagion, And Compassion Fatigue In Nurses During COVID-19 Pandemic: A moderated mediation model **9**

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MISSED NURSING CARE IN THE NEW ERA AFTER PANDEMIC COVID-19: A CROSS-SECTIONAL STUDY FROM NURSES' PERSPECTIVE

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ABSTRACT

BACKGROUND:
The important role of being a nurse is giving a safe nursing care comprehensively and without missed caring left behind. In recent years, missed nursing care become the most significant causes of morbidity and mortality of the patient in the health services, particularly at the hospital.

PURPOSE:
Identify and analyse the most frequent missed nursing care and its risk factors gave by the nurse at the hospital.

METHODS:
One hundred fifty (150) nurses who worked at inpatient COVID-19 rooms, at a Public Hospital in Jakarta, Indonesia, where involved in this study. Participants were selected by random and proportional sampling by determine nurses' number in each room helped by head nurse. The inclusion criteria of the sample are nurses who have experience working in the COVID-19 room and are willing to be research respondents. Head nurse leadership questionnaire was modified from the Practice Environment Scale of the Nursing Work Index with Cronbach's alpha 0.759 and Missed nursing care questionnaire with Cronbach's alpha 0.828.

RESULTS:
As results show there is relationship between education (p=0,05), leadership (p=0,05), and management function (p=0,005) with missed nursing care. Using SEM analysis, increasing one times of leadership factor and its function will be decreasing 0,145 times missed nursing care factor. While increasing one times of management function factor will decreasing 0,298 times missed nursing care.

CONCLUSION:
There is a significant relationship between leadership of manager, function management, and the occurrence of missed nursing care. Continuing formal education and maintaining competences of the nurses is one of how to give a comprehensive nursing care without missed. In other hand, as a nurse managers asked to become a role model for their staffs at work. Moreover, a nurse managers should participate and involve in management function such as planning, organizing, structuring, managing equipment, adjusting working environment, manpower assignment, guiding staff and providing feedback.

KEYWORDS
nurses, missed nursing care, leadership, management function, COVID-19, pandemic.

INTRODUCTION

COVID-19 is becoming a public health concern in the past few years. World Health Organization stated COVID-19 as a pandemic due to its characteristics of widely and rapid infection across many countries in the world. Global data shown that on September 13, 2022, there were already 606,459,140 confirmed cases of COVID-19 with 6,495,110 deaths cases. COVID-19 patients in Indonesia placed on 20 out of 223 countries and became 2nd largest in Southeast Asia after India. With this large number of COVID-19 patients', health care workers particularly a nurse became a vital role in taking care and should have high competencies and intolerable missed nursing care. The significant role of nurses is often accompanied by a shortage of human resources, leading to some care tasks being overlooked. Research exploring missed nursing care is necessary to identify the care that is often overlooked and to provide input for similar conditions in the future.

Nurses are front-liner healthcare workers in handling COVID-19. [1–3] Nurses are considered as a backbone of a health system, not only because of its large number of nurses but also because its presence and performance in health services minutes to minutes of the patients. Nurses should maintain coordination with other health care workers and ensure that every single patient receives a comprehensive health care services from the beginning till the end of treatments. [4] Nurses have many roles and functions during pandemic COVID-19 attacks which required nurses to have high skills and competences particularly in handling of COVID-19 patients. COVID-19 patients are needed supportive care such as high knowledge, skill and attitudes of the nurses. In the context of COVID-19, there is often a shortage of resources, making it difficult to carry out some care tasks due to the high workload. [3] As an impact, missed nursing care will potentially arise when there is a deficiency of the numbers of health care workers particularly nurses and its health care facilities. [5] This shortage condition often leads to factors such as medication administration errors and other neglected care tasks. [9]

Missed nursing care is a condition when necessary care nursing is postponed, partially done, or even unfinished at all. [6] Alfuqaha et al (2022) found more than 78% of nurses were facing many reasons in missed nursing care of COVID-19 patients compared to non-COVID-19 patients which was only 72% previously. [7] Most of the missed nursing care

activities are ambulation, give patient education, and give mental support to the patients and families. Same findings explained by Labrague (2022) which there are five most missed nursing care items happened at the hospital such as adequate patient surveillance, talking with patients, skin care, ambulation, and oral hygiene. [6]

There are some factors where missed nursing care happened [8] were found that staffing, material resources, severity level of the patients and health care collaboration have become the most influential factors in their research also found that characteristics and manager function impact to missed nursing care. In other hand, missed nursing care has correlation between patient's bad experiences of nursing care, increasing of urinary tract infection, fall and death. [9] Despite that, missed nursing care also has impacts to the nurse as a health care worker such as increasing of mental and physical fatigue and high intention to resign or quit from the job. [10,11] Researchers are still undergoing on the research missed nursing care factors that affect to patient safety and the service quality and performance.

Even though a lot of research has been done on nursing miss-care, the conditions of the pandemic and new post-pandemic adaptations are still relevant to explore because there are still concerns about COVID-19 infection from patient transmission. In addition, Indonesia is interesting to study considering that during the pandemic, families were not allowed to wait for patients, even though because of the culture of the family centre in Indonesia, treatment such as bathing was often assisted by the family. The question is how is the need for care such as bathing during a pandemic and the post-pandemic transition period? Is miss-nursing care a bigger problem than it was before the pandemic? The aim of this research is to fulfil and support other missed nursing care factors of nurses at COVID-19 inpatient rooms, Public Hospital X, in Jakarta, Indonesia and give recommendation for its continuous improvement of the nursing strategies and development.

METHODS

DESIGN STUDY AND PARTICIPANTS

This research using cross-sectional research that employs structural equation modeling (SEM) multivariate analysis. There are 150 volunteer nurses involved in this study who worked at COVID-19 inpatient rooms, at Public Hospital "X" in Jakarta, Indonesia. Participants were selected by

random and proportional sampling by determine nurses' number in each room helped by head nurse. The sample inclusion criteria were team leaders and nursing staff who work in inpatient wards and have work experience of more than six months. While the exclusion criteria from the study were nurses who were on leave, were sick, and were not willing and withdrew from the research process. Samples were asked to fill an online questionnaire which take around ten minutes to be finished. Participants were paid to compensate their internet fee of access the online questionnaire. Inputted data were safe and secure in researcher database and only be utilized for this research purposes.

RESEARCH ETHICS

This research has been reviewed and approved by two ethical committees, one from Faculty of Nursing, Universitas Indonesia ethic committee with approval number KET-122/UN2.F12.D1.2.1/PPM.00.02/2022 and one from Hospital "X" ethic committee, Jakarta, Indonesia with approval number No. 31/KEPK/RSUDM/VII/2022. on May 11, 2022.

All respondents have signed the written informed consent and understood after research explanation. The respondents understood the purpose, benefits and procedures of the study. The questionnaires were filled out anonymously, and the team ensured confidentiality and explained the benefits of rese, which include accompanying the change of service providers with better quality and prioritizing patient safety. In publishing research data research the authors will also use ethical principles by maintaining data confidentiality as well as individual and organizational privacy.

INDEPENDENT VARIABLE

There are some demographic questions as independent variables (age, working experience, gender, current education, career level, and working position). The head nurse leadership questionnaire was modified from the Practice Environment Scale of the Nursing Work Index (PES-NWI) consists of nurse manager leadership, skills and support to other nurse. [12] Likert scale (1-4) was used in this questionnaire which 1=strongly disagree and 4= strongly agree. Cronbach's alpha was 0.759.

Management function questionnaire was modified from [13,14] which consist of 39 statements (combined with positive and negative statements) with Likert scale (1-4). For positive statements, 1=never and 4=always then for negative statements, 1=always and 4=never. Cronbach's

alpha was 0.775. Management elements (5M) was modified from (15) and (16), (17) which consist of 17 statements (combined with positive and negative statements) with Likert scale (1-4). For positive statements, 1=never and 4=always then for negative statements, 1=always and 4=never. Cronbach's alpha was 0.623. Self-Efficacy was modified from General Self Efficacy Scale/ GSES, Indonesian version from Schwarzer & Jerusalem, 1995 and consists of 10 statements. Cronbach's alpha was 0.671. [18]

DEPENDENT VARIABLE

The missed nursing care questionnaire was modified from [16], [19], Nursing Intervention Classification (NIC) (20) which consist of 54 statements with Likert scale (1-4). For positive statements, 1=never and 4=always then for negative statements, 1=always and 4=never. Cronbach's alpha was 0.828.

RESULTS

Table 1 shows that there are three most frequently missed nursing cares, which are self-cleanliness, communication and giving patient's needs of play, relaxation and recreation.

Table 2 shows participants characteristics which age range 26-35 years, 2 to 5 years working experiences (52%), female (84.7%), Diploma educational background (66.7%), career path at Level 1 (66.7%), practitioner nurse (60%) and employment status as permanent workers (91.3%). Table 2 also shows strong relationship between educational background with missed nursing care. Nurses with Bachelor Nurse background have higher mean score compared to nurses with Diploma educational background.

Table 3 shows that there is relationship between management function (p=0,01) with missed nursing care.

Table 4 shows that there is relationship between education (p=0,05), leadership (p=0,05), and management function (p=0,005) with missed nursing care. Using SEM analysis, increasing one (1) times of leadership factor, and its function will decreasing 0,145 times missed nursing care factor. While increasing one (1) times of management function factor will decreasing 0,298 times missed nursing care.

DISCUSSION

Missed nursing care is considered as a major problem at hospital services. This research involves 150 voluntary nurses at inpatient COVID-19 rooms, Hospital B, Jakarta, Indonesia with randomized proportional sampling. The aim of this research is identified missed nursing care among nurses in new adaptation era of COVID-19 with its factors. Findings of this research are there are three most missed nursing care activities, self-cleanliness, communication and giving patient's needs of play and recreation.

The first missed nursing care is self-cleanliness or known as personal hygiene. Helping patient's personal hygiene is very important to protect patient's health from unwanted macrobacteria and viruses from the environmental, including from Corona Virus which causes COVID-19 illness. Self-cleanliness become a missed nursing care because nurses think it is a routine job that that internship student or nursing assistant at the hospital are able to conduct it to the patients. So, nurses have more time to conduct another nursing care checklists. [21] These findings are also in line with [22] research that found 43.6% nurses often missed self-cleanliness or personal hygiene to their patients. If this situation keeps going on, it will lead to the development of complication disease and increase the risk of spread infection disease (23) found that nurses who bathing their patients only reached 41% that potentially impact that impaired skin integrity and mucosa membrane and effect of patient's comfort, [24] stated that there are some fundamental principles in perform patient's personal hygiene with COVID-19, such as usage of equipment's that increase patient's independence, checked the bathroom ventilation, proper bathroom size for keep distancing and limited to 15 minutes of bathroom usage. For patients with need bathing assistance on the bed, nurses are encouraged to use one-time wet tissue and wear a hair cap for their self-cleanliness.

For the second missed nursing care is the patient's need of play and recreation. Virginia Henderson stated play, and recreation is one of the basic needs of the patient. [25] Play and recreation could improve physical and mental patient's health However, it is becoming a missed nursing care in the new adaption COVID-19 era. It should be an important notice for nurses to understand and accommodate patient's hobbies. It could play an important role in patient's health recovery, relieve boredom while at the hospital. Nurses also encouraged to

facilitate child patient's happiness such as bring their favourite toys (26) stated that caring child patients with fun and enjoy game increased high score of their therapeutic and contribute to speedy recovery of their health condition. This caring can reduce a bad feeling of child treated in hospital [27] found that COVID-19 patients feel anxious, stressed, worried and isolated. So, it is important for nurses know their hobbies or favourite patient's activities [28] revealed that walking around in the hospital, doing video call with family members, interact with friends in social media could prevent boredom at the hospital.

The last missed nursing care is good communication. Good communication is taking important role for nurses to identify patient's needs. In the beginning of COVID-19 pandemic, communication is one of the avoided activities among nurses whereas basic patient's needed cannot be explore without good communication. [29] Virtual communication became popular between nurses and patients. Virtual communication is communication using third party application using internet or intranet connection. In past few decades, communication between health care workers and patient conduct face to face meeting, but in the past two years, it switched to virtual communication. [30] At the hospital, communication between nurse and patient held with intercom or video call which helped nurse in exploring basic patients feels and needs.

The most factors that impact to missed nursing care is educational background, leadership and the last is management function that role in nurse manager. This research finds that educational background related to missed nursing care. Nurses with Bachelor degree do fewer missed nursing care compared to nurses with Diploma degree. As a general common that education is taking important role of giving a comprehensive nursing care to the patients. Nurses hold an undergraduate degree have more ability to identify the problem, analyse based on evidence and use critical thinking to find the solution. Study conducted by [31] found that educational background and experiences drove nurses to understand patient situation and quickly find the alternatives solution to solve the patient's problem particularly on safety aspects. Nurses with Bachelor educational background forced nursing environment at the hospital to stay on continuous improvement in management and promote health and safety among nurses, health care workers and patients.

Another interesting finding is nurse manager's leadership became one of the factors that leads to missed nursing

care. In this research found that there is a significant positive relationship between leadership with missed nursing care. It means the more good manager's leadership have, the more comprehensive nursing care given. [32] stated that contributing factors which influence missed nursing cares are that leadership of the manager who have the role to set a standard of caring patients. Standard operational procedure become an important rule to keep nurses taking care of patients without missed anything left behind.

In addition, effective leadership is needed to estimate an adequate staff and direct their performances. [33] One of another problem while COVID-19 pandemic arises was human resources management. In [34] stated that leadership has significant relationship (p=0.001) and negative correlation (r =-0.35) with missed nursing care, This finding means that weaker of leadership management. leads to the increasing of missed nursing care of their staffs. In his research also presented the leadership ability of nurses' manager could reduce the probability of missed nursing care. Nursing manager who performed as a charismatic leader, full of love with others and giving inspiration to the staffs through respect and empathy could reduce missed nursing care.

Besides leadership, management function also plays important roles. (Mollahadi et al., 2021) stated that with leadership and proper management function lead to giving a good health care with COVID-19 patients. The involvement of the manager to help, support and guide staffs decreases missed nursing care numbers. [34] Nurse staffs will be motivated in seeing managers at work and became their role model. Get involved in planning, organizing, structuring, supply equipment's, adjust environmental condition, setting manpower, and provide feedback of staffs worked. This working culture became very important factors particularly in a public health crisis like the COVID-19 pandemic. (36) A good nurse manager should have a clear vision and mission that have determined by problem solving process previously. In the COVID-19 era, a leader with good educational abilities is needed, who can manage human resources, tools, and coordinate with other subsystems such as doctors. The ability of the nursing manager will also direct and implement supervision so that missed nursing care can be reduced. [3]

Management function that should have owned by nurse managers are planning, organizing, staffing, directing, and controlling. [37] Planning defined as a detail activity about what process to make an output achieved. Planning for nurses manager is the competencies to planning yearly, monthly, weekly and daily about the nursing activity. [37] In principle, planning the process of use all of the resources available and achievable by all staffs. Planning also has a realistic goal and focused on the expected result. For an example, planning in the context of missed nursing care could started on how standard operational procedures implement comprehensively start from planning on the patient's intervention until finished or called as discharge planning. [38] stated that planning strategy for nurses in pandemic COVID-19 situation could improve physical, mental and emotional health and all employees. Manage high turnover of nurses and health care workers, preparing for good recruitment and orientation and improve collaboration between health care workers in manage patient's health in receive a comprehensive health care service.

Afterwards, nurse managers should have an ability to organizing. Organizing is the process of gathering resources, classifying of duties, and giving authority and responsibility to achieved what organization is aimed. [39] The principles of organizing is managed the task, unit, command, delegation and coordination from the top of nurse management to front-liners nurses. [40] stated that the important role of coordination with COVID-19 task group. The next step is as a nurse manager should has a competencies to count an adequate staffs. [41] found missed nursing care happened due inadequate nursing staffs. Adequate staffs have positive impact to prevent death and, long period of patient's stay at hospital. An adequate staffs could identify with the numbers of patients and their characteristics.

The next is nurse manager should have the function to direct an important organization purpose. Increasing nurses' motivation that affect to their performance. Nursing supervision could increase staffs' motivation and confidence. Supervision is important to increasing motivation, enthusiasm and performance in nursing activity, including while hand over patients. [42]

For the final steps is control in management function is how to measured performance and take the corrective action to ensure organization aim. [39] Control is including coordination in various activity, decisions making at planning, organizing, directing and evaluating processes. In another context, control is also stated as taking notes,

making a report, updating progress organization and use all the resources effectively. Control implements refers to local and national regulations.

LIMITATION

This research was carried out during the transition period from the COVID-19 Pandemic to the new normal. The adaptation of several nursing care conditions was still influenced by room changes from isolation rooms to non-isolation rooms, so that some nursing actions that were missed might have been influenced by the adaptation process.

CONCLUSION

From the multivariate analysis using SEM shows that self-cleanliness, good communication and needs of play and recreation is the most missed nursing care among nurses in the new adaptation of COVID-19 era. Statistics calculated that there is a strong relationship between nurses' educational background, leadership and management function. Nurses with Bachelor educational background have more potential to identify and critical thinking to find an alternatives solution of missed nursing care compared to nurses with Diploma educational background. Implication of study refer to the nurse manager must be aware to improve management function. As a nurses' manager maintain and improve staffs' competencies and education should implement continuously to prevent missed nursing care, particularly in the context of new adaptation of COVID-19 era. Nurse managers should has a leadership thinking and behaviour because they are becoming a role model for their staffs and could improve motivation of nurses and get involved in help, support, and guide staffs in nursing care to the patients is highly required as a role model. Thus, leadership has a significant impact on in term of planning, organizing, staffing, directing, and controlling.

CONFLICTS OF INTEREST:

All contributing authors declare no conflicts of interest.

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RESEARCH ARTICLE

PUBLIC HEALTH EMERGENCY MANAGEMENT (PHEM) FOR THE COVID-19 PANDEMIC: LESSONS LEARNED FROM PUBLIC HEALTH REGION 10TH UBON RATCHATHANI, THAILAND

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ABSTRACT

The COVID-19 pandemic affected the health of the Thai people. PHEM was essential for the surveillance, prevention, and control of COVID-19. This study aimed to present the process of the PHEM for COVID-19 from February 29, 2021, to April 30, 2022, and the factors affecting the successful outcome.

The study area covered three provinces. The Target group included 37 public health personnel. The data were collected through in-depth interviews and focus group interviews based on the non-structure interview guideline and were analyzed by content analysis.

The components of COVID-19 prevention and control in the process of PHEM included (1) Emergency Operation Center (EOC) with the incidence command system (ICS) from the district to the provincial level to propose the provincial measure, (2) Provincial Communicable Disease Committee (PCDC) to manage the provincial measure, (3) the measure for surveillance, prevention, control, and treatment of COVID-19, and (4) outcomes and best practices for surveillance and control of COVID-19. The success factors of 4S and EC included space to prepare for the quarantine (HQ, LQ), Cohort Ward (CW), field hospitals, community isolation, and home isolation to face the patient and risky group, Staff from various organizations, and groups including the community leader and Health Volunteer (HV), Stuff to manage and share the medical and non-medical equipment, System of COVID-19 response including EOC, ICS, Joint Investigation Team (JIT) and Communicable Disease Control Unit (CDCU) for monitoring the real-time of surveillance and control of COVID-19 output, Environment to conduct management in hospital and the community with Infections Control (IC), and Culture in term of social capital on "the relationship of Isan people" to provide the good care and support for the patients. The structure of PHEM, Isan's culture, and good preparation were the significant factors in the three provinces.

KEYWORDS

public health, emergency management, COVID-19, pandemic

BACKGROUND

The outbreak of COVID-19 originated in China. It was an emerging disease since December 30, 2019, with confirmed cases from many countries around the world [1]. Since the virus can spread from person to person through nasal or mouth secretions from COVID-19 patients along with coughs, sneezes, or talking [2]. Thailand announced the situation of COVID-19 on December 31, 2020, with 194 new cases and 4,869 infected patients in the country [3]. According to the data on the new wave of outbreaks on May 14, 2021, it was revealed that Thailand was ranked the 94th in the world with confirmed cases of 96,050 patients,

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new cases of 2,256 patients, and a cumulative death of 548 cases as well as 30 deaths and 62,316 patients who were fully recovered [4]. In Thailand, according to measures for surveillance, prevention, and control of the disease are under the authority and responsibilities of the Ministry of Public Health (MOPH) or government agencies under the MOPH and Article 43 specified that the MOPH has a government agency [5].

The MOPH created public health approaches for managing the outbreak of COVID-19 according to Section 9 of the Emergency Decree on Public Administration in Emergency Situations B.E. 2548, totaling two copies. The first one was effective from March 26, 2020, and the second one was effective from April 3, 2020, onwards, to manage the outbreak of COVID-19[6]. This is in conjunction with the strong structure of the public health system in Thailand covering all 6 main components [7]. Management guidelines have been prepared for a crisis as well as public health personnel at the provincial and district levels to handle the emergency situation in the country [8]. Besides, the system approach is to allocate available resources for smart use based on the environment and context, leading to effective performance [9]. Strategies for the development of national disease prevention and control systems under the National Health Development Plan of the 12th National Economic and Social Development Plan B.E. 2560-2564 (Recommended Edition) [10] imposed measures to monitor COVID-19 to know the scope of the problem, identify an outbreak and track the direction of the disease with timely screening among risk populations in risk areas [11].

The literature review on systematic management approaches based on the concepts and Imperial College led to Thailand's "Lockdown and Reopening" [12]. The management of the COVID-19 epidemic prioritizes guidelines based on national policies and measures along with operations as a working group to manage the situation through mainly proactive approach [13-15]. Slum communities' implementations in Bangkok were based on the principles of community empowerment through participation in managing, developing, and solving problems in the community. The treatment for a large number of COVID-19 patients should be establishing COVID-19 centers in community settings to increase the number of facilities [16]. Additionally, the improvement of people's social quality of life and epidemic prevention is mainly conducted through the participation of the people and the community [17], especially for enhancing health literacy (HL) of vaccination for COVID-19 prevention to people in the community [18].

As for the research review, factors affecting the success in controlling and preventing COVID-19 included the 4S-EC Theme, consisting of Space, Staff, Stuff, and System [19]. Environment culture includes the physical structure of the health infra-structure [20]. As for teamwork, the implementation is related to interdisciplinary professions, history of success, knowledge and understanding of the nature of the disease, the proper use of necessary materials, equipment, and tools for the prevention and control of the diseases, and clarity and simplicity in managing the health system, enabling personnel to implement policies, leading to concrete results[19], systematic media management and the enhancement of people's digital literacy to increase their collaboration in disease control and prevention[21], community participation in the management [22], policy implementation as a leverage point in driving the entire body [23], and culture influencing behavior and lifestyles[24].

Therefore, the systematic management of the COVID-19 is crucial in Public Health Region 10th Ubon Ratchathani. The Public Health Emergency Management (PHEM) for COVID-19 has been implemented to effectively control the outbreak in the area. This study aimed to study the public health emergency management for COVID-19: A case study of management in Public Health Region 10th Ubon Ratchathani, consisting of the process of PHEM for COVID-19 and human resources in public health, and factors affecting success in the emergency situation management.

METHODS

This qualitative research was to explore the community base lesson learned on COVID-19 management [25]. The study area was Public Health Region 10th consisting of three provinces located in border areas of Thailand, including LAO PDR, Mukdahan, Amnat Charoen, and Ubon Ratchathani.

Two target groups were the representatives of public health personnel who responsible for the COVID-19 pandemic at provincial and district level, 64 people, consist of the provincial health office, district health office, provincial hospital, and district hospital and the

representative of community level, 36 people consist of the community leader, NGOs/ private, Local Administrative Organization (LAO), and Village Health Volunteers (VHV). The tool was non-structure interview guide about the direst experience of the stakeholder for COVID-19 management in the community. Method of data collecting was in-depth and group interview. Data was analyzed by content analysis.

Ethics issues have been certified by the Ethics Committee for Research in Human Subjects (IHRP, No. FWA 027-2564).

A: DEMOGRAPHIC DATA OF KEY INFORMANTS

Demographic data of key informants 100 people , key informant from Ubon Ratchathani (34.0%) and Mukdahan equally to Amnatcharoen (33.0%), most of key informants were male (51.0%), aged 36 to 50 years (53.0%, Mean = 45.69, S.D.=8.17, Min.=27, Max=58), work group of VHV (26.0%), position as PHT (29.0%), and career is work in the government office (64.0%)

B. FOUR WAVES OF COVID-19 PATIENT ACCUMULATION.

Regarding the situation of patients with COVID-19 in Public Health Region 10th, the first case of COVID-19 was found in Ubon Ratchathani on March 19, 2020. During the first wave, the report on March 31, 2020, Public Health Region 10th reported 18 cumulative patients. During the second wave from December 15, 2020, to March 31, 2021, there were 29 cumulative patients. During the third wave, from April 1, 2021, to October 31, 2021, there were 25,011 cumulative patients, and during the fourth wave, from November 1, 2021, to April 30, 2022, there were 59,852 cumulative patients. The situation at the national level was as follows: the first wave reported 456 patients, the second wave reported 1,582 patients, the third wave reported 22,565 patients, and the fourth wave reported 910,171 patients. The cumulative total on April 30, 2022, was 2,058,223 patients.

The impact and severity in each wave from the COVID-19 are as follows:

As for the first and second waves, there was a shortage of necessary equipment, such as PPE suits, masks, and alcohol gel to prevent infection by disease investigation teams and service providers in hospitals. There was also a lack of knowledge of patient treatment, resulting in panic and fear among the personnel.

The third wave is the most severe in terms of preparation for treatment, disease control, and management to treat patients due to the lockdown situation in Bangkok. In the provincial, district, and sub-district levels, the CIW, field hospitals, the CI, and the QC were prepared. It was so chaotic in the whole system, including treatment services, the services to support the patient, and the workload of physicians, nurses, public health personnel, village health volunteers, and community leaders at sub-district and village levels. As for severity among patients, patients who were infected from Bangkok took about 3-5 days to get proper treatment. For most of them, the virus could reach the lungs. Many people expressed severe symptoms. And there were deaths including people in the HR group who traveled with patients. However, in this wave, vaccines provided by public health agencies were distributed to the public.

As for the fourth wave, there was the highest number of infections, but the impact and severity were less than in the third wave since most patients expressed mild symptoms along with vaccination covering all age groups. Most patients were asymptomatic or had only mild flu which can be treated at the HI, except group 608 and the regular group with pulmonary abnormalities who were admitted to the hospital.

C: PUBLIC HEALTH EMERGENCY MANAGEMENT (PHEM) FOR COVID-19

The PHEM for COVID-19 consists of 5 components: Emergency Operation Center (EOC) with Incidence Command System (ICS), planning or measure proposal, Provincial Communicable Disease Committee (PCDC), measures for surveillance, prevention, control and treatment of COVID-19, and outcomes and best practices as follows:

The EOC was the core system in the ICS when facing the emergence of COVID-19. The role of provincial EOC included the ICS in all district and sub-district levels. The origin of the response to the COVID-19 pandemic was the CDCU to take a role in the surveillance, detection, and screening of COVID-19. The Subdistrict Health Promotion Hospital (SHPH), health Volunteer (HV), Local Administrative Organization (LAO) District Health Office (DHO), and District Hospital (DH) at the district level work together as the Joint Investigation Team (JIT) and Situation Analysis Team (SAT). SAT was a key team to propose planning and the measure to the EOC. Planning or measure proposal was considered by the PCDC which was the main mechanism of decision-

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making for the provincial measure to cope with COVID-19. Almost all the measures for surveillance, prevention, and control were launched by the PCDC while some of the measures were launched directly by the MOPH. The outcomes were COVID-19 control within 28 days in any size of COVID-19 clusters in 3 provinces and the care and treatment coverage of COVID-19 patients during the severe pandemic in the third wave. The best projects included the No MUK's people left behind project, the COVID-19 charter at the subdistrict level, conflict management in field hospitals, and the Sokka-Tae model of lockdown of the village to control COVID-19 (Diagram 1). The successful factors for controlling the COVID-19 outbreak within 28 days were the structural factors of the state's emergency operations, consisting of PCDC, EOC committees, CIS systems, and the development of CDCU capacity covering the district level. The success in treating COVID-19 patients in hospitals, field hospitals, and communities was due to community participation, awareness of joint problem solving, and the social capital of the Isan (north-eastern part of Thailand) communities that provide care for patients as if they were family members. Community cooperation in preparing patient care facilities both in field hospitals and in communities, as well as sacrifices by community health volunteers, community leaders, monks, schools, local administrative organizations, people, and volunteers both in and outside the community.

DIAGRAM1: MANAGEMENT MECHANISM TO COVID-19 OF THREE PROVINCES LOCATED IN PUBLIC HEALTH REGION 10TH, THAILAND
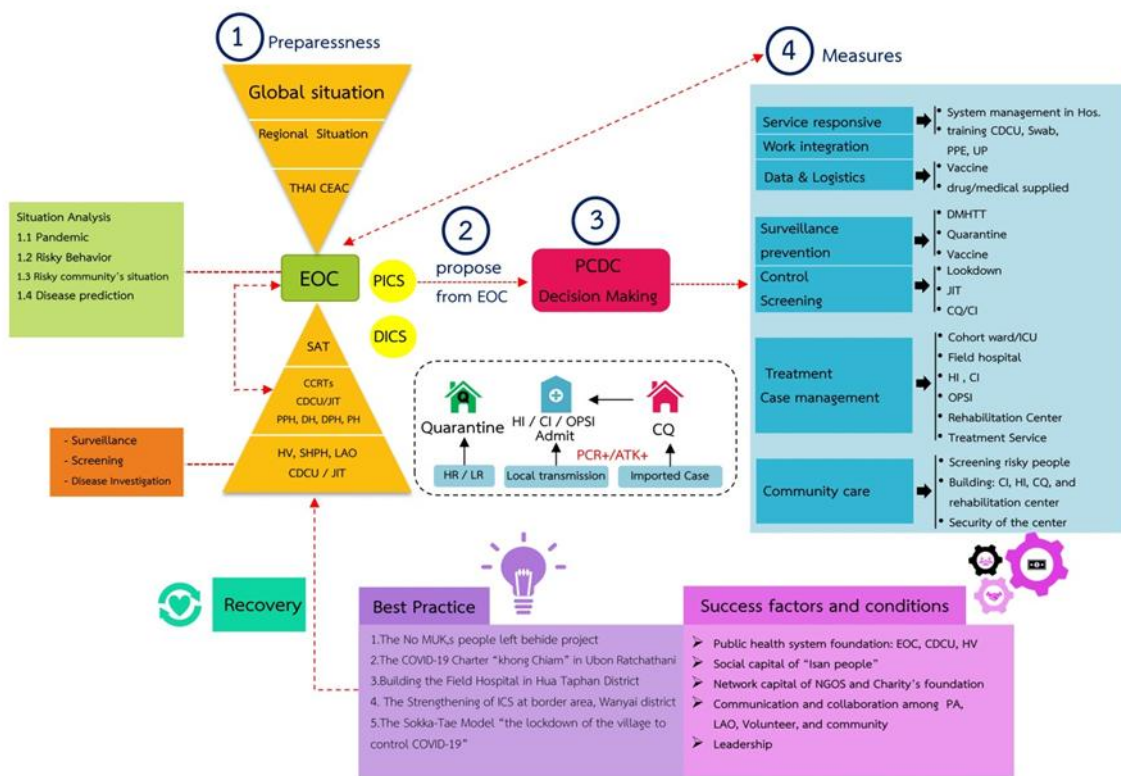
The process of prevention and control of COVID-19 in Public Health Region 10th, Ubon Ratchathani, employed the analytical framework according to the Public Health Emergency Management (PHEM) 2P2R process (P1: Prevention and Mitigation, P2: Preparedness, R1: Response, R2: Recovery) as follows:

P1: Surveillance/Prevention/Mitigation is the overall surveillance and prevention in the country through a national emergency surveillance plan. The DDC, MOPH, prepared to manage emergencies with the development of the EOC and the ICS as a guideline for public health personnel development in all provinces, including the provincial public health physicians and hospital directors.

Moreover, in all provinces, the EOC must be established while the Communicable Diseases Act was issued along with the development of the CDCU at the district level. The development of the JIT team and the SAT team at the provincial, district, and sub district levels were contributing to the preparation of the Thai public health system to deal with emergency situations and to reduce severity.

P2: Preparedness was to structurally deal with the COVID-19 outbreak in the three provinces. Every province used the term "Activate EOC" in the EOC committee meeting to acknowledge the roles, duties, and preparations as well as the epidemic situation and the severity of the disease at the national and international level from the CEAC to analyze the situation and to report to the EOC committee under Communicable Diseases Act. This is to issue measures for surveillance, prevention, and control of the disease in each province. The key contributors to the preparations included the President of the OEC and the EOC in each province.

R1: Respond was operated through measures, surveillance, prevention, and control of COVID-19 when facing the situation of COVID-19. This includes situation analysis as the main role of the SAT team in the provincial EOC committee by collecting data on the situation within the province at the sub district and the district levels through the CDCU committee or CCRTs from disease surveillance and investigation field visits, and disease management of risky groups for quarantine according to the measures. Data on all patients receiving care in a healthcare facility were managed by the EOC and the SAT team and sent to the provincial SAT team to conduct a situation analysis which was presented to the provincial public health physicians and hospital directors. The tendency of infected people, the situation, and the spread of COVID in the area were predicted. The inspector of the MOPH assigned the ODPC 10 team to analyze the overall picture of the district while the SAT team was responsible for the provincial level due to its size and severity. This includes preparation guidelines to handle the situation which were presented to the EOC to impose measures or operational guidelines at the provincial level. This effective response was dependent on the essential performance, skills, and techniques of public health personnel (PHP), which were developed before and during the COIVD-19 pandemic. The process of issuing measures in the provincial level starts with the SAT team in the EOC committee presenting the tendency and severity of the situation in the area to the CDC for decision-making to issue work plans and guidelines. The key measures to respond to COVID-19 included surveillance measures to prevent and control the disease, logistics system management, service system and operational integration, and the nursing care team in the community.

As for R2: Recovery, the three provinces prepared to restore tourism in the provinces and reopen the country to stimulate the economy, especially Mukdakarn and Ubon Ratchathani. Public relations were prepared for a Covid-free setting in tourist attractions, restaurants, and hotels, and there were also legal and regulatory systems that facilitate tourism to stimulate the economy within the provinces.

DISCUSSION AND CONCLUSION

The process of the prevention and control of COVID-19 in Public Health Region 10th was compared to the systematic approach for the sustainable development goal which was consisting of 3C principles [27], namely classification, coordination, and collaboration. According to the factors affecting the success of the COVID-19 prevention and control of the Public Health Region 10th Ubon Ratchathani above, when compared to factors affecting the success of COVID-19 disease prevention and control operations with 4S-EC Theme [19], similarities and differences were found. As for Space, the three provinces were prepared to accommodate patients and risk groups at the household, village, and sub district levels, while foreign countries only prioritized hospitals. As for Staff, importance was placed on patient care from the hospital to the community level, and this differed from other countries. To clarify, they did not focus on taking care of the community. However, the findings in the study areas of the three provinces suggested that community care was the most important to prevent and control the disease effectively. The key roles in caring at the community level included VHVs, community leaders with the SHPH as mentors, and the Provincial Public Health Office to direct the implementation of the measures. Thus, the performance and essential skills, knowledge of prevention and control, and care and treatment on COVID-19 were crucial the most for all staff of PHP, VHVs, LAO, community leaders, and villagers.

As for Stuff, it was not quite different from the case of other countries. As for System, a working structure and system were clear including collaboration from the village, sub district, district, province, and national levels under the structure or work model of the EOC, ICS, OEC, and CDCU.

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As for Environment, the same principles of environmental management were employed to prevent and control the disease. However, the IC was used to design environmental management at the village, household, and sub district levels for risk groups and patients. As for Culture, it was different from the case of other countries. The household culture was stressed in disease prevention and control while, in the study area, a social capital emphasizes the relationship between relatives with neighbors as a relative affecting the care and assistance of risk groups and patients in the community. The details are as follows:

COMPARISON OF FACTORS AFFECTING THE SUCCESS OF THE PREVENTION AND CONTROL OF COVID-19 IN PUBLIC HEALTH REGION 10TH UBON RATCHATHANI AND 4S - EC THEME FROM ABOARD

Public Health Region 10th Ubon Ratchathani	4S-EC Theme
Space: The HQ and LQ were prepared to support risk groups and the group waiting for PCR results before being admitted to the hospital and the CIW, ICU, field hospitals, CI, and HI were prepared to treat patients.	**Space:** Health infra-structure [1, 8] included quarantine areas, number of beds and wards, and necessary tools for sufficient patient treatment.
Staff: Operations were in form of a network from all sectors with clear roles. The common goal was to prevent and control COVID-19 in the area and reduce the loss to a minimum. The key groups contributing to the community level included VHVs and community leaders. All staff were enhancing their performance to fight COVID-19.	**Staff:** It included public health personnel with multidisciplinary personnel from other agencies and the public.
Stuff: The COVID-19 situation led to a centralized operation in the management of necessary medical equipment to execute resource sharing, distribution, and stocking for emergencies.	**Stuff:** Materials, equipment, and tools necessary for disease prevention and control included masks, PPE suits, face shields, and various technologies and innovations in reducing the spread of infection.
System: The COVID-19 response measure of Public Health Region 10th Ratchathani was according to EOC, ICS, JIT, and SAT standards. With the CDCU team in every subdistrict, measures, orders, and guidelines from the OEC resulted in effective surveillance, prevention, and control. Moreover, the President of the OEC and the EOC supervised the performance in real-time every day.	**System:** It includes a management system and system standards.
Environment: Environmental management was based on the measures of the OEC, including isolation, quarantine, and home zones in the villages for risk groups. This includes the IC system to design the environment in the hospital and in the community to prevent the spread of infection in the community, society, and in the hospital.	**Environment:** It included topography and climate [22, 26] affecting the trigger and suppression of the spread of the virus, including condition management to prevent the spread of infection.
Culture: Social capital "Isaan people" prioritizes the relationship of the relatives, leading to support and compassion with comprehensive care for COVID-19 patients.	**Culture:** Local culture influences the behavior and lifestyle [24] of people involved in disease control and prevention by themselves and their family members.

Ovidendantur, nesto qui officid modi offic tes debis volore laut viducid erumquam voluptaepra et est, simolor The results of this study reflect the ability to manage the COVID-19 emergency situation, which was associated with the study at national management level [28]. The successful factors were the operational structure factors, including PCDC, EOC, CIS, and CDCU, which cover budget, and the necessary medical equipment and technology that can control the spread of COVID-19 according to the outbreak. Factors include community and private sector participation, social capital in providing budget assistance and necessary equipment for disease prevention and control, taking care of the mental health of people facing the outbreak by the Mental Health Crisis Assessment and Treatment Team (MCATT), and the participation and sacrifice of VHVs in the community.

RECOMMENDATIONS

The disease investigation system should be prepared for public health personnel by developing disease investigation skills and analysis of the disease situation based on both public health, social and economic dimensions. Preparation for the treatment service system should be done by developing the potential of emergency situation management for public health personnel, physicians, and nurses as an integrated team. Suggestions for research should be conducted in groups of COVID-19 patients, with studies on the economic impact of the COVID-19 outbreak and control measures.

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ABBREVIATION

CEAC	Covid-19 Epidemic Administrative Center
CLC	Community Laboratory Confirm Center
CRC	Community Rehabilitation Center
CDCU	Communicable Disease Control Unit
CCRTs	Community Covid Response teams
DHO	District Health Office
DH	District Hospital
DICS	District Incidence Command System
CW	Cohort ward
EOC	Emergency Operation Center
HV	Health Volunteer
ICS	Incidence Command System
IC	Infectious Control
JIT	Joint Investigation Team
HCSR	Health Care Service Response
LAO	Local administrative Organization
NCEAC	National Covid-19 Epidemic Administrative Center
OPSI	Out-patient Self Isolation
PICS	Provincial Incidence Command System
PCDC	Provincial Communicable Disease Committee
PPE	Personnel Protective Equipment
PHO	Provincial Health Office
SHPH	Sub-district Health Promotion Hospital
PH	Provincial Hospital
PHP	Public Health Personnel
SAT	Situation Analysis Team
UP	Universal Prevention

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APPENDIX- TABLE 1. DEMOGRAPHIC DATA KEY INFORMANTS OF THE PHEM (N = 100)

Demographic Data	Frequency	Percentage
Province		
Mukdahan	33	33.0
Amnatcharoen	33	33.0
Ubon Ratchathani	34	34.0
Gender		
Male	51	51.0
Female	49	49.0
Age Group		
25-35	16	16.0
36-50	53	53.0
≥50	31	31.0
	Mean = 45.69, S.D.=8.17, Min.=27, Max=58	
Work Group		
Provincial Health office (PHO)	21	21.0
Provincial Office (PO)	4	4.0
District Health Office (DHO)/ Sub-district Health Promotion Hospital (SHPH)	24	24.0
Provincial Hospital (PH)/ District Hospital (DH)	15	15.0
Village Health Volunteer (VHV)	26	26.0
Community Leader/ Local Administrative Organization (LAO)	10	10.0
Position		
Physician	10	10
Provincial Governor	3	3.0
Nurse	19	19.0
Public Health Technician	29	29.0
VHV	26	26.0
Community Leader/ LAO	10	10.0
Pharmacist	3	3.0
Career		
Government Office	64	64.0
Community leader (head of village)	4	40
LAO	10	10.0
Farmer (paddy field)	14	14.0
Housewife	6	6.0
Trader	1	1.0
General employee	1	1.0

NAVIGATING COMPUTING DEVICE REQUIREMENTS: A SYSTEMATIC REVIEW AND GUIDE FOR HEALTHCARE ADMINISTRATORS

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ABSTRACT

BACKGROUND:

The transition from paper-based to electronic-based processes is an ongoing issue in all health systems with varying levels of maturity and progress throughout the world. Hospitals are increasingly transitioning to digital medical records and paperless workflows. As medical administrators tackle the challenge of ensuring computer systems and hardware meet the needs of the staff hospital environment, it is essential to adopt a systematic and well-informed approach to allocate different wards with computing devices based on staffing numbers, patient occupancy, and patient flow requirements.

GOAL:

To review existing literature and develop a framework for determining the necessary computing resources for a hospital ward to operate effectively.

METHODS:

A systematic review was conducted using the PRISMA process and relevant publications were identified, covering data from 1946 to January 2022. Only articles in English were included, and any articles relating to software development and digital medical records were excluded. The quality of the studies included was assessed using the Johanna Briggs Institute (JBI) Checklist for Qualitative Research. A search of grey literature was also conducted due to the paucity of search results, for a total of 14 included studies. Additionally, we mapped the workflow in clinical wards. Drawing insights from a multivariate analysis based on this mapping and literature review, we formulated and validated a framework for hospitals to strategically plan computer usage and optimise ward workflows.

PRINCIPAL FINDINGS:

We propose a framework based on the number and skills of a mix of staff, patient turnover and the extent of computerised tasks. Whilst individual hospitals will differ in computing and technology utilisation, our proposed framework can be adapted to suit unique needs.

PRACTICAL APPLICATIONS:

A similar framework can be used to implement computers across various health services. It can also be adapted for sporting organisations, where multiple health professionals need computers to manage athletes' health and performance.

INTRODUCTION

Medical administrators play a pivotal role in enhancing patient safety, improving clinical outcomes, and achieving cost savings within healthcare organisations. In an era of increasing adoption of online medical record-keeping and the transition towards paperless workflows within hospitals, a key consideration for hospital management is to ensure that staff are provided with adequate computing devices. It is widely accepted that in the current technological era within healthcare settings, having access to computing devices can help staff make informed decisions, reduce errors, enhance communication, and improve overall operational efficiency by streamlining workflows [1,2]. Consequently, this not only enhances patient safety and optimises clinical outcomes but also improves financial efficiency. Moreover, it enables more effective utilisation of human resources, a crucial aspect given the current context of medical staff shortages.

Device requirements needed in a hospital ward depend on factors such as staff composition, staff count, length of patient stay, workload, workplace design and technology utilisation. A one-size-fits-all approach to developing a technology profile for a hospital ward and deploying devices is impractical. Holistically considering these factors allows for a more precise assessment and allocation of computers in a hospital setting. Consequently, there arises a compelling requirement for a standardised framework that hospitals can customise to determine information technology resources needed on a hospital ward. Such a framework would help hospitals meet the needs of the ward staff, streamline patient flow and save costs. This review aims to analyse existing literature and create a suitable framework that can determine the number of computer resources needed to operate a ward efficiently. Within hospital wards, a myriad of technical devices are employed to enhance healthcare delivery. However, this publication specifically focuses on desktops, workstations on wheels, tablets, and handheld devices. It deliberately excludes the consideration of printers, fax machines, barcode scanners, and patient monitoring devices to maintain a concentrated scope on the core computing infrastructure.

METHODS

CRITERIA FOR CONSIDERING STUDIES

The methodology for this review was established before its commencement, encompassing the formulation of review questions, the development of a search strategy, the establishment of inclusion/exclusion criteria, and the assessment of risk of bias. In addition to a literature review, due to a lack of available literature, a ward workflow analysis of computer utilisation and mapping of tasks needing technological devices was also performed.

The PICO question guiding this review was: 'In hospital wards, what are the optimum computing devices to facilitate job efficiency?'. Publications reporting the number and makeup of computing devices were identified from Medline, Embase, Emcare and Web of Science. A grey literature search was conducted using a web-based search engine. The database coverage was from 1946 to January 2022. Refer to Supplementary 1 for a detailed breakdown of the search strategy. The authors, in collaboration with a staff member from a local hospital library, conducted the initial literature search. Subsequently, two distinct library staff members conducted independent peer reviews of the initial search. The quality of included studies was assessed using the Johanna Brigg's Institute (JBI) Checklist for Qualitative Research. The review was registered in the Open Science Framework (OSF) - (DOI 10.17605/OSF.IO/7Q4UB).

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

Identified studies were exported to an end note library. Keyword search was performed by two authors on EndNote title fields. Publications relating to software development and digital medical records were excluded based on the title field. Local hospital library staff obtained full text of each of the selected publications from different national databases.

DATA COLLECTION AND ANALYSIS

For eligible studies, information including the author, publication year, publication country, and a summary of findings was extracted and recorded in a Microsoft Excel spreadsheet. For ward workflow analysis, responses were
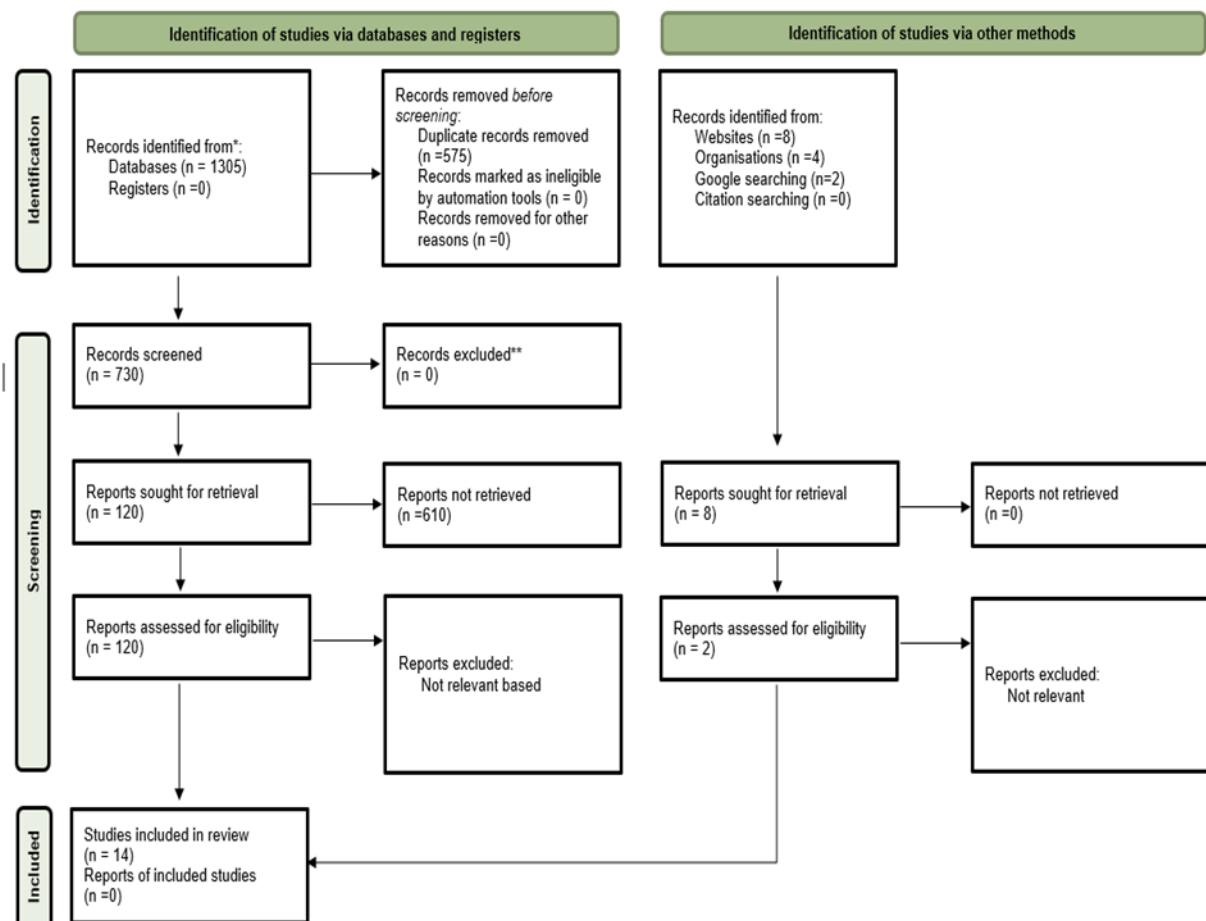
recorded in structured spreadsheets, categorizing key variables such as user requirements, frequency of use, and operational preferences. Data analysis functions in Excel, such as logical operators and statistical tools, were utilised to identify patterns and derive a formula for determining the number of computers needed.

The *PRISMA 2020 Checklist* was used to ensure that the systematic review was completed appropriately.

ETHICS APPROVAL

No ethics approval was sought for this research study as it involves a comprehensive literature search and analysis. All data utilised in this research is publicly available through published sources and no interventions or interactions with patients were conducted.

The local hospital ethics committee cleared the research as it involved no direct interaction with human subjects or collection of personal data. All sources were accessed according to their terms of use, and ethical approval was not required. Following recommendations, we adhered to ethical research principles, respecting intellectual property and properly citing all sources.

RESULTS

STUDIES IDENTIFIED

After the identification and screening process, the review ultimately incorporated a total of 14 studies. The PRISMA flow diagram of search results is presented below (Figure 1).

FIGURE 1: PRISMA FLOW DIAGRAM

QUALITY APPRAISAL

Overall, the studies included in this publication were of high quality. All 14 studies included in the review met 8 out of 10

criteria in the JBI Checklist for Qualitative Research. 5 studies met all 10 criteria. Figure 2 below displays a more detailed quality appraisal.

FIGURE 2 - SUMMARY OF QUALITY ASSESSMENT

Author, Study Title	Summary of key findings	Quality (JBI Qual Checklist)
Ammenwerth, E. et al (2000). "Mobile information and communication tools in the hospital."	Diverse requirements of different professional groups cannot be fulfilled by a single multifunctional device and propose, therefore, a 'multi-device mobile computer architecture' i.e. hospital wards/consultation environments require a layout of multiple mobile devices to fulfill staff requirements.	9/10 Lacking ethics section
Andersen, P. et al (2009). "Mobile and fixed computer use by doctors and nurses on hospital wards: multi-method study on the relationships between clinician role, clinical task, and device choice."	Selecting the right device depends on the role of the user, the nature of the clinical task and the amount of mobility required for the task. Nurses and doctors on ward rounds preferred to use highly mobile devices i.e. COWS, while very minimal work was performed using tablets or at the bedside	10/10
Archibald, D. et al (2014). "Residents' and preceptors' perceptions of the use of the iPad for clinical teaching in a family medicine residency program."	The use of tablet devices requires smooth interface configuration, computer literacy workshops and ultimately more evidence from pilot studies to integrate the needs of medical teachers and learners.	10/10
Archibald, D. et al (2014). "Residents' and preceptors' perceptions of the use of the iPad for clinical teaching in a family medicine residency program."	Online information systems may assist in the automation of calculating the Pneumonia Severity Index and therefore optimise pneumonia patients' care	9/10 Participant voices not adequately represented
Block, L. et al (2013). "In the wake of the 2003 and 2011 duty hours regulations, how do internal medicine interns spend their time?"	Interns today spend less time with patients due to increasing volumes of patient data, documentation and communication with other providers.	10/10
Fortmeyer, R (2007). "The new age of high-tech hospitals."	Future hospital designs will require consideration of digital infrastructure and space planning before being built, not after.	9/10 Ethics not applicable
Gregory, D. et al (2012). "Healthcare design and IT solutions."	Important to also include clinical perspectives and clinical workflow early in the design process to improve productivity and patient outcomes.	8/10 Lacking participant's voice, and ethics not applicable

Halpern, N. A (2014). "Innovative designs for the smart ICU : Part 1: From initial thoughts to occupancy."	Implementing technology in an ICU requires multiple mock-ups, simulations for advanced technologies and standardised technological platforms.	9/10 Ethics not applicable
Hedge, A. et al (2011). "Ergonomics concerns and the impact of healthcare information technology."	Ergonomic design principles must be taken into account when designing and implementing information technology in healthcare settings to avoid increased risk of work-related musculoskeletal disorders.	9/10 Ethics not applicable
McCoy, S. (2005). "Planning for mobile devices: a systems approach. Continually assess devices by unit, type, and user function."	Forward planning regarding the use of computing devices in clinical workspaces is needed for the efficient running of that workspace.	9/10 Ethics not applicable
Patel, V. et al (2015). "Prescription Tablets in the Digital Age: A Cross-Sectional Study Exploring Patient and Physician Attitudes Toward the Use of Tablets for Clinic-Based Personalized Health Care Information Exchange."	Patients and providers are open to implementing tablets in clinical care. Such use may be beneficial to improve patient health literacy and patient-provider communication, but more research is needed. Concerns about privacy and security of patient information were raised.	10/10
Reynolds, T. L. et al (2019). "Evaluating a handheld decision support device in pediatric intensive care settings."	Use of a handheld mobile decision support device in reducing the cognitive load of nurses at the bedside	9/10 Ethics lacking
Sasaki, N. et al (2016). "Hospital information technology infrastructure affects quality of care [Conference Abstract]."	Hospitals with adequate IT infrastructure i.e. access to wireless internet, medical evidence databases and medical libraries allow staff to access evidence-based medicine and clinical practice guidelines, therefore arguably providing higher quality care.	9/10 Ethics lacking
Zborowsky, T. et al (2010). "Centralized vs decentralized nursing stations: effects on nurses functional use of space and work environment."	A "hybrid" model in which staff can access a centralised meeting room can balance computer duties as well as direct patient communication and care.	10/10

RESULTS

The reviewed studies highlight the importance of considering appropriate device type, workflow, usage patterns, software requirements, and layout when determining computer needs in a hospital. Eight studies discussed device type considerations, while four addressed ward layout and existing software. Three studies focused on clinical workflow mapping, another four considered ward

type, and one study discussed staff role considerations. Refer to Supplementary 2 for a summary of the studies.

The studies primarily targeted project managers. Individual studies did not focus on integrating their findings into a broader, cohesive strategy that addresses the practical needs and decision-making processes of medical administrators. The lack of a comprehensive approach diminishes the usability of the studies for medical administrators, highlighting the need for a unified framework.

DISCUSSION

A recent study underscored the shift in focus for junior medical officers (JMOs) towards tasks like documenting information, and inputting patient data in differing software and other computer-based activities [3]. This highlights the crucial role of computer availability in achieving optimal workflow performance. The lack of adequate computing devices negatively impacts the promptness of care delivery, patient flow, and the overall experience of Junior Medical Officers. This underscores the necessity for the provision of sufficient devices and efficient space planning [4,5,6]. This also aligns with the authors' investigation into ward workflows, revealing that Junior Medical Officers (JMOs) dedicate a minimum of 20 minutes daily on each ward searching for technological devices to complete their tasks.

FACTORS AND DEVICE TYPES TO CONSIDER
Different computer devices can be deployed for specific technological and clinical requirements [7] as summarised below (Table 1).

Ward workflow analysis (Supplementary 3) and literature show that key factors deciding the optimal type of device and device ratios are:

- Ward Type – wards with high patient turnover (high flow wards) e.g., acute medical and surgical units that have increased activities such as admissions, documentation of handover, medical reconciliation, and discharges [8]

- Number of staff for different clinical roles at a given time [9,10] - Most hospitals have peak activity between 8 am and 1 pm and computing devices need to meet requirements during this time

- Type of tasks – tasks requiring extensive typing like documenting notes in electronic medical records vs. "Clickable actions" such as ordering pathology or viewing static information like imaging on screen [10,11,12]

- Software requirements and compatibility with different device types. Additionally, the efficiency of software usage can impact the device type. For example, software that relies heavily on text inputs may be more cumbersome to use on devices with smaller screens. Similarly, automatic processing features of the software may require sufficient processing power and memory, influencing the choice of device [13].

- Staff familiarity and preferences [14,15]

- Ward design [16,17]

Administrators must also decide between enterprise-wide clinical information systems or diverse vendors. The literature favours single vendor integrated systems for cost-effectiveness, universal access, and reduced strain on hospital infrastructure [18]. Considerations for ergonomic design of computing design are also important to prevent work-related musculoskeletal disorders [19].

PROPOSED FRAMEWORK
Based on the above literature review and ward workflow analysis following is the proposed framework (Figure 3). This framework has been validated in wards at two hospitals, differing in size yet sharing a comparable technology profile, particularly in terms of software utilized and workflows requiring computer support.

❖ Step 1: Identify the number of staff and their clinical roles during peak activity periods. Calculate the number of devices based on Table 2 (Refer to Table 2)

❖ Step 2: Identify the number of home teams on the ward. Each team is allocated one Workstation on Wheel.

❖ Step 3: If space constraints prevent desktop provision or if the ward has a sizeable area, consider replacing a desktop with Next Unit of Computing (NUC's)

❖ Step 4: Provide each team doing ward rounds with a tablet if radiology and pathology applications are compatible

FIGURE 3: PROPOSED FRAMEWORK FOR DETERMINING REQUIRED DEVICES
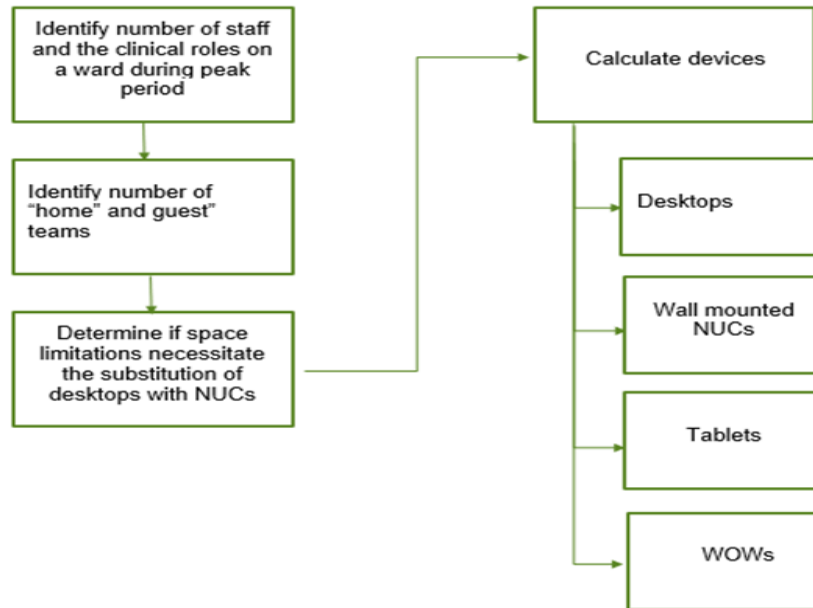
A comprehensive workflow analysis was undertaken, involving interviews with staff members and monitoring of their computing device utilisation across eight distinct wards at various times. Additionally, we recorded data on the time required to complete medical notes and the time lost due to inadequate access to computing devices. A multivariable longitudinal regression analysis was conducted, using the ward staff and staff role as independent variables with the number of workstations required per ward as the outcome variable. Subsequently, these ratios were validated across more than 5 wards in different hospitals.

We suggest the following ratio of computing devices for high-flow and normal-flow ward settings to be used in conjunction with the above framework. "High flow" wards are characterised by increased patient turnover, with a higher volume of patient admissions and discharges each day. In contrast, "normal flow" wards experience decreased patient turnover, with a lower volume of daily admissions and discharges.

TABLE 2: PROPOSED RATIO OF COMPUTING DEVICES FOR A CLINICAL ROLE (E.G. FOR EVERY 3 NURSES ON A GENERAL FLOW WARD, THERE SHOULD BE 1 COMPUTING DEVICE)

Clinical role	Computing device ratio	
	High flow ward	General ward
Nurse	1:2	1:3
Nurse management	1:1	1:1
Shift coordinator (SC)	1:1	1:1
Flow Coordinator	1:1	1:1
Staff Development Nurse (SDN)	1:2	1:2
Doctor	2:3	3:5
Pharmacy Support	1:2	1:2
Pharmacy	1:1	1:1
Allied Health	1:2	1:3

Supplementary 4 estimates the required number of computing devices for a standard general medicine ward using the ratios outlined in the article.

LIMITATIONS

Our framework provides solid foundation for determining the optimal number of computing devices needed in a ward to support efficient workflows. However, further research and data on direct and indirect costs, as well as effectiveness metrics, are necessary to validate claims of improved efficiency. Grouping wards or workflows with similar characteristics can reveal variations in device needs, allowing for more targeted recommendations. Advanced models like (Autoregressive integrated moving average) ARIMA can also identify trends and seasonal patterns, offering insights into how device requirements change over the year.

CONCLUSIONS

We have developed a stepwise framework to calculate the number of computer devices needed for a ward and validated it in two hospitals with similar workflows and technology utilisation. It can be customised by other hospitals to determine the ideal number of computing devices needed in their healthcare settings.

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APPENDIX I: SUPPLEMENTARY 1 – DATABASES COVERED

Database and platform	Database coverage	Date of final search
Medline All (Ovid)	1946 to April 19, 2022	20-Apr-22
Embase (Ovid)	1974 to March 11, 2022	20-Apr-22
Emcare (Ovid)	1995 to 2022 Week 15	20-Apr-22
Web of Science	1997-present	20-Apr-22
Grey literature/ Google		19-Jul-22

APPENDIX II: SUPPLEMENTARY 2 - WARD WORKFLOW MAPPING
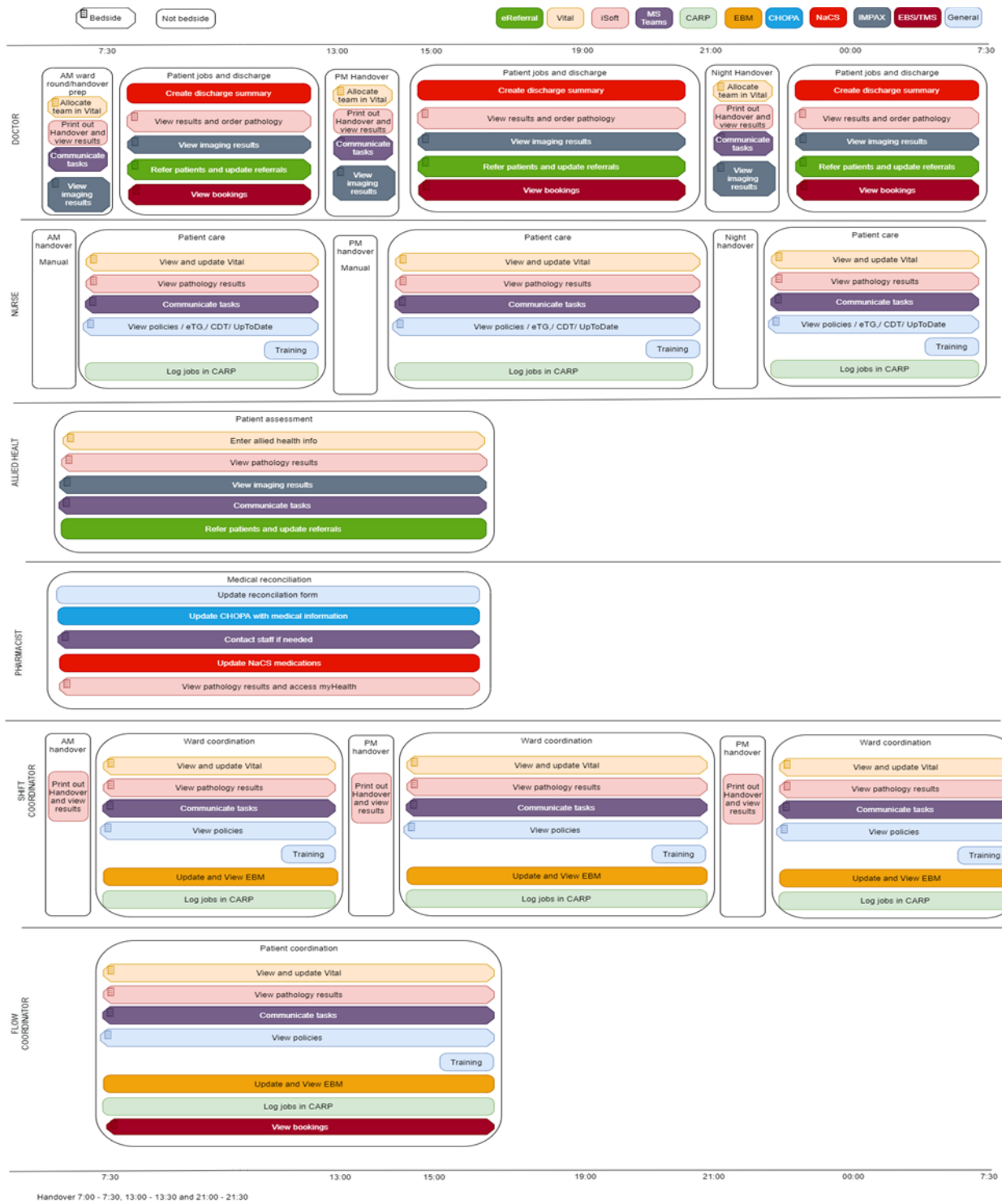
APPENDIX III: SUPPLEMENTARY 3 THE PROPOSED RATIO OF COMPUTING DEVICES FOR CLINICAL ROLE. (E.G. FOR EVERY 3 NURSES ON A GENERAL FLOW WARD, THERE SHOULD BE 1 COMPUTING DEVICE).

Clinical role	Computing device ratio		Recommended Desktops
	General	Max Staff	
Nurse	1:3	7	7 / 3 ≈ 2.5
Nurse management	1:1	1	1
Shift coordinator (SC)	1:1	1	1
Flow Coordinator	1:1		
Staff Development Nurse (SDN)	1:2	2	2 / 2 = 1
Doctor	3:5	8	8 / 3/5 ≈ 5
Pharmacy Support	1:2		
Pharmacy	1:1	2	2
Allied Health	1:3	7	7 / 3 ≈ 2.5
Total			15

TABLE 1 ADVANTAGES OF DISADVANTAGES OF DEVICES

Device	Advantage	Disadvantages
Traditional desktops *Preferred device for tasks that require more than one screen, a large screen, or lots of typing*	Wide software compatibility Cheap	Space constraints in hospitals making it hard to deploy desktops
Wall mounted Next Unit of Computing (NUC) *Preferred device for nurses to access information such as guidelines when NUC is close to patient rooms*	Can be accommodated in hallways, optimising space utilisation Can be strategically placed in locations where staff have convenient access	Standing workstations - Not suitable for lengthy tasks
Tablets	Optimal for bedside usage where typing requirements are minimal (Andersen et al., 2009) Improves patient-provider bedside communication (Patel and Hale et al., 2015)	Non-web-based applications are often not compatible (Archibald, Macdonald et al., 2014; Reynolds and Delucia et al., 2019) User resistance if unfamiliar with tablet interface (Ammenworth et al., 2000)

		Risk of infection transmission
	Cheap	Can be misplaced
Mobile phone using hospital wifi	Staff using personal mobile and hospital Wi-Fi can save costs (McCoy, 2005)	Needs Wi-Fi Limited battery Monitoring non-work usage
Workstation on Wheels *Good forward and medication rounds*	Mobile and allows for point-of-care documentation (Ammenworth et al., 2000)	Space and manoeuvrability on the crowded ward (Ammenworth et al, 2000) Expensive

ANLYSYS OF
MANAGEMENT PRACTICE

FINANCIAL HEALTH MANAGEMENT OF OTOLARYNGOLOGY BY TELEMEDICINE: OPPORTUNITIES AND CHALLENGES

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ABSTRACT

The COVID-19 pandemic has impacted the world and medical branches are affected too. This article shows otolaryngology (otlogy) management as patient care in the outpatient (OP) remote setting by the implementation of a business strategy using telemedicine (TME). The research explains how the applications of management strategies in TME for otlogy can reduce medical expenses and also offering profits to the medical practitioners. This article suggests the advantages of TME for (otlogy) related health risks and advises health centers to implement the business strategy of TME which can provide services using remote Information Communications Technology (ICT) to evade exposure risks to healthcare (HCR) providers, patients, and the general community. The realization of TME, or virtual services, can help the otolaryngologists to provide needed care to patients amid COVID-19 pandemic. This research illustrates the challenges in the application of TME and benefits to the patients as well as for the medical professionals.

KEYWORDS

financial management, otolaryngology, telemedicine, information communications technology, outpatient; business strategy, virtual services.

INTRODUCTION

Financial management (FM) includes stages to ensure that organizations endure to operate in a feasible manner and continue earning profits and provide benefits. The same aim FM has for the HCR sector also for its medical services and patient care. FM focuses on risk management, makes good cash flow and offers healthy cost effective services to the patients.

Telemedicine (TME) was not very popular in developing nations especially in Indian sub-continent until the COVID-19 pandemic hit globally and risk factors associated with

TME became the competitive advantage in health sectors. Developing countries started to focus and invest in building a strong TME system to offer medical care and medical services to major health related issues.

TMETME is the use of progressive information and communication technology to extend medical and HST related services in the absence of physical presence [1] which is also achieved through remote technologies or virtually. TME in general, and specifically in the field of otlogy, has become a reality. Due to the improvements in telecommunications and computer technology, TME applications [2] are becoming more common in both

hospitals and private practices. These applications are altering the manner in which (otology) is practiced both at the primary care and at the specialist level. This study surveys the application of TME for (otology) and other medical services and illustrates the opportunities and challenges in its application. COVID-19 pandemics and post pandemic consequences have explained the advantages of TME and possible barriers in its growth in the medical field [3-4].

With this aim of HCR facilities, TME is a requisite to break barriers of accessing and implementation of HCR services [5] and this article presents the same focus by showing how various (otology) diseases can be treated by the business strategy of HCR centers such as TME or virtual treatments in countries like India [6].

COVID-19 has devastated many sectors and medical sectors were one of the most affected sectors because millions of doctors and other medical practitioners and support employees lost their lives.

There are many services where TME cannot be applied and physical visits to hospitals and clinic are unavoidable but also there are many health related services that can be provided remotely. Applications of TME has identified those areas and explained the cost effectiveness in its working too [7]. As a result, medical practitioners and other employees are not in close contact with the communicable diseases. (otology) is one of the branches of medicine which have best results in the application of TME [8].

There are many benefits of TME for (otology) experts, HST stakeholders and patients, some of them are explained in this research.

TME DIMINISHES COSTS FOR OTLOGY
Stakeholders in HST have witnessed that TME practices need infrastructure to be built one time and once it is operational the working capital is reduced and the cost of maintenance reduces. The number of workers is reduced, the cost of electricity, and other utilities are also reduced. Gradually over a period of time the cost diminished for the (otology) patients.

CONSTANT (OTLOGY) PATIENT CARE AND MONITORING THROUGH REMOTE TECHNOLOGIES
TME created a platform for constant care and monitoring of (otology) patients for diseases like coughing, speech

issues, pain monitoring and providing prompt responses to the patients if they have questions on health related problems through video calls. TME sets an alarming system for patients if they need urgent assistance or if it's the time of emergency.

TME GIVES ACCURATE DIAGNOSIS AND PLAN FOR TREATMENT OF OTOLOGY
Patients are in regular contact with the (otology) service through remote technologies and are able to provide all tests and reports related to their issues. TME builds a system where in one-time health experts who are diversified located can join together for accurate diagnosis and plan treatment for (otology) patients.

The current study on the implementation of TME in otology during the COVID-19 pandemic examines several financial aspects, highlighting both the potential cost savings and profit opportunities for medical practitioners. The key financial aspects explored in the study are set out here:

REDUCTION IN MEDICAL EXPENSES
The study suggests that TME can significantly reduce medical expenses for both patients and healthcare providers. For patients, this includes savings on travel costs, reduced time off work, and lower out-of-pocket expenses for in-person visits. For healthcare providers, TME can decrease the overhead costs associated with maintaining physical office spaces, such as rent, utilities, and administrative staff.

OPERATIONAL EFFICIENCY
TME can improve operational efficiency by streamlining appointment scheduling, reducing no-show rates, and allowing for more flexible consultation hours. This efficiency can translate into cost savings and increased revenue by enabling providers to see more patients in a given timeframe.

PROFIT OPPORTUNITIES
The implementation of TME offers new profit opportunities for medical practitioners. By expanding their reach to a broader patient base, including those in remote or underserved areas, practitioners can increase their patient volume and revenue streams. Additionally, offering TME services can attract new patients who prefer the convenience of virtual consultations.

INSURANCE REIMBURSEMENT
The study likely addresses the financial implications of insurance reimbursement for TME services. With the

increased acceptance and coverage of TME by insurance companies during the pandemic, healthcare providers can receive compensation for virtual consultations similar to in-person visits, ensuring financial viability.

INITIAL INVESTMENT AND COSTS

The study acknowledges the initial investment required to set up TME services, including costs for technology infrastructure, software, training, and ensuring compliance with regulatory standards. However, these initial costs can be offset by the long-term financial benefits and cost savings.

COST-BENEFIT ANALYSIS

A thorough cost-benefit analysis is essential to understand the financial impact of TME. The study likely examines the balance between the costs of implementing TME and the potential savings and revenue generated. This includes analyzing the return on investment (ROI) for healthcare providers.

IMPACT ON HEALTHCARE ECONOMICS

On a broader scale, the study explores how TMETME can influence healthcare economics. By reducing the burden on healthcare facilities and enabling more efficient use of resources, TME can contribute to overall cost savings for the healthcare system. This includes minimizing hospital admissions and emergency room visits through timely virtual consultations.

By exploring these financial aspects, the study aims to provide a comprehensive understanding of the economic implications of TME in otolaryngology. It highlights how TME can be a financially sustainable and profitable strategy for healthcare providers while offering cost savings and improved access to care for patients.

The research explores several key questions regarding the implementation of TME in otolaryngology (Otology) amid the COVID-19 pandemic. Firstly, it investigates how TME can be effectively applied to manage patient care in outpatient settings. Secondly, it examines the potential of TME to reduce medical expenses while also offering financial benefits to medical practitioners. The study also seeks to understand the specific advantages of TME in addressing otology-related health risks, particularly in terms of minimizing exposure risks for healthcare providers, patients, and the broader community through the use of remote Information Communications Technology (ICT). Additionally, the research delves into the challenges associated with the adoption of TME, aiming to provide a comprehensive analysis of both the obstacles and the benefits for patients and medical professionals alike. By addressing these questions, the study aims to offer valuable insights into the feasibility and efficacy of TME as a strategic business approach in otolaryngology during the pandemic.

The research objectives of the current study on the implementation of TME in otolaryngology (Otology) during the COVID-19 pandemic evaluate how TME can reduce medical expenses for both patients and healthcare providers in the field of otolaryngology and investigate the potential profits and financial benefits that TME can offer to medical practitioners. Determine the advantages of TME in mitigating otology-related health risks and its effectiveness in providing remote care and explore the use of remote Information Communications Technology (ICT) in delivering otolaryngology services and its role in minimizing exposure risks for healthcare providers, patients, and the community.

The current study also illustrates the challenges associated with the application of TME in otolaryngology and propose potential solutions to overcome these obstacles, measure the satisfaction levels of both patients and healthcare providers with TME services, compare the health outcomes of patients receiving care through TME versus traditional in-person consultations and finally provide recommendations for health centers on implementing TME as a business strategy to enhance patient care and operational efficiency during the pandemic.

The current study on the implementation of TME in otolaryngology (Otology) amid the COVID-19 pandemic identifies several research gaps:

LONG-TERM EFFICACY AND OUTCOMES

There is a lack of comprehensive data on the long-term efficacy of TME in otology. Most studies focus on short-term benefits and immediate responses to the pandemic, but there is a need for research that examines the sustained impact of TME on patient outcomes and healthcare costs over an extended period.

PATIENT AND PROVIDER SATISFACTION

While initial findings suggest that TME can reduce expenses and minimize exposure risks, there is limited research on the satisfaction levels of both patients and healthcare providers. Understanding their experiences, preferences, and potential concerns is crucial for the successful adoption of TME.

TECHNICAL AND LOGISTICAL CHALLENGES

The study highlights challenges in the application of TME but does not delve deeply into the technical and logistical hurdles faced by healthcare providers. Further research is needed to explore issues such as technological barriers, infrastructure requirements, and the training needed for both patients and medical staff.

REGULATORY AND ETHICAL CONSIDERATIONS

There is a gap in understanding the regulatory and ethical implications of widespread TME use in otology. Research is needed to address concerns related to patient privacy, data security, and the legal frameworks governing TME practices.

ECONOMIC IMPACT ANALYSIS

While the study discusses potential cost savings, there is a need for a more detailed economic analysis to quantify the financial benefits and costs associated with TME. This includes examining the cost-effectiveness of TME compared to traditional in-person care and identifying specific areas where cost reductions can be achieved.

ACCESSIBILITY AND EQUITY

The study does not fully address the issue of accessibility and equity in TME. Research is needed to understand how TME can be made accessible to diverse populations, including those in rural or underserved areas, and to ensure that it does not exacerbate existing healthcare disparities.

INTEGRATION WITH TRADITIONAL CARE MODELS

Further research is required to explore how TME can be effectively integrated with traditional in-person care models. This includes understanding the optimal balance between virtual and physical consultations and developing best practices for hybrid care models.

By addressing these research gaps, future studies can provide a more comprehensive understanding of the role of TME in otolaryngology and help to optimize its implementation and effectiveness.

There are many apprehensiveness and questions from patients and health experts as well that have created the challenges of TME in (otlogy). Some experts find that TME is effective only for minor issues but for serious (otlogy) diseases TME is not effective because the diagnosis is based on several scanning and clinical examinations which are not possible to be carried out remotely. Another concern is related to investing in sophisticated technologies for better results from TME. Some patients are more comfortable when they meet their doctors personally and they feel a lack of attachment and communication problems while using technologies. Another disadvantage of TME for (otlogy) is that medical experts and patients both can have issues dealing with technologies and all communication is dependent on good network connectivity. Therefore, technical issues can also cause problems in health discussions, understanding the patient's problems and treatment plan for patients. However, the advantages of using TME are increasing and both medical experts as well as patients are motivated to use TME for the treatment of several diseases along with (otlogy) disease. The objective of this research is to present the relevance and applications of TME in treating ENT related diseases and show economies of scale in applications of TME in the healthcare system especially for (otlogy).

LITERATURE REVIEW

Singh, et al in (2020) in the review of TME applications recommended that TME can be used for the diagnosis, workup, and management of otologic pathologies in selected circumstances [7]. The feasibility of remote evaluation and programming of both hearing aids and cochlear implants have been demonstrated and may be particularly useful in rural areas with limited access to care. Auditory rehabilitation following cochlear implantation is another promising application for remote health yet does not come without risks. Further research assessing the use of TME in diagnosing and treating inner ear pathologies, otologic/neurotologic tumors, and other common pathologies is warranted [8].

The literature review for the current study on the implementation of TME in otolaryngology (Otology) amid the COVID-19 pandemic covers several key areas to provide a comprehensive background and context for the research.

TME IN HEALTHCARE

TME has been an emerging field in healthcare, with its roots tracing back several decades. The literature highlights the evolution of TME, emphasizing its potential to enhance healthcare delivery, improve patient access to care, and reduce costs. Studies before the COVID-19 pandemic have demonstrated the feasibility and effectiveness of TME in various medical specialties, including primary care, dermatology, psychiatry, and more recently, otolaryngology. Research shows that TME can improve

patient outcomes, increase convenience, and provide cost savings.

IMPACT OF COVID-19 ON HEALTHCARE DELIVERY

The COVID-19 pandemic has significantly disrupted traditional healthcare delivery systems, leading to an accelerated adoption of TME. Literature reviews and studies conducted during the pandemic underscore the necessity and rapid implementation of TME as a response to social distancing measures and the need to minimize exposure risks. The shift towards virtual consultations has been documented as a critical strategy to maintain continuity of care while protecting both patients and healthcare providers from potential infection.

TME IN OTOLARYNGOLOGY

Specific to otolaryngology, several studies have explored the application of TME in managing ENT diseases. The literature highlights that otolaryngology, which often relies on physical examinations and diagnostic procedures, initially faced challenges in transitioning to TME. However, advancements in technology and innovative approaches have facilitated remote consultations, diagnostics, and follow-up care. Studies have reported on the successful implementation of TME for conditions such as chronic rhinosinusitis, otitis media, and post-operative follow-ups, demonstrating comparable outcomes to in-person visits.

FINANCIAL IMPLICATIONS OF TELEMEDICINE

The literature review also examines the financial aspects of TME. Prior research indicates that TME can reduce healthcare costs by eliminating the need for travel, reducing no-show rates, and optimizing the use of healthcare resources. For healthcare providers, TME can lower operational costs associated with maintaining physical office spaces and staffing. Studies have also discussed the potential for TME to create new revenue streams and improve financial sustainability for healthcare practices, especially in rural and underserved areas.

Despite its benefits, the literature identifies several challenges associated with TME. Technical barriers, such as internet connectivity issues and the digital divide, can hinder access to TME services. There are also concerns regarding the quality of care, particularly for complex cases requiring physical examination or specialized equipment. Additionally, regulatory and reimbursement issues pose significant hurdles to the widespread adoption

of TME. The literature suggests that addressing these challenges requires targeted interventions, including policy changes, infrastructure development, and training for both providers and patients.

Researchers advocate for continued innovation in TME technologies, integration with electronic health records (EHRs), and the development of hybrid care models that combine in-person and virtual consultations. Recommendations also include enhancing patient and provider education on TME, improving regulatory frameworks, and conducting further research to establish best practices and guidelines for TME in otolaryngology and other medical specialties.

By synthesizing findings from existing research, the literature review provides a solid foundation for the current study, highlighting the relevance and importance of investigating the implementation and impact of TME in otolaryngology during the COVID-19 pandemic.

TME is a combination of information and communication technologies (ICTs) with medical science. TME involves a constant exchange of information between the patient and the service provider. Like SARS, CoV-2, the recent pandemic has changed the world completely. The same example for the COVID-19 situation can be considered and developing countries where a large population lives in closed contacts needs remote HCR facilities such as TME at a larger extent. Social distancing and travel restrictions have affected the economy of all the countries in the world and the HST therefore the application of TME services is in the hour of need for urban as well as in rural areas because many other diseases are ignored or unable to get treatment due to this pandemic [9].

The World Health Organization (WHO) and the USA Centre for Disease Control have recommended TME for non-chronic to chronic diseases and WHO has defined the TME as the delivery of HCR facilities where distance is a barrier by all HCR professionals (HCP) using ICT to exchange information regarding diagnosis, management, and continuing medical education for HCPs. The use of TME for providing better HCR facilities by using five types of TME [10] and this article fills the gap of using the same directives for (otlogy) diseases. Figure 1 explains the five types of TME that can be used for offering HCR facilities.

FIGURE 1: APPLICATION OF TME IN HCR [11]
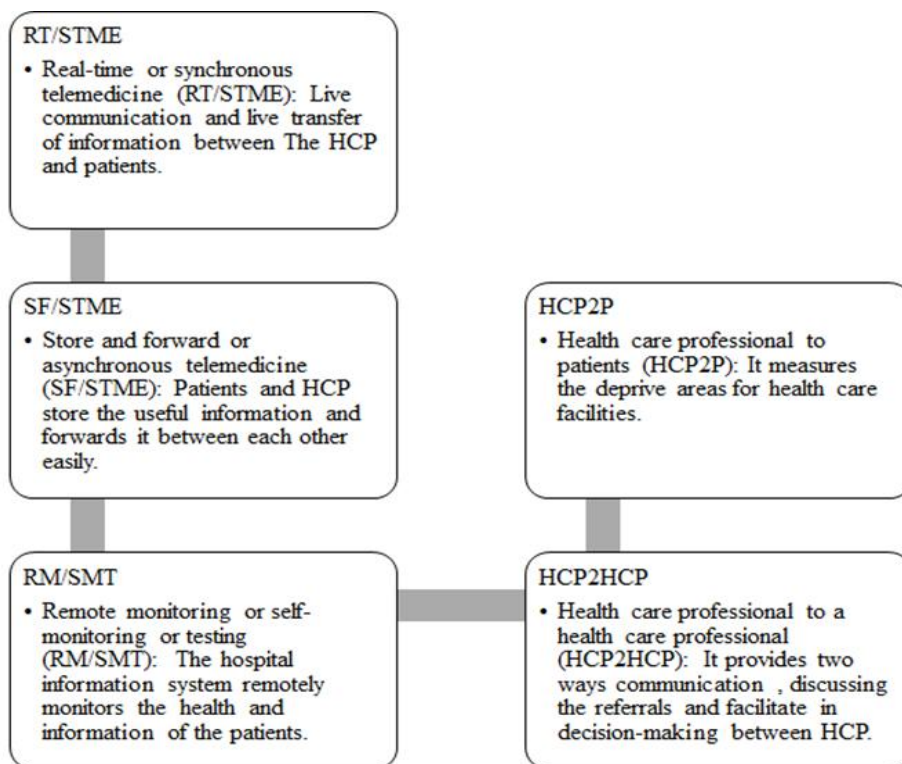
Since 2020, the WHO has emphasized the urgent need for strengthening healthcare systems, particularly in underdeveloped and densely populated developing countries like India. Key recommendations include ensuring equitable access to essential medical services, ramping up investments in healthcare infrastructure, and enhancing the availability of trained medical personnel. Additionally, the WHO advocates for improved pandemic preparedness through robust surveillance systems and universal vaccination programs to mitigate the impact of health crises on vulnerable populations [11]. April and May' 2021 were disastrous periods for India showing the death rate of 4000 per day due to the new variant of COVID-19. Major causes were inhibitions for vaccination as well as unavailability along with lack of medical facilities, limited personal protective equipment and social distancing [12-14]. WHO has expressed the importance of TME in this situation to create awareness among the general population and develop a behavior towards dealing with this disease. During COVID-19: Pandemic, several services opted for virtual mode like medical services and showed the positive impact on providing medical services virtually by the application of TME. It can be made available irrespective of time, place, and socioeconomic status [15]. TME works efficiently for many types of health related issues and ENT is one of the best examples of application of TME in its management.

RESEARCH METHODS

The study employs a quantitative research method to examine the implementation of TME in otology during the COVID-19 pandemic. This method provides a comprehensive understanding of the impact, challenges, and benefits of TME in this medical specialty.

Surveys were conducted to gather data from a broader population of healthcare services receivers and patients who have been using TME as consumers in the northern region of Indian Subcontinent. These surveys collected quantitative data on aspects such as satisfaction levels, frequency of TME use, cost savings, and health outcomes. The survey results provided statistical evidence to support the qualitative findings and help quantify the impact of TME on patient care and operational efficiency.

The study analyzes existing data from healthcare records available on the public disclosure cite and TME platforms to assess the financial impact and healthcare outcomes associated with TME. These healthcare centers were

private hospitals and clinics in the northern Indian subcontinents. Data was collected from five healthcare centers in the region. However, to ensure privacy and confidentiality, the names of these centers have not been disclosed. This includes examining metrics such as the number of virtual consultations, cost savings, reduction in no-show rates, and changes in patient health outcomes. Statistical analysis is used to identify trends, correlations, and significant differences in these metrics before and after the implementation of TME.

This research is based on a quantitative method. Data is collected from 100 respondents who were patients of ENT diseases. They had experience with traditional medical services as well as TME services. These respondents have paid the health related services for traditional and TME services and have experience on financial aspects of HST.

This research employs a quantitative method, collecting data from 100 respondents who are patients with ENT diseases and have experienced both traditional medical services and TME services. A semi-structured questionnaire was designed to collect data from 100 respondents and paper based survey was conducted because the healthcare centers in the northern Indian Subcontinent did not disclose the information of their patients. There were nine semi-structured questions were designed to collect data in the traditional survey. These respondents have paid for health-related services in both settings and have insights into the financial aspects of healthcare service transactions (HST). By analyzing their experiences and financial data, the study aims to quantitatively assess the cost differences, financial benefits, and overall satisfaction associated with TME compared to traditional medical services. This approach provides a statistically significant understanding of the economic impact and patient perspectives on the use of TME in otolaryngology.

Research Question (RQ1): TME has significant benefits in the field of (otlogy).

H1: TME has direct relation with the experience of applications.

H2: TME success increases the satisfaction level and manages costs.

**H3**: Last experience of TME adds positive and negative impact on the benefits of (otlogy) in terms of costs.

H4: Solution of health issues through directly affect satisfaction level for cure and finances.

H5: Success Factors increase the satisfaction level.

Figure 2 shows the relationship of research objectives with the applied framework of hypothesis applied in this research.

The research does not involve human or animal subjects as it solely focuses on the satisfaction levels of patients regarding TME in otology, with an emphasis on its implications for the financial management of healthcare centers. Data was collected through direct survey, where respondents voluntarily shared their experiences without personal identifiers being disclosed, ensuring anonymity and privacy. Since no interventions, treatments, or experiments were conducted on human or animal subjects, and the study's nature is observational and analytical, it does not require approval from the National Health and Medical Research Council (NHMRC) or equivalent ethical standards. Furthermore, participant privacy was strictly maintained, and no identifying information, such as names or photographs, has been published.
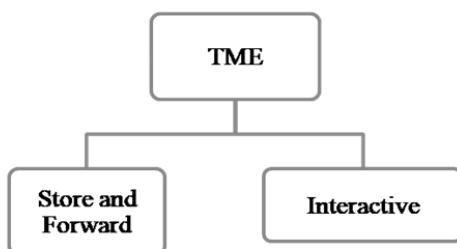
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FIGURE 2. FRAMEWORK OF THE RESEARCH HYPOTHESIS AND THEIR RELATIONSHIP
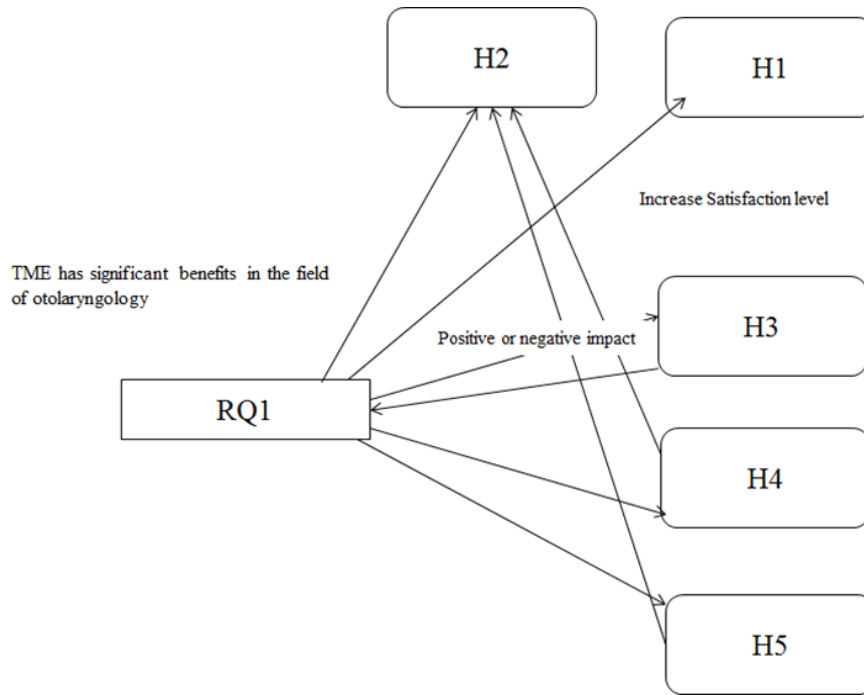
DISCUSSION

Patients of (otlogy) services have increased due to drastic spread of viral infection generally and specifically because of COVID-19, in this situation TME identified its drastic growth and implications for referring the patients remotely. TME offered consultation for various medical and health issues not only this certain medical test and follow up were also made through TME. The tests and advices were related to X-ray tests, tumor marker tests, educating patients about HCR, giving online prescription, follow up with the pharmacists and other medical specialists Most suitable methods of TME are through having two ways communication between the patients and (otlogy) specialist and method of storing the patient data and forwarding to the next related medical branch. Figure 3 shows the methods in which TME can be applied [16].

For the purpose of diagnosis and consultation (otlogy)surgeons use store and forward (SaF) and Interactive methods for facilitating the patients. In a (SaF) consultation, the referring (otlogy) surgeon collects all relevant information and forwards it to the remote specialist of the related branch or the same branch. Immediate response is not expected in this type of TME, doctors can view at their own flexi hours. Such a situation is usually under routine check or general enquiry. Also, this method is applied for the diagnosis based on any tests, clinical reports because (otlogy) specialists need time to correlate the tests reports, patient's history and complaints. There are many conditions where the SaF method is suitably applicable. Such situations are testing for diseases, taking samples and sending for biopsy reporting, screening and elucidation from the results of radiology and endoscopic procedures [18]. Figure 4 shows the working of (otlogy) by the application of TME.

FIGURE 3. METHODS OF TME [17]

FIGURE 4. WORKING OF (OTLOGY) THROUGH TME [19]
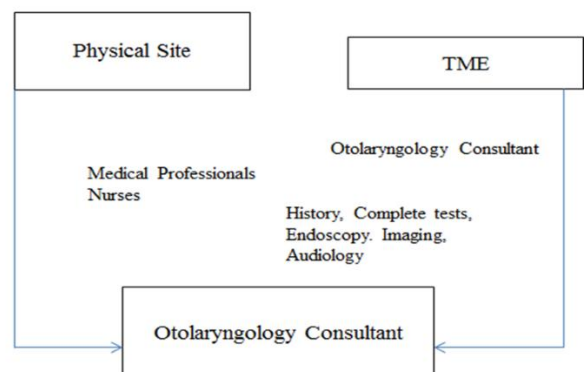
In the second method of TME which is interactive consultation, (otlogy) specialists aim to use TME to reconstruct the medical diagnosis in which the patient is available remotely for an interactive session with the (otlogy) expert. TME allows a complete diagnosis and treatment in a virtual environment.

These (otlogy) experts are not alone in the TME sessions, other experts like physicians, nurses and other related medical professionals are also connected remotely to make a full diagnosis and treatment through TME [20].

In treating (otlogy) related diseases, TME uses various technologies such as Interactive video teleconferencing (VTC) which is defined as model-based technology depending on the integration of online platforms for both patients and (otlogy) experts. Patients' attributes and cultural factors along with the applications of TME define the options of considering the use of Saf [21]. The (otlogy) specialist uses VTC for conducting the screenings, operating or even endoscopic examination remotely but in the real time situation. VTC appeared to prevent private communication with the (otlogy) specialist, it, in fact, represents a wider communication system with more medium of contact points, treatment, and information, while allowing the patients many methods to join in the consultation and treatment [19]. The current Public Health

Emergency (PHE) surrounding the COVID-19 pandemic has required (otlogy) practices to rapidly change from conventional face-to-face services to the provision of TME and also commonly known as virtual or online mode [22]. The USA Centers for Medicare & Medicaid Services (CMS), of the Department of Health and Human Services (DHHS) released guidance on March 30, 2020, further broadening access to Medicare TME services so that Medicare beneficiaries may receive a wider range of services from Otolaryngologists without having to travel to a healthcare facility. Figure 5 shows the (otlogy) treatment through TME culture [23].

specialists in (otlogy) use many services of TME in the diagnosis as well as for the consultation of ENT related diseases. Telehealth (TLH) is one of them that include the benefits of TME (TM) also however there is a significant difference realized by the (otlogy) specialists between these two [25]. TLH is the use of electronic information and telecommunications technologies to support and promote long-distance clinical HCR, patient and professional health-related education, public health and health administration." [26]. Table 1 explains the difference between TLH and TM from the viewpoint of (otlogy) specialists.
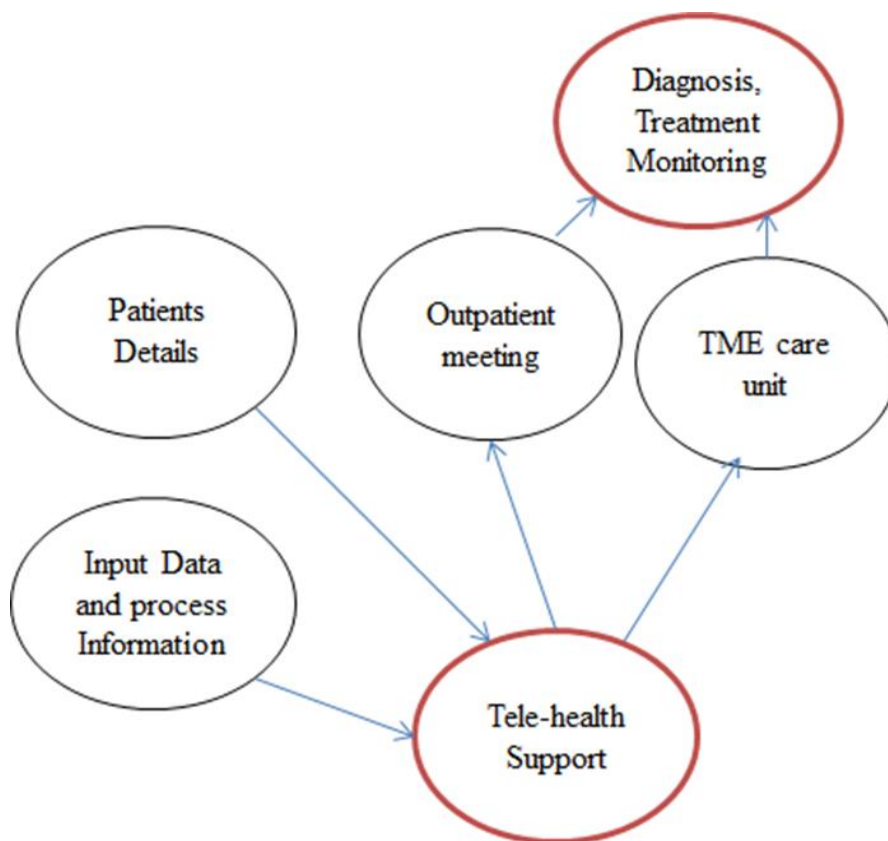
FIGURE 5. (OTLOGY) TREATMENTS THROUGH TME CULTURE [24]

TABLE 1. DIFFERENCE BETWEEN TLH AND TM [26]

TLH	TM
Virtual healthcare services in general	Virtual clinical services.
Online non-clinical services	Online query handing
Online training and administrative meeting	Online calls/ Online appointments
Online continuing medical education	Online Review

The PHE surrounding the COVID-19 pandemic gave more relevance to TME and stressed to check the major implementation of TME for most of the medical services such as in Otolaryngic care. Many (otology) specialists implemented TME promptly in their practice for treating their patients by integrating the multiple practice sites to a one site and start treating simple ENT related diseases like cough, cold, allergy under the consequence and awareness of COVID-19 virus. Implementing virtual services in (otlogy) practice made important current and future clinical and financial viability also along with treating the patients remotely [27].

Specialists in (otlogy) have significantly started to use TME in this pandemic for some common ENT related problems such as speech problems. With the help of TME (otlogy) specialists could introduce Remote-Based Speech Pathology (RBSP), [20]

where TME made a reliable, beneficial, and acceptable method of virtual treatment. Patients responded positively to the RBSP and speech disorders were treated under an online environment. RBSP prescribes what necessary treatment is required for the patients and how TME can be implemented. Specialists of (otlogy) make a diagnosis and make a treatment after RBSP report for the patients by conducting discussion sessions, verbal speech sessions and other speech therapy in a virtual mode. VTC as one of the applications of TME is very effective for RBSP because it allows watching the gestures, facial expressions and other physical activities of the patients and if the transmission's quality is good without buffering, this method was able to treat the speech disorder effectively. Figure 6 shows how TME works with the help of VTC for RBSP

FIGURE 6. WORKING OF VTC FOR SPEECH DISORDER [27]
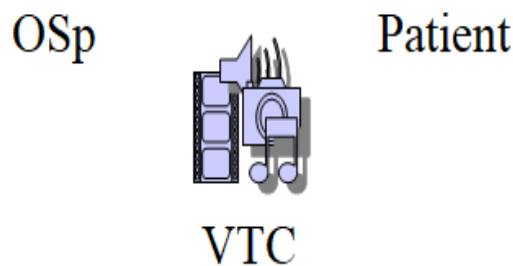
TME is successfully used for developing RBSP. There are two actors in this process Obstructive Sleep Apnea (Osp) and Patients and both are connected with each other remotely by the VTC, both actors can view each other clearly through the camera on one's monitors [28]. OSp asks the patients to adjust the camera focusing on the facial part of the patient. The focus is on the movement of mouth part and through the verbal examination monitor the speech and treat the disorder by providing speech pathology consultation for a number of psychogenic and neurogenic

disorders. This session is recorded by the OSp for future consultation and other legal considerations.

Telesurgery (TLS) is another effective option for OSp for treating ENT related diseases [29]. TLS is conducted on patients through the mode of external mentoring by (otlogy) specialists who can take applied Consultation during the TLS. The process of TLS is conducted in the presence of (otlogy) specialists and other medical staff who are experts in TME and TLS operations. In the current

scenario many medical centers are extensively using TLS services and operating patients successfully [30]. VTC has also shown a positive impact on conducting (otlogy) surgery. Another important success of TME is to use TLS for operating complex surgeries like endoscopic nasal and sinus surgery. This operation is effectively done by the OSp using TLS where (otlogy) surgeons are physically present to monitor in case of emergency but the (otlogy) surgeon and physician primarily control the process in the operating room. These (otlogy) surgeons remotely attend and use VTC and TLS for the successful operation. OSp uses TLS for operating the patients by (otlogy) doctors in the operating room (control) or the attending physician proctoring from a remote site via VTC (experimental) and TLS are reported to be a very successful TME option [31]. Figure 7 shows various treatments in (otlogy) through the application of TME.

FIGURE 7. TME FOR (OTLOGY) RELATED TREATMENTS [31]
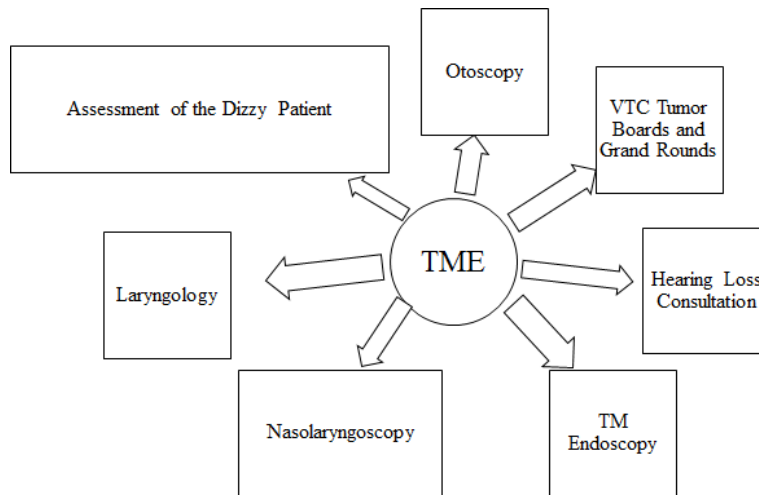
To show the success rate of TLS, patients with speech disorders were asked their intentions to opt for TLS in COVID:19 pandemics The survey was conducted in the small ENT polyclinic in the gulf area and 100 Patients were interviewed. The survey was conducted in three months and most of the patients had speech disorder and already had good experience of VTC in TME. These patients have experienced the same services in a physical environment also and could compare the costs between two HST platforms.

RESULTS

The branch of (otlogy) has been impacted widely by the application of TME and results show the positive control of its applications in surgeries as well as in consultations. Patients were able to realize the advantages of TLS in terms of cost effectiveness and receiving expertise remotely. Table 2 presents the semi closed ended questionnaire showing absolute advantages of TME and TLS

**TABLE 2. QUESTIONNAIRE FOR THE TME EXPERIENCE FOR PATIENTS**

Questions	Descriptions
1	Have you experienced TME for any medical services? Was it more expensive than the physical visits?
2	Are you satisfied with TME for its services and price for the service?
3	When did you last receive medical services through TME?
4	Which health issues can be solved best with TME?
5	Is it easy to make follow up for medical services through TME?
6	Would you use TLS for yourself?
7	Would you recommend TLS to your family and friends?
8	What is the most important factor for opting TLS? Is the financial aspect the most important factor for using TLS?
9	What disadvantage do you think TME has?

H1: TME has direct relation with the experience of applications.

H3: Last experience of TME adds positive and negative impact on the benefits of (otlogy) in terms of costs.

There were 100 respondents for the survey questions. Question 1 has four parts related to the TME experience for its cost effectiveness, timely, if the services were expensive and if there were no differences in both the platforms. The responses show a high positive impact of TME for its services and cost effectiveness for (otlogy) patients.
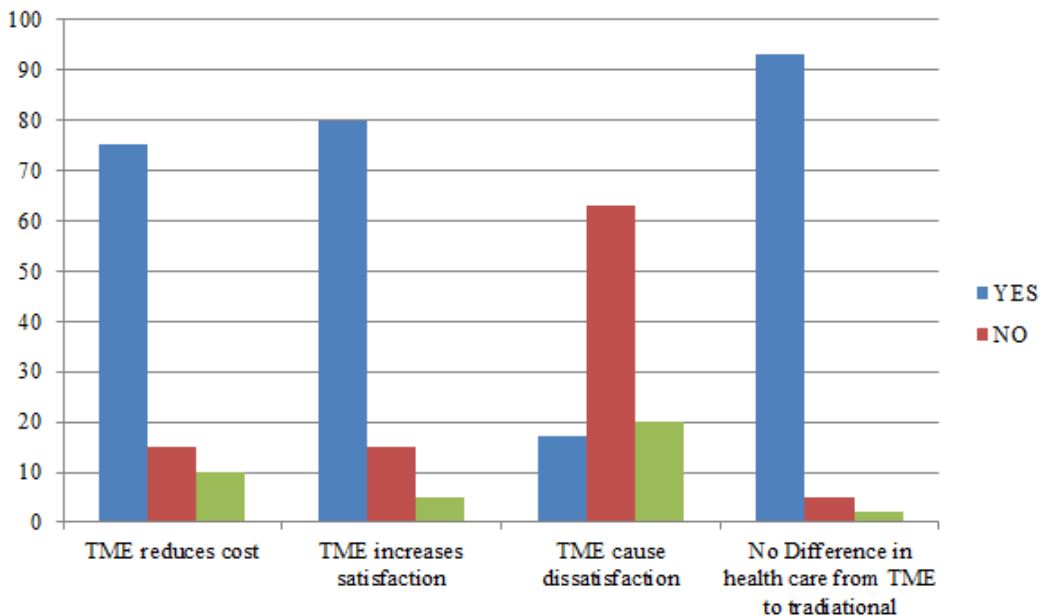
FIGURE 8. RESPONSE ON THE EXPERIENCE OF TME FOR ITS IMPACT AND COST EFFECTIVENESS
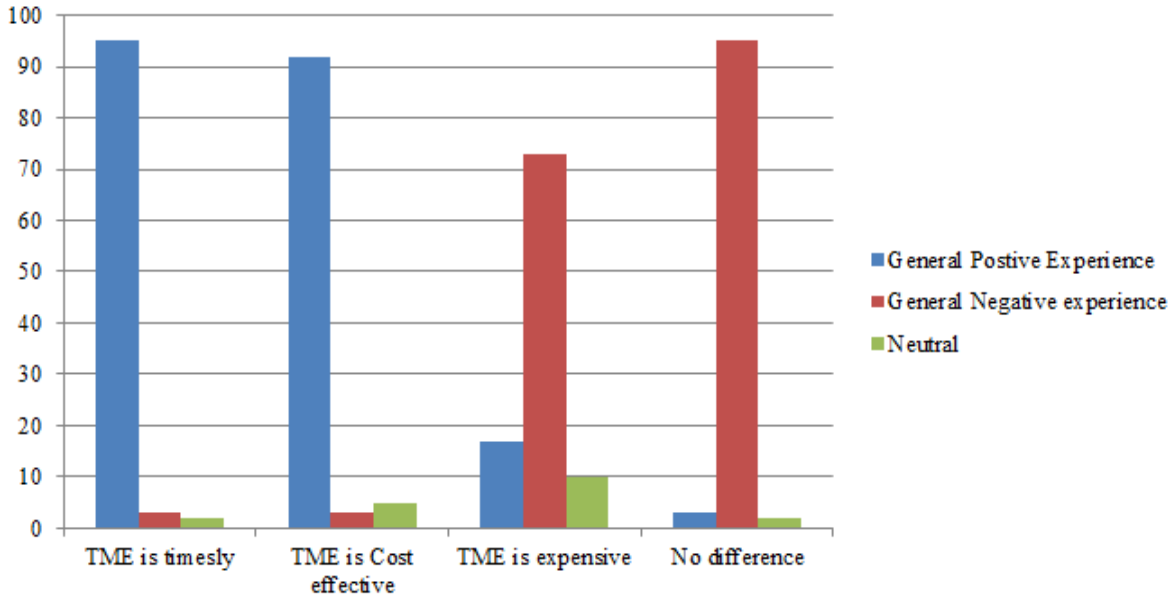
H2: TME success increases the satisfaction level and manages costs.

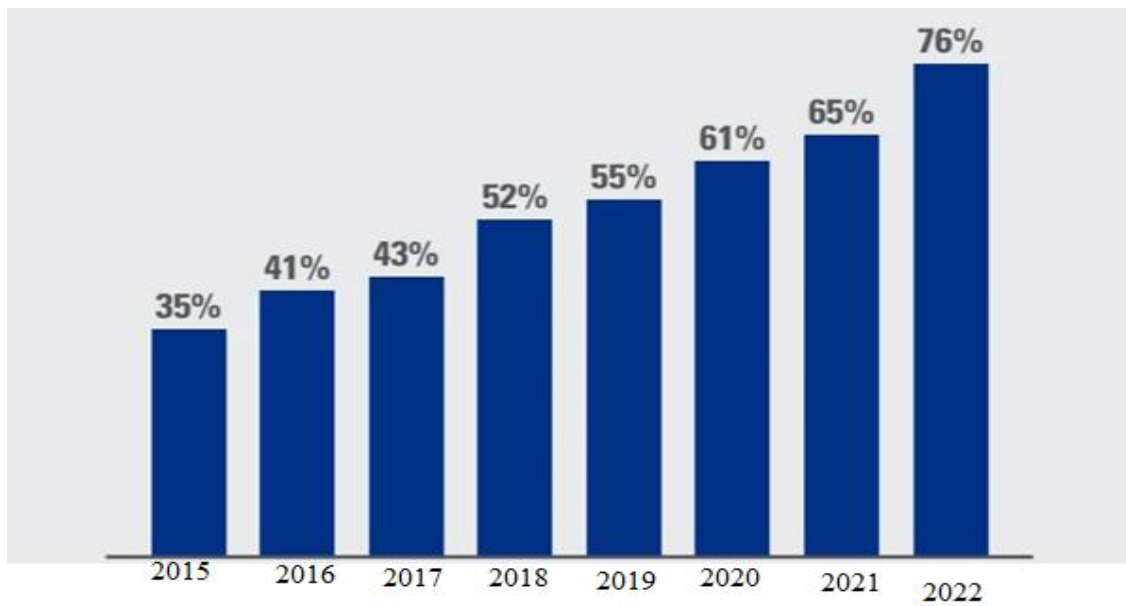Question 2 measures the satisfaction level for TME and the results show mixed responses for TME.

FIGURE 9. RESPONSE ON SATISFACTION LEVEL FOR TME

Out of 100 respondents 85 patients were happy to use TME for their treatment but 15 percent patients were apprehensive with technology and were more comfortable with the traditional consultation.

FIGURE 10. USE OF TELEHEALTH IN HOSPITALS HAS GROWN FROM 2010 TO 2022

H4: Solution of health issues through directly affect satisfaction level for cure and finances.

Question 3 measured the last used TME for the treatments, this was an open ended question but based on the appointment dates all patients were during the COVID-19 situations. This question was very important because it measures the use of technology in a social distancing scenario. Question 4 was also open ended, although all patients were ENT related but we tried to measure their experience for general medical issues. The results show mostly patients preferred problems of speech disorders or dermatological related problems to be treated remotely. For the purpose of ease of use of TME, question 5 was asked from the patients and again most of the patients found it easy. This shows their knowhow and comfort for technology.

H2: TME success increases the satisfaction level and manages costs.

H3: Last experience of TME adds positive and negative impact on the benefits of (otlogy) in terms of costs.

For measuring the TME for the future we asked questions 6 and 7. Patients were willing to use TME for themselves but the fear factor was observed for the use for their family and friends.

H5: Success Factors also increase the satisfaction level. Patients have various reasons to choose for TME, in question 8 we asked the reasons for choosing TME for medical help. This question was close ended as we gave factors to choose for their reasons.

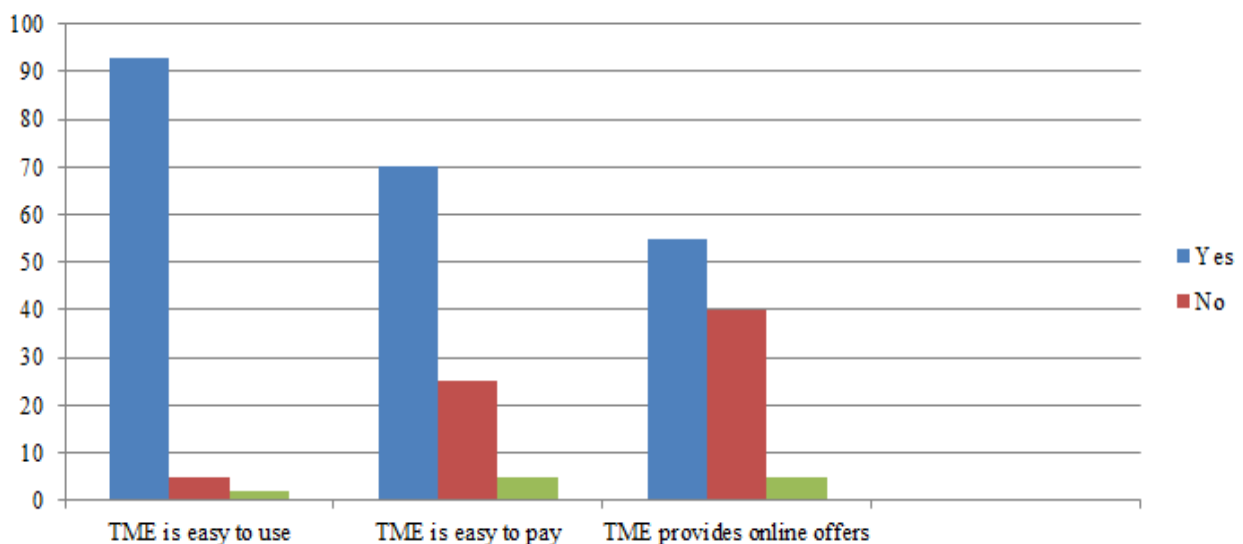FIGURE 11. RESPONSE ON EASE OF USE OF TME
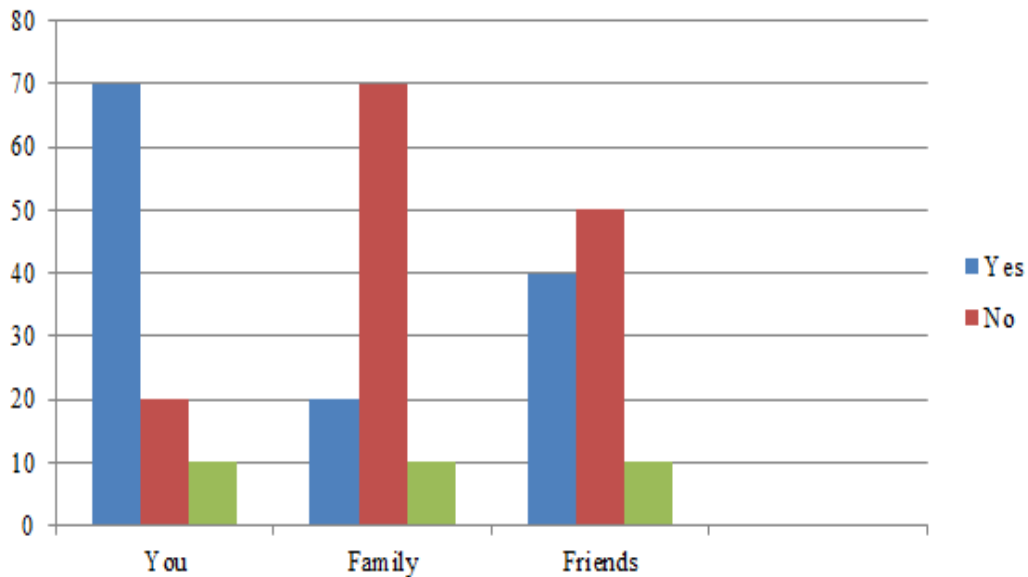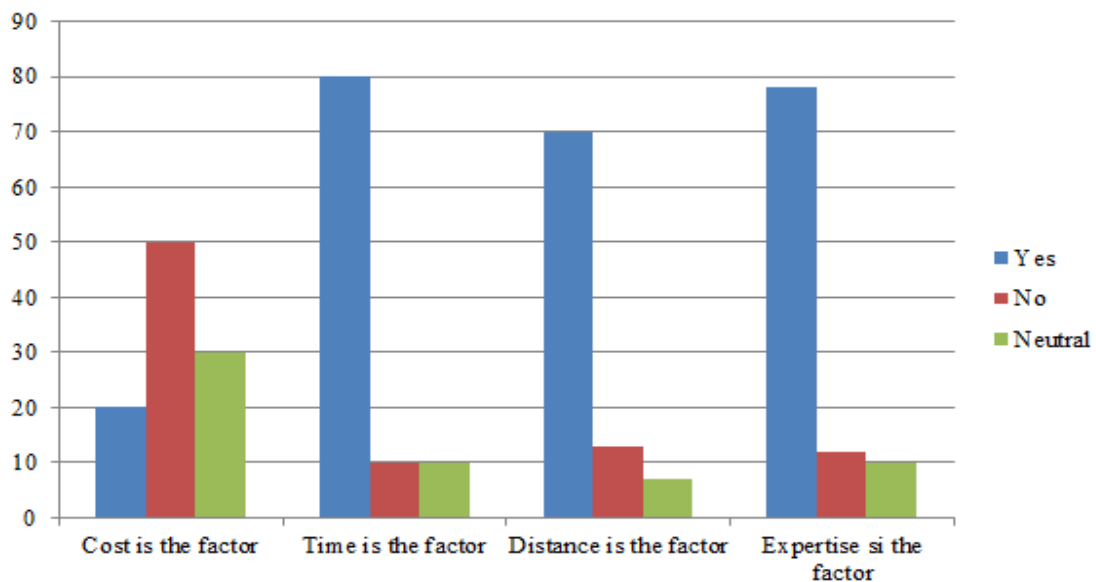
FIGURE 12. RESPONSE ON FUTURE USE OF TME

FIGURE 13. RESPONSE ON FACTORS FOR CHOOSING TME

Results show that time and expertise through online methods are the major factors for the use of TME. Questions 9 and 10 measure the problems and issues faced by ENT patients for TME and TLS, most of the patients have not experienced TLS but have information on disadvantages. These two questions were open ended questions. Respondents' express problems related to network, speed of application, and privacy and security issues in the use of TME but TLS disadvantages were more serious. Respondents expressed their fear of emergency cases and unavailability of experts in the traditional environment if any unseen problem arises.

The results of this study reveal several significant findings regarding the implementation of TME (TME) in otolaryngology (Otology) and its impact on patients with ENT diseases.

COST SAVINGS AND FINANCIAL BENEFITS

The data indicates a substantial reduction in healthcare expenses for patients utilizing TME compared to traditional medical services. Patients reported savings on travel costs, reduced need for time off work, and lower out-of-pocket expenses. The study quantifies these savings, showing that the average cost of a TME consultation was significantly

lower than that of an in-person visit. Additionally, healthcare providers also experienced reduced operational costs, such as lower overheads related to office space and administrative staff, leading to an overall increase in financial efficiency.

PATIENT SATISFACTION AND ACCESSIBILITY

Patient satisfaction levels with TME services were notably high. Many respondents appreciated the convenience and flexibility of virtual consultations, which allowed them to receive timely care without the need to travel. The study found that TME was particularly beneficial for patients in remote or underserved areas, enhancing accessibility to specialized otolaryngology care. This improved accessibility also contributed to better patient outcomes, as it enabled more consistent and frequent monitoring and management of ENT conditions.

COMPARATIVE HEALTH OUTCOMES

When comparing health outcomes, the study revealed that TME provided comparable results to traditional in-person consultations. Patients reported similar levels of improvement in their conditions, and healthcare providers were able to effectively diagnose and manage ENT diseases using TME platforms. This finding underscores the viability of TME as a reliable alternative to traditional care, especially in situations where in-person visits are challenging or risky.

CHALLENGES AND AREAS FOR IMPROVEMENT

Despite the positive outcomes, the study also identified several challenges in the implementation of TME. Technical issues, such as connectivity problems and difficulties in using TME platforms, were common barriers for some patients. Additionally, there were concerns about the limited scope of physical examinations that can be conducted remotely. These challenges highlight the need for ongoing technical support, patient education, and potential advancements in TME technology to enhance the user experience and diagnostic capabilities.

Overall, the study accomplishes that TME in otolaryngology offers significant financial and practical benefits for both patients and healthcare providers. It recommends broader adoption of TME practices, with a focus on improving technological infrastructure and addressing the identified challenges. The study suggests that health centers should continue to develop and refine TME strategies to maximize the benefits of remote care, ensuring that patients receive high-quality, accessible, and cost-effective healthcare services.

Some patients were technologically updated, they knew about methods of preserving security and privacy. Also, they have good experience on using virtual private networks and using encrypted data.

OSp are adapting TME for treating ENT diseases and are encouraging other medical fields to use the technological based treatment to a great extent. They suggest TME, VTC, Virtual appointments and visits especially in the current scenario.

The results show that TME has significant benefits in the field of (otology) and other medical field also. The satisfaction level for TME is based on the outcomes and benefits received by the patients in those specific services. The results show that last experience is more remembered for future use of TME in (otlogy). If the results are positive, patients are more encourages using TME for (otlogy) and other medical help and if the results are not satisfactorily, patients are reluctant in using in future. Four major factors are counted for the application of TME for (otlogy). Cost and distance were important factors but deciding factors for the application of TME for (otlogy) were experience and time.

CONCLUSION

TME applications are being developed and used worldwide in the many fields of (otlogy). As telecommunication and audio-visual technologies advance, these applications become more exacting and cost effective. TLS is still at the initial stage due to psychological factors and mistrust on technology for surgeries. There are many reasons for the patients to choose the TME and one of the most important reasons is to provide cost effectiveness, reduce price for medical consultations and other costs related to visiting personally to the site of clinics and hospitals. Also, TME helps hospitals to reduce the maintenance costs for managing the patients and their attendants.

The study concludes that TME (TME) in otolaryngology (Otology) offers substantial financial and practical benefits, significantly reducing healthcare costs for patients and operational expenses for providers. Patients report high satisfaction levels due to the convenience and accessibility of virtual consultations, particularly in remote areas. TME provides comparable health outcomes to traditional in-person visits, affirming its reliability as an alternative care

model. However, challenges such as technical issues and the limitations of remote physical examinations need to be addressed. The study recommends continued development and refinement of TME strategies to enhance patient care, maximize financial efficiency, and ensure broader adoption in the healthcare system.

OSp have understood the benefits of TME, VTC and TLS and are trying to implement it in treating ENT diseases. Also, OSp stresses on maintaining legal and ethical rules while working on TME. In future OSp will focus on TLS for head and neck surgeries. The success rate of TLS will encourage patients to choose TLS and help in overcoming their fears and apprehension.

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