Asia Pacific Journal of Health Management

Volume 18 Issue 1 2023

The Journal of ACHSM & SHAPE

ACHSM | Australasian College of Health Service Management

ACHSM Asia Pacific Journal of Health Management

Board of Directors

Contents Vol 18(1), 2023

RESEARCH ARTICLE

Mental Wellbeing and Recreational Sports – Two Together for a Healthy Win - Implications for Higher Education Institutions

Author(s): Aparna Pandey, Anjali Chopra, Shailaja Karve

CONFERENCE SECTION

Selected papers from the ***2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability***
- Editorial Facilitator: Professor Prema Basargekar: Somaiya Vidyavihar University, Mumbai, India

CONFERENCE ARTICLE

How Socioeconomic and Demographic Factors Affect Health Literacy? Assessment of health literacy level in different socioeconomic classes in India

Author(s): Prema Basargekar , Chandan Singhavi, Trisha Sinkar, Meenu Goel

CONFERENCE ARTICLE

Innovations In the Indian Healthcare Industry to Brave the Vuca Times

Author(s): Jaya Mathew, Neha Gupta, Jennifer Jagose

CONFERENCE ARTICLE

The Use of Digital Healthcare Systems to Predict Diseases

Author(s): Janvee Garg, Anil Kumar Singh

CONFERENCE ARTICLE

Determinants of Digital Health Information Search (DHIS) Behaviour: Extending UTAUT with healthcare behaviour constructs

Author(s): Surya Neeragatti, Ranjit Kumar Dehury, Nishchala Sripathi

CONFERENCE ARTICLE

Motivations And Barriers to Purchase Health Insurance: A qualitative study

Author(s): Vilasini Jadhav, Smita Ramakrishna

CONFERENCE ARTICLE

A Study on Challenges of Data Security and Data Privacy in the Healthcare Sector: SWOT Analysis

Author(s): Asha Prasuna, Avani Rachh

ACHSM Asia-Pacific Journal of Health Management shape

PRESIDENT MESSAGE

ACHIEVING PROFESSIONAL AND PERSONAL GOALS AT THE BEGINNING OF THE YEAR 2023

Dr Neale Fong FCHSM

President of Australasian College of Health Service Management

Welcome to the first issue of the College's Asia Pacific Journal of Health Management for 2023. I trust the year is treating you well and you are well on your way to achieving professional and personal goals set at the beginning of the year.

The College is moving forward with a successful year, too. In March we held a hugely successful Health Leadership Conference in Melbourne with well over 200 attendees. The focus on the common issues of leadership, workforce concerns and health system sustainability as well as aged care leadership and management was appreciated by all who participated. These issues of Workforce and Sustainability will be explored in more detail at the ACHSM Asia-Pacific Health Leadership Congress to be held in Canberra, 11-13 October 2023. Please put a hold on those dates in your diary and register for this Congress.

The College Board is near to completing a full strategic planning process for 2023-2026, with the elements of a bold strategy for the future, to be launched a bit later this year. In everything the College does we aim to support your career and how you choose or need to grow professionally. We are committed to supporting great health leadership across the health system and the profession of health management. It is the unique body of knowledge that we foster and develop through such vehicles as this Journal.
I recently visited with members of the New Zealand Branch and met with NZ Health CEO Margie Apa. It was great to see the enthusiasm of the branch councilors in Auckland and Christchurch. Please keep 14-15 March 2024 for our one-day conference in Auckland and associated site visits/study tours.

We recently launched to College members our annual free Mentoring Program with senior members mentoring others in a network that helps us all to grow and move forward. There may still be time to register your interest in being part of the 2023 program. A bit later in the year we will be launching a set of learning modules for aged care leadership with a focus on authentic leadership. And of course, don't miss out on catching some of our free to members webcasts this year – it offers great value to ACHSM members.

Thank you for spending time catching up with the latest research in health leadership and management through the articles you will find here in this Journal. Your commitment to lifelong learning is the cornerstone of our great profession.

Dr Neale Fong
College President

Asia Pacific Journal of Health Management 2023; 18(1):i2601. doi: 10.24083/apjhm.v18i1.2601

ACHSM Asia-Pacific Journal of Health Management shape

EDITORIAL

HEALTH EQUITY ENABLED THROUGH LEADERSHIP

Dr Mark Avery

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

The first issue of the journal for 2023 provides original research and review works across a range of issues and topics relevant to leaders and managers in the health, aged and social care sectors. The relationship between resources, capabilities, value and their relevance to healthcare and its enablement has been demonstrated in enabling organisation and system performance and contribution. Clinical care and associated access for those living and working in rural and remote settings continues as an important factor in relation to quality and access to care in Australia. These can have different geographic impact. Any health system needs to continually consider the growth and development of the coming generation of leaders and managers and therefore critical to that responsibility our issues about leading and leadership development. Our health systems need an appropriate and proportionate balance between issues and elements of service and learning support for those providing care.

Equity, along with access, quality, processes of care and outcome elements is a fundamental approach to evaluation of fairness and the just delivery of health services. Inequities in health have been seen and observed for many years in many countries and the importance of developing leaders who can manage the environments that advance and support equity is a fundamental challenge [1].

Opportunities for leaders and managers to deal with issues of equity are varied. The capacity to identify a range of interventions targeted at areas of potential development and innovation alongside a reading of a bandwidth of resources to deal with inequities needs to be part of the development and articulation of vision. System organisation, communication, policy development and ethical leadership skills, competencies and attributes that provide solutions and enable ways of facilitating macro, miso and micro level engagement aimed at providing equity in services and systems.

In this issue there are several contributions that identify and articulate areas of leadership opportunity as it relates to equity in our health services. These are direct and indirect opportunities and responsibilities for experienced and emerging leaders and managers in health, aged and social care.

Kosiol and colleagues examine resource-based review theory and how it may have an impact and can be used to so as to improve efficiency and effectiveness in health organisations. Authors articulate how practical application provides for understanding and subsequent actions around resources, capabilities, public value and their relevance in healthcare so as to provide competitive advantage and superior performance in organisations.

Thorn and Olley identified a series of barriers and facilitators in terms of the accessibility of medical services in rural and remote parts of Australia. Their review articulated a significant range of areas for leadership and management engagement to make changes and improvement.

Kumar S and colleagues examined areas where enhanced education programs concerning COVID-19 vaccination programs to support health professionals and demands on them regarding knowledge, attitude and practice to drive and improve vaccination rates in the community demonstrates key responsibilities in health professionals enabling equity in care delivery and health standing. El-Koofy and colleagues explored issues associated with sustaining care delivery for community members with chronic health problems during times of significant service and system disruption and how action or approaches in that area a highly valued by consumers in those situations.

Asia Pacific Journal of Health Management 2023; 18(1):i2609. doi: 10.24083/apjhm.v18i1.2609

Lloyd and colleagues identified learning mechanisms and modes to gain experience by early career health managers has a positive impact for employability for graduates and subsequently equity in high impact learning opportunities. Olley and Hozynka the effectiveness of clinician training in the use of electronic health records through scenario-based learning opportunities. Centrality of workflow, clinician engagement on scenario-based training identified as important in maximising opportunity for clinicians to learn about the significant impact in our systems of digital records enhancing opportunity for quality care.

2ND INTERNATIONAL HEALTHCARE MANAGEMENT CONFERENCE 2022

Selected papers from the 2nd International Healthcare Management Conference are included in this issue.

Editorial Facilitator: *Professor Prema Basargekar*
Somaiya Vidyavihar University, Mumbai, India

Professor (Dr) Prema Basargekar, as the Conference Convenor, reports that the conference enabled the theme "Navigating the New Normal with focus on Healthcare Accessibility, Innovation and Sustainability" which enabled focus on challenges and opportunities in building sustainability and providing accessibility to all in the new normal environment impacted after COVID-19. Papers presented discussed and contributed on changes brought out by new technologies and innovations such as digital healthcare, use of AI and data analytics, alternative medicines, and focus on preventive medicine has brought out significant changes in consumer behaviour in terms of the adoption of technology and increased awareness, enhanced patient engagement, the rising reach of healthcare organization and emergence of new tech health start-ups.

Mark Avery
Editor-in-Chief

1. Corbie G, Brandert K, Noble CC, Henry E, Dave G, Berthiume R, et al. Advancing Health Equity Through Equity-Centered Leadership Development with Interprofessional Healthcare Teams. J Gen Intern Med. 2022;37(16):4120-9.

ACHSM Asia-Pacific Journal of Health Management

COMMENTARY

THE UNSPOTTED IMPACT OF GLOBAL INFLATION AND ECONOMIC CRISIS ON THE NIGERIAN HEALTHCARE SYSTEM

Tope Michael Ipinnimo[1], *Ireoluwa Oluwatomisona Adeniyi*[2], *Oluwatifemi Margaret-Mary Osuntuyi*[3], *Peace Erinose Ehizibue*[3], *Motunrayo Temidayo Ipinnimo*[4], *Ayodeji Andrew Omotoso*[1]

1. Federal Teaching Hospital, Ido-Ekiti, Nigeria
2. Nidus Aquilae Hospital, Ilupeju, Lagos State, Nigeria
3. Afe Babalola University, Ado-Ekiti, Ekiti State, Nigeria
4. Ekiti State University Teaching Hospital, Ado-Ekiti, Nigeria.

Correspondence: abbeymagnus@yahoo.com

ABSTRACT

Inflation, the rise in prices of goods and services, has been on an exponential rise over the past few years globally. Excess inflation and the devaluation of the Nigerian currency has aggravated the problem of poor healthcare funding in the country. The overlooked influences that global inflation has had on the Nigerian healthcare system were highlighted in this work. Some of the influences included increased healthcare costs leading to demand-related problems, increased morbidity, reduced quality of healthcare delivery despite the increased cost, understaffing, the inefficiency of healthcare workers, medical brain drain as well as dwindling of research activities. In line with these consequences, it has become imperative for the government to take action to curb the growing menace of inflation and its impacts, through policy development and implementation as well as increasing resource allocation to the health sector.

KEYWORDS

economic crisis, health system, impact, inflation, Nigeria

The socioeconomic development of a country may be adversely impacted by inflation when there is a continuous increase in the prices of goods and services and a fall in the purchasing power of money such that more money could only buy fewer products. Inflation becomes excess when these prices rise faster than income, causing a rise in the cost of living. [1] In July 2022, inflation rates soared in many countries globally rising to as high as 256.9% in Zimbabwe, 71.0% in Argentina, 31.7% in Ghana and 10.1% in the United Kingdom. [2] There have been several outcries and protest over the high cost of living across several countries in the world including Argentina, Ghana, the United Kingdom, Kenya as well as Sierra Leone among others. [3] Nigeria's inflation rate increased from 18.6% in June 2022 to 19.64% in July 2022, the highest since September 2005. [2]

In addition to the rising inflation in Nigeria, Naira, the Nigerian currency is currently facing serious devaluation with over ₦700 exchanged for a dollar in the parallel market (Central Bank of Nigeria exchange rate: ₦421.7 to $1). [4] These economic challenges may further aggravate the problem of poor healthcare funding in the country's healthcare system. Most of the equipment and drugs used in hospitals within Nigeria are imported and rely heavily on the exchange rate. Therefore, exchange rate devaluation is a major cause of the sudden spike in the cost of

pharmaceutical products, hospital equipment, healthcare services and across all value chains in the country's healthcare delivery system. [5] It is important to note that the Nigeria's healthcare spending per capita was $71 for 2019 while the 2022 Federal Ministry of Health budget was about ₦3,311 ($8) per capita. [6] Also, the majority of the people pay for healthcare out-of-pocket with <5% of the population being captured under the National Health Insurance Scheme. [7]

The inflation in healthcare is more of cost-push inflation (from increase in the cost of production) and to some extent build-in inflation (expectations that inflation will continue leading to wages increase). [1] The rise in the cost of health care services and other products has led to the decrease healthcare seeking behavior of the populace, especially those without health insurance cover, consequently, leading to delay elective care. Decreased patronage may be affecting private healthcare providers more because they are more likely to be the first to increase their fee considering that they are mostly profit-oriented organizations, and their revenue is usually from the money generated from the health services provided. However, some healthcare services such as emergency service at the time of injury and childbirth have relatively inelastic demand and their patronage may not reduce, even when it led to individuals and households experiencing catastrophic health expenditure and impoverishment.

In Nigeria, over two-third of the population of about 210 million people are living below the national poverty line in 2022 and an estimated 87 million live in extreme poverty. [8] Rising inflation further worsens inequality and poverty because it hits income and savings harder. Inflation lowers an individual's real income as well as their purchasing power. [9] Poverty is both a cause and a consequence of poor health. Poverty increases the chances of poor health especially in terms of increased burden of infectious and neglected tropical diseases, child and maternal mortality as well as malnutrition as people are not able to afford basic needs and proper healthcare. [10] Poor health, in turn, traps community in poverty. [11]

Currently, an inflation rate increase of 22.0% has been reported on food. [2] The increase in the price of food may affect affordability and is a known cause of transitory household food insecurity, [12] which would eventually lead to undernutrition most especially among children and pregnant women, predisposing them to diseases and ill-health. In a country already having a very high contribution to global under-five and maternal mortality, [13] economic instability stemming from inflation, a strained healthcare system, low uptake of preventive health measures and poor healthcare seeking behavior may lead to worsening of these deaths. [13] Furthermore, economic challenges have been associated with unemployment, poverty and mental illnesses such as substance use disorder, anxiety, depression and suicide among vulnerable individuals. [14] Higher cases of suicide have been linked with financial crisis. [14] Nigeria has recently recorded an increase in crime and violence such as kidnapping, arm robbery and ritual killings further impacting on the health of the people.

When industries have to deal with greater costs in operation secondary to a rise in the costs of goods and services, they often increase their prices in order to balance the books and unfortunately, the business of healthcare is not exempted. [1], [15] Inflation increases the cost of inputs for healthcare services and if not properly managed may impact on the cost and quality of healthcare services. For example, the 130% rise in the price of Automotive Gas Oil (Diesel) from ₦288 to ₦655 between January and April 2022, [16] alongside the poor electricity supply in Nigeria that caused most industries including healthcare institutions to run almost exclusively on diesel electric generators have now increased overhead costs as these industries would need to spend a higher price to acquire equal amounts of diesel to run the facility. For private health facilities this leads to direct rise in the cost of care, however, due to difficulty in increasing healthcare services cost in the public institutions, most have resulted into rationing of power from diesel generators and this may significantly impact on the quality of health care delivery. Consequently, this aforementioned situation occasionally leads to delays in instituting emergency care. Petroleum is used widely in modern health care and this makes healthcare vulnerable to its supply shifts. [17] It has been documented that a rise in the cost of petroleum products contribute to the worsening cost of healthcare. [17]

Furthermore, since contracts for healthcare are agreed in advance, the capital projects budgeted for in the 2022 appropriation act may now require more funding than earlier planned as a result of inflation. This may lead to some of them becoming abandoned owing to the increased cost of inputs. In order to cut cost and still make good profit, healthcare providers may resort into procurement of cheaper brands or even unbranded medications as well as consumables ultimately, affecting the quality of health care delivery. Staffing may also be impacted while trying

to cut cost such that lesser number of workers required to function are employed especially in private health facilities [18] leading to increase workload and pressure on the limited hands available.

The increase in the cost of living has had a significant impact on healthcare workers (HCW), the majority of whom is experiencing physical, psychological and financial stress from the ongoing pandemic and general burnout. Nigeria is affected by a paucity in the number of available HCW to meet its population of roughly 210 million people [19] The country has 15 nurses and midwives for every 10,000 people while there are 4 doctors for 10,000 persons which is less than the recommended by the World Health Organization. [19] These HCW are faced with burnout and stress due to their low number, [20] coupled with the current inflation may result in low productivity and inefficiency of the HCW. Due to the rising costs of goods and service with absence of a similar rise in remuneration, HCW have to spend more to live the same lifestyle as before causing an income deficit. Therefore, they may have to resort to borrowing, taking on extra jobs or starting a business or career different from healthcare service delivery in an attempt to beat the inflation. Besides, some of them have exported their services to developed countries with better pay leading to increased brain drain.

Lastly, research in healthcare may also have been impacted by the current economic crisis. The hike in the prices of goods and services has not left out the inputs needed to conduct healthcare research, and this would ultimately raise the cost of projects above that in the proposals thereby affecting the execution of grants. The continuous devaluation of naira against dollar has delayed and even halted publication of some completed project manuscripts most especially, in foreign journals that demand dollars as their payment currency. Apart from this, messages have been sent to authors by some journals notifying them of increase in their fees in order to meet the current economic challenges for printing.

In conclusion, several effects of inflation were brought into limelight, including increased healthcare costs which has led to reduced demand for healthcare services especially among those without health insurance, increased morbidity from undernutrition, mental illnesses and social vices. Also, inflation has increased the cost of production of healthcare services resulting in reduced quality of healthcare despite increase in cost. Inefficiency of HCW, medical brain drain and dwindling of research activities are other highlighted impacts. Therefore, it is necessary for the government at all levels to develop and implement policies that will reduce inflation, decrease its attendant effect on the health system as well as mitigate against the effect of future inflation on the Nigerian healthcare system. There is also a need to improve healthcare funding through increasing the resource allocation of the health sector in line with the 2001 Abuja declaration.

AUTHORS' CONTRIBUTIONS:

ITM conceptualized the study. Literature search, manuscript writing, critical review and editing were conducted by all authors. The final draft was read and approved by all authors.

ACKNOWLEDGMENTS:

Nil

DISCLOSURE OF CONFLICT OF INTEREST:

Authors declare no conflict of interest.

DISCLOSURE OF FUNDING SOURCE(S):

No financial support or grant was received for this article.

ETHICS APPROVAL AND INFORMED CONSENT:

This article followed all ethical standards for research without direct contact with human or animal subjects.

References

1. World Population Review. Inflation Rate by Country 2022. Available from: https://worldpopulationreview.com/country-rankings/inflation-rate-by-country [last accessed 10 September 2022]
2. Trading Economics. Inflation Rate World. 2022. https://tradingeconomics.com/country-list/inflation-rate?continent=world [last accessed 10 September 2022]
3. Kamau R. Inflation Protests Span Sri Lanka, Albania, Argentina, Panama, Kenya, Ghana - How Long Before They Hit The United States? 2022. Available from: https://www.forbes.com/sites/rufaskamau/2022/07/11/inflation-protests-span-sri-lanka-albania-argentina-panama-kenya-ghanahow-long-before-they-hit-the-united-states/amp/ [last accessed 10 January 2023]
4. Central Bank of Nigeria. Exchange Rates. 2022. Available from: https://www.cbn.gov.ng/rates/ExchRatebyCurrency.asp [last accessed 10 January 2023]

5. Okafor T (Business Day). How Nigeria's healthcare cost quietly drives inflation. 2023. https://businessday.ng/health/article/how-nigerias-healthcare-cost-quietly-drives-inflation/ [last accessed 10 January 2023]
6. Budget Office of the Federation - Federal Republic of Nigeria. 2022 Budget. 2022. Available from:https://www.budgetoffice.gov.ng/index.php/resources/internal-resources/budget-documents/2022-budget [Last accessed 10 September 2022]
7. Ipinnimo TM, Ibirongbe DO, Omowaye MT, Ajayi PO, Ogunleye TS. Health Insurance Uptake and Affordability of Care Among Patients with Hypertension in a Federal Teaching Hospital in Southwestern Nigeria. Journal of Health and Medical Sciences 2021; 4(2):128-135. doi: 10.31014/aior.1994.04.02.165
8. Obayelu AE, Obayelu OA, Bolarinwa KK, Oyeyinka RA. Assessment of the Immediate and Potential Long-Term Effects of COVID-19 Outbreak on Socioeconomics, Agriculture, Security of Food and Dietary Intake in Nigeria. Food Ethics. 2021;6(1):5. doi: 10.1007/s41055-021-00085-w.
9. Reese J. The link between poverty and inflation. 2022. Available from: https://borgenproject.org/poverty-and-inflation/ [last accessed 10 January 2023]
10. Mukherjee, K. Poverty as a Cause and Consequence of Ill Health. Epidemiology and Health System Journal. 2015; 2(4): 209-220.
11. Roberts S. Key facts: poverty and poor health. 2018. Available from: https://www.healthpovertyaction.org/news-events/key-facts-poverty-and-poor-health/#:~:text=Poverty is both a cause, most vulnerable people each year [last accessed 10 January 2023]
12. Mohammed A, Wassie SB, Tesfaye E. Determinants of Smallholders' Food Security Status in Kalu District, Northern Ethiopia. Challenges. 2021;12(17:)1-9. doi: 10.3390/challe12020017
13. United Nations Inter-agency Group for Child Mortality Estimation. Levels & Trends in Child Mortality: Report 2020, Estimates developed by the United Nations Inter-agency Group for Child Mortality Estimation. United Nations Children's Fund, New York, 2020.
14. Fernandez-Rivas A, Gonzalez-Torres MA. The economic crisis in Spain and its impact on the mental health of children and adolescents Communications of the European Society for Child and Adolescent Psychiatry. 2013;22:583–586 DOI 10.1007/s00787-013-0465-z
15. Janus S. How Inflation is Impacting the Healthcare Industry. 2022. Available from: https://knowledge-leader.colliers.com/shawn-janus/how-inflation-is-impacting-the-healthcare-industry/ [last accessed 10 September 2022]
16. National Bureau of Statistics. Automotive Gas Oil (Diesel) Price Watch. 2022. Available from: https://nigerianstat.gov.ng/elibrary/read/1241136 [last accessed 10 September 2022]
17. Hess J, Bednarz D, Bae J, Pierce J. Petroleum and health care: evaluating and managing health care's vulnerability to petroleum supply shifts. Am J Public Health.2011;101(9):1568-1579. doi:10.2105/AJPH.2011.300233
18. Onyekwelu J, Kalu FT, Olotu FE. Capacity utilization of private medical facilities in Nigeria. Nigerian Journal of General Practice. 2013; 11(1):1-9
19. World Bank Group. Data. 2022. Available from: https://data.worldbank.org/indicator?tab=all [last accessed 10 September 2022]
20. Lasebikan VO, Oyetunde MO. Burnout among Nurses in a Nigerian General Hospital : Prevalence and Associated Factors. 2012;2012:1-6. doi:10.5402/2012/402157

ACHSM Asia-Pacific Journal of Health Management shape

REVIEW ARTICLE

RESOURCE-BASED VIEW: A NEW STRATEGIC PERSPECTIVE FOR PUBLIC HEALTH SERVICE MANAGERS

Jennifer Kosiol, Linda Fraser, Anneke Fitzgerald, Katrina Radford*

Griffith University, Queensland, Australia

Correspondence: j.kosiol@griffith.edu.au

ABSTRACT

The resource-based view (RBV) theory is a widely accepted strategic management theory, particularly within private sector organisations. [1,2,3] However, within public healthcare settings, the level of empirical support available on the use and appropriateness of RBV within this environment is largely unchartered. Consequently, this paper aimed to further understand the level of evidence for the purpose of providing an insight into how it may be used to improve the efficiency and effectiveness of public health organisations.

An extensive literature search returned a total of 859 studies. Of these, just 13 studies met the inclusion criteria of being an investigation of the use of RBV theory in public sector healthcare organisations. The analysis conducted demonstrates that while the use of RBV theory has been relatively slow, the benefits are positive.

The practical application of RBV theory lies in strategically mapping the relationships between resources, capabilities, and public value, relevant to healthcare organisations, in order to gain and understand how public value is created to provide a competitive advantage and superior performance for the organisation.

KEYWORDS

resource-based view; strategic management; healthcare; competitive advantage

INTRODUCTION

Public healthcare organisations are facing dynamic economic and financial challenges and are searching for solutions that translate into greater adaptability and efficiency. [4] Greater adaptability and efficiency are essential to ensure sustainability and performance, and to meet the demand for insight and transparency surrounding the nature and management of public resources. [2,5] The RBV theory is an efficiency-based explanation of sustainability and performance [6] that has been credited by some researchers as enabling organisations to survive or even thrive in turbulent environments. [7,8] An intrinsic assertion of the RBV theory is that resources, which are valuable; rare; inimitable; and non-substitutable can be used to create sustained performance differences and, therefore, should feature prominently in strategic planning. [9] Given the growing concerns for financial sustainability in public healthcare it may now be useful to expand this theory into the public healthcare arena. [10] Thus, implementing the logic of this theory in the management of public healthcare organisations in challenging and turbulent environments appears to be a legitimate strategy. [7,8,3,5]

Using the RBV within public hospitals may be one way of managing resources more effectively, however, there is

limited empirical evidence as to the appropriateness and applicability of this within the public healthcare context. Therefore, this study was designed to begin to fill this gap in the literature and scope the potential viability of this theory for use in public health sector management. To assist with this, the study was guided by the following research question:

How can the resource-based view theory apply to public healthcare organisations?

BACKGROUND

PUBLIC HEALTHCARE ORGANISATIONS

Historically, the Australian healthcare system was unreliable in its financial approaches until the establishment of Medicare in 1984, due to the reliance on the prevailing political climate. From 1996 Australian healthcare was financed publicly via national universal health insurance with publicly subsidised private health insurance. [11] This financing has continued to present day with the inclusion of means testing for the publicly subsidised private health insurance added in 2013. [12,11] The responsibility of the management of healthcare lies with the states and territories, with some of the funding and jurisdiction provided by the Federal government. [13,11] For example, public hospitals, which account for about 65% of all hospitalisations are operated and governed by the states and territories, but the funding of services is a joint responsibility of both levels of government. [12,11] The result is a complex system with fragmented and disjointed responsibilities. [11]

From 2015 until June 2017, Commonwealth efficient growth funding was uncapped, with growth funding provided at 45% for all service activity growth above the prior year. However, from 2017-18 the Commonwealth growth funding was capped at 6.5% of funding, with approximately 1.6% consumed in cost escalation. [12] This is a significant funding cap that will not be sufficient to meet current and future demand. [13] This means that public hospitals must now be more conscious of using resources efficiently and effectively to ensure long-term sustainability.

Since public healthcare funding is largely derived from government funds where there are constraints from this finite 'resource pie', it creates competition with other public healthcare organisations and government agencies, for funding. [12] Each health service must have its own resources and capabilities and consider its environment, in order to negotiate with the government for a piece of the funding resource pie. Most notably, they are dependent on other bodies, such as Ministerial cabinets, for direction and scope of their operation. In addition, public healthcare organisations, are externally justified in that their existence is dependent on the provision of services for public purpose. [4] They are to some extent, politically, economically, and socially aligned to satisfying key stakeholders [14,4] and the key to success is identifying, sustaining, and growing strategic capabilities to produce the greatest public value at an efficient and reasonable cost. [4]. In recent times, where resources are fluctuating; organisational slack is decreasing; and there is an increase in public scrutiny and scepticism, satisfying key stakeholders is becoming increasingly difficult. [4,2,15,5]

While distinctively private organisations generally rely on governance structures that provide direction and scope of operations that are designed for the firm's own financial well-being, both public and private organisations may face similar competitive challenges in terms of obtaining resourcing. The increasing attention on incorporating the Environmental, Social and Governance (ESG) aspects of healthcare operations into reporting, as an essential appurtenance to organisational performance measures, brings similar challenges to both private and public healthcare organisations. [16] This is largely due to the attention and pressure from investors, consumers, employees, and stakeholders on ESG issues making healthcare organisations reassess the way they communicate and deliver services. [16] As such, resource management in healthcare organisations requires a strategy that exploits specific tangible and intangible resources that will enhance organisational performance.

RESOURCE BASED VIEW

RBV originated in the strategic management field and is based on the theory that organisations have both tangible and intangible resources made up of human, physical, and organisational capital. [1] The idea that organisations can be looked at as a set of resources was initially proposed by Penrose. [17] However, the development of .RBV theory was advanced by Wernerfelt [18] and further progressed by Barney [1] with the concept of strategic resources providing a competitive advantage for the organisation. The rudimentary distribution of resources across organisations within the same industries is thought to be the reason for differences in performance. RBV theory is based on the concept of building a competitive advantage and organisational performance, built on the ownership of

organisation-specific strategic resources. [1,6,3,19] RBV theory has been widely accepted in the strategic management field however, RBV empirical studies have only provided mixed evidence of construct validity, suggesting a need for further theoretical advancement. Mostly in healthcare the application of RBV has centred on theoretical interpretation and less on the use of RBV as a theoretical lens to investigate healthcare organisations.

RBV is a theory about the behaviour of organisations and is essentially a statement about how organisations operate. According to Barney [1] the internal attributes of these resources must be valuable; rare; inimitable; and non-substitutable (VRIN). Hence, RBV argues that while it is necessary for organisations to possess VRIN resources, organisations must also demonstrate the ability to alter them to their full potential to gain a competitive advantage and superior performance. [20] Strategically managing these resources to create a superior performance and competitive advantage depends not only on the scope to invest in innovation and improvement through exploitation of the internal environment but also on the capability and capacity of managers to sense, seize and respond to opportunity that will shape organisational performance. [21,22,23]

COMPETITIVE ADVANTAGE FOR PUBLIC HEALTHCARE ORGANISATIONS

The notion of competitive advantage is relevant for understanding the differences in performances of public sector organisations, where the value and profit are not retained by the firm but instead are apportioned to the community it serves. [19] Recognising and managing VRIN resources is only part of the process of RBV theory; developing and strategically controlling the resources builds organisational livelihood. [24] Unfortunately, there is limited empirical research that gives attention to the paradox this raises where the purpose of the organisation is to provide knowledge and services for the objective of giving them away for the public good rather than maximising profit. [19]

This is important because public healthcare organisations are created to fulfill the responsibilities of the government and are expected to contribute to the common good in the delivery of healthcare services to the community. [12] Notably, the Australian healthcare system is a multifaceted complex network of governance and support mechanisms that facilitates the delivery of quality services through policy, legislation, coordination, regulation, and funding. [12] The purpose of government funded public healthcare delivery in Australia is not for commercial profit but to develop sustainable capability within the industry in terms of efficiency, quality, reputation, and performance. As such, maintaining a competitive advantage plays a key role in establishing funding for public healthcare organisations.

Competition is a key element of economic policy in Australia, seen as the engine which drives efficiency, productivity and innovation. [25] In 2015, Australia's competition policy, laws and institutions were reviewed by the Competition Policy Review Panel (Harper Review) [26] to determine whether they remained fit for purpose considering the challenges and opportunities facing Australia in the foreseeable future. [26] The Harper Review [26] recommended a new set of competition principles that would assist in directing the government's commitment to competition reform. [27] Competition was welcomed if it was in the public interest and did not impede on the long-term wellbeing of the public. The healthcare sector was expressly recommended by the Harper review [26] as being amenable to competition reform to ensure innovative ways to deliver high-quality and efficient human services.

In 2016, the Productivity Commission was requested to inquire into Australia's human services with the objective on innovative ways to improve outcomes through the introduction of competition, contestability, and informed user choice. [28] The inquiry found that the provision of public hospital services was one of the six human services best suited for competition-based reform. [28] One of the main principles of the inquiry was that healthcare should be user-focused with consumer choice the basis of service provision and delivery. [28]

While competition, contestability and choice are still in the early stages of reform, it is likely that these factors will become an important part of Australia's healthcare system in the future. Particularly since other successful jurisdictions, such as the United Kingdom, have had competition policy as an integral part of their National Health Service.

Without sustainable strategies and continued attention to resource capability, public healthcare organisations face difficulty in achieving the goals of creating public healthcare value and responsiveness. Thus, the RBV theory may be useful in public health service management

because of its potential to assist healthcare leaders in understanding resource value and value creation.

DISTINCTIVE COMPETENCIES AND CAPABILITIES

Distinctive competencies and capabilities that fit within the VRIN context, are built on the foundational work that RBV addresses in possessing and deploying resources for competitive advantage. [4,29] It is the capabilities and core competencies within the organisation that have been far more significant in explaining competitive advantage and performance than resources alone. [30,21,29] The distinctive competencies and capabilities can simply be individual tacit knowledge which makes them difficult to replicate or can also involve a unique pattern of links that synergistically provide the uniqueness. [30,22,4] For example, organisational reputation is a unique intangible resource that organisations acquire, usually by the goodwill of the firm, and as such is a critical resource for an organisation. [20]

This more contemporary extension of RBV theory argues that while it is necessary for an organisation to possess VRIN resources, organisations must also demonstrate the ability to alter them to their full potential in order to gain superior performance and competitive advantage. Distinctive competencies and capabilities have not been as widely studied by strategic management theorists as tangible resources have been. [30,29] The importance of strategic planning concentrating on developing an organisational livelihood and good reputation, which it enables the organisation to cope and recover from external challenges, such as economic and social upheaval, has yet to be explored. Researchers have focused on identifying organisational strengths and weaknesses in relation to external threats and opportunities rather than on organisational livelihood. [24,31,32,33,34,35,36,37]

These identified gaps in the literature may be a result of failing to identify distinctive competencies, or rather, not knowing how to link competencies and capabilities with the organisational goals and mission. [4] While it is beyond the scope of this review to draw conclusions, it is possible that measuring resources is more easily achieved than measuring the intangible resources of competencies and capabilities. Nevertheless, gaps exist in the public management literature with respect to what distinctive competencies mean within the public healthcare arena. [4,38,5,3] In addition, distinctive competencies theorised in the private organisation literature may not provide a useful guide on how to identify them within public or not-for-profit organisations in a way that makes them useful for public organisation strategy planning and implementation. [4,39,3] Answers to these questions rest in part on a conceptualisation of what constitutes the appropriate scale of distinctive competency and capability analysis in the public domain.

METHOD

A scoping study was performed to identify all the relevant literature systematically, using Arksey & O'Malley's [40] identified review framework. There are very broad definitions of what constitutes resources, and without first defining the parameters this might generate an unwieldy number of references. In turn, using the term healthcare only may reduce the likelihood of missing relevant articles, particularly if 'hospital' is a keyword and not 'healthcare'. Consequently, the initial search was done using a broad approach to the topic to try and generate the breadth of coverage required. Once this was done, there was a sense of the volume and general scope of the field which then informed the parameters and key search terms used. Identification of studies relevant to the research question included examining the electronic literature database; reference list for relevant literature; key journal hand search; existing networks; relevant organisations, and conference papers. This was to ensure a wide scope of the literature and to reduce the risk of missing relevant articles. The method is shown in flow diagram 1 (see Figure 1).

SEARCH TERMS

The search terms were selected following an initial scan of the literature and included the terms: organisational resources, distinctive capabilities/competencies, resource-based view, hospital and healthcare, public organisation. These terms were utilised in the electronic databases set out below.

EXCLUSION CRITERIA AND LIMITATIONS

Foreign language material was excluded due to the cost and time involved in translating the material. It is acknowledged that the risk of this approach is that potentially relevant papers may have been missed.

The search included studies published between January 1984 and March 2022. January 1984 was chosen as it covered major health policy changes in Australia and because public healthcare improvement from a RBV perspective is a relatively new development. Arguably the major contributors to the dominant theoretical

underpinnings of RBV, is the work of two Strategic Management theorists, Wernerfelt [18] and Barney. [1]

ELECTRONIC LITERATURE DATABASES

The databases searched included ABI/INFORM Complete (ProQuest); EBSCOhost; Thomson Reuters LBC; Emerald Full text; Informit Search (multiple databases); MEDLINE; EMBASE and CINAHL. These databases were chosen due to their subject coverage of the business, management, and health sectors. Technical searching strategies were checked by the Griffith University Library Information Officer and comparable results were obtained. The search technique was confirmed and the risk of missing relevant articles was minimised. The articles selected were exported into Endnote for ease of organising the results and to keep a structured record of articles and any library requests made.

ARTICLE SCREENING AND CRITERIA

The various mechanisms for searching in this scoping study yielded a total of 3,892 references. Of these 3,873 were obtained via electronic database searches; 14 were identified from references, 2 from hand searching, and 3 from existing networks and conferences (see Table 1).

TABLE 1. ARTICLE SCREENING RESULTS

Article Screening	Total	Combined total
Electronic database search	3873	
Article reference search	14	3892
Journal hand search	2	
Existing networks and conferences	3	

The references were reviewed and articles with irrelevant titles such as, "Carbon Management Systems and Carbon Mitigation" were excluded, as were news items, letters, and book reviews. As the objective of this scoping review was to examine the literature on healthcare organisational resource capability and value from a resource-based view perspective, the abstracts retrieved were read and assessed for relevance based on whether the article considered RBV and healthcare / hospital / public organisation.

All selected articles based on these criteria were read in full and recorded. This included the author; year of publication; country; focus of the study; method, comments; and future research suggestions. Both the screening process and abstracts were independently reviewed and validated articles selected for inclusion.

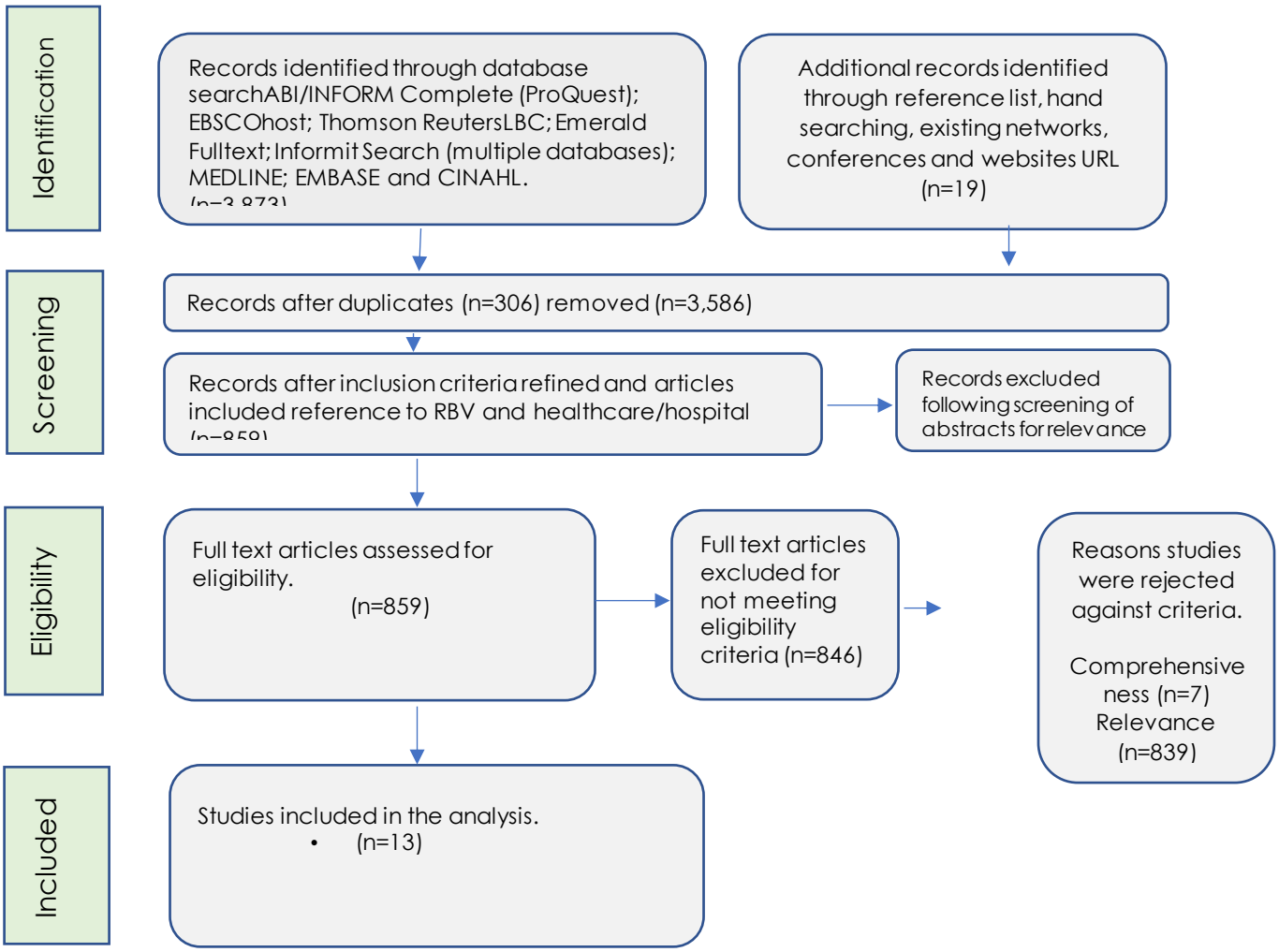
Results

The initial review of the 3,892 reference citations indicated that the search strategy had collected a sizeable number of irrelevant studies. This was largely due to the difficulty with different terminologies in different countries and with 'resource' being a relatively broad term. As such, this scoping study adopted specific criteria post hoc once familiarity with the literature was obtained. The inclusion criterion was based on whether the article considered both RBV and healthcare / hospital / public organisation. Flow diagram 1 sets out the selection process for review. Reference to RBV and healthcare/hospital/public organisation yielded 859 results once duplicates were eliminated (306) and papers that did not relate to health care and RBV (2727). Of these 859 articles, 839 were rejected for relevance and 7 were rejected as they were short articles of less than two (2) pages and were general commentaries and as such were not comprehensive enough to draw logical conclusions from. Ultimately a total of 13 papers were selected. Of these 13 articles, similar themed studies (strategic management (6); human resource (3); information technology (2); reputation (1); competitive advantage (1) were grouped together and all were read closely and in comparison, to identify common themes.

The framework for assessing the quality of primary research reports was through Kmet's Quality Assessment Framework. [41] This framework provides a scoring system for both qualitative and quantitative research to assess the quality of the methods used in the included articles. The scale from Kmet [41] was originally designed to assess technology in healthcare, however, this framework provides a useful instrument that facilitates the quality assessment of the studies used in this review. The criteria for qualitative studies have 10 domains for which the answers and scoring can be as follows: (yes = 2); (Partially = 1); (No = 0); and not

applicable. The quality score of each article was calculated by summing the total score of items with non-applicable domains removed from the scoring. The calculated summary score for each article was obtained across relevant items. The quality assessment was appraised by two reviewers independently. The possible standard quality assessment score ranged from 0 to 20 with 0 indicating low quality and 20 indicating high quality. Articles that had a Quality Assessment Score (QAS) of 15 and above were included in the review (see Table 2).

FIGURE 1. FLOW DIAGRAM SELECTION PROCESS



Adapted from PRISMA. [42]

TABLE 2. RESULTS SUMMARY

Study	YEAR		QAS	Reference
Strategy implementation Kash, B.A., Spaulding, A., Johnson, C.E., & Gamm, L.	2014	Resource dependency theory and RBV in strategic management. Two HC systems had similar pursuits and both utilise an externally orientated RDT method of strategy formulation. The relevance of the RBV was apparent during resource deployment for strategy implementation. The process of HC strategic decision making incorporates RDT amd RBV as separate and compatable activities that are sequential.	17	32
Decision making Fraczkiewicz-wronka& Szymaniec-mlicka	2012	Public hospitals use both RDT and RBV approaches and these are both positively correlated which means that managers who understand the importance of resources for decision making usually try to use both the external and internal view. They understand the importance of stetting the goals on the basis of own resources and resources that are owned by stakeholders. Paying more attention to resources which are used	18	42
Strategic management capability Turkeli, S., & Ercek, M.	2010	Making the destinction between resource and capability based monitoring is impt particularly in times of uncertainty. Political ties hampered the implementation of the project because external and political relationships. Internal stakeholder and top management difficulties in initiating and maintaining strategic	15	29
What constitutes value in public healthcare and how can RBV improve benefits management practices? Svejvig, P., & Schlichter, B.R.	2020	RBV used to theorise about value creation process. Public value creation linking resources, capabilities and public value. Identified five public value dimensions: professional value; organisational value; patient-perceived value; employee-perceived value; and learning.	16	38
How strategic resources influence hospital performance in HC industry Su, S., Lai, M., & Huang, H.	2009	Objectives were to examine the relationships among human capital, innovation capability and organisational performance; present a conceptual framework linking these elements; and examine the influence of hospital ownership on performance of innovative hospitals. The results showed the mediating role of innovation in the impact of human capital on organisational performance. Human capitall is the most fundamental element of strategic resources and may affect innovation capability. Human capital and innovation positively influence on another. Innovation generates and enhances hospital performance.	16	26
Human resource capabilities Lee, W., Hung, S., & Chau, P. Y. K.	2011	Relationship between innovative business processes and market interrelationisation performance from RBV perspective. Technological capability and cultural capability positively affect market interrelationship performance where as structural capability is unrelated to innovative business processes. Influence of KM infrastructure on market interrelationship and performance	17	31
Evaluation of business value of CPOE in cancer care from a RBV perspective Haddad, P., Schaffer, J.L., & Wickramasinghe, N.	2015	The CPOE system has potential to generate business value and enhance the overall performance of the hospital in the area of oncology. Improved reputation of the hospital as "state of the art" system. Both assets and capabilities are key to attain business value from the studied CPOE.	16	28
Interorganisational relationships and hospital financial performance from a RBV perspective Gloede, T.D., Pulm, J., Hammer, A., Ommen, O. Kowalski. C.. Groß. S.E.. & Pfaff. H.	2013	RBV perspective of interorganisational relationships with hospital and outpatient physicians. Impact on hospital financial performance. Study of 95 hospitals. Outcome - need to clearly define variables that measure competitative advantage and clearly distinguish between those variables and any measures of resources. Having effective interorgansational relationships is positively associated with hospitals	16	37
RBV measure of reputation in HC sector Smith, A.D.	2008	Reputation should be seen as a competitive advantage driven by knowhow and culture. Repuation as an intangible asset	15	40
Putting the Resource-based view of strategy and disctinctinve competencies to work in public organisations Bryson, J.M, Ackermann, F., & Eden, C.	2007	Method of recognising distinctive competencies to create a competitive advantage for the organisation. National Health Service is used as an illustration. Key to success of public organisations is identifying and building strategic capacities to produce the greatest public value for key stakeholders at a reasonable cost. The RBV approach to strategy is relevant and potentially useful for public sector organisations.	15	5
Impact of strategic orientation adopted by an organisation on its performance Szymaniec-Mlicka, K	2016	Public organisations should adopt RBV in strategic decision making and focus on the organisations resources and skills to better enable its effectiveness with emerging challenges and when operating in a turbulent environment	15	6
Resource-based view on safety culture's influence on hospital performance: The moderating role of electronic health record implementation. Upadhyay, S., Weech-Maldonado, R., Lemak, C.H. Stephenson, A., Mehta, T., & Smith, D.G.	2016	The association between safety culture and hosptial quality and hospital performance based on RBV theory. Tangible and intangible resources specific to an organisation assist with the achievement of strategic goals of improving patient safety and performance.	17	37
Resource-Based and Strategic Group Influences on Hospital Performance Short, J> C., Palmer, T.B., Ketchen, D.J.	2002	Healthcare complexity creates challenges to uncovering the determinants of the performance of these organisations. Study looked at 85 hospitals and the effects of resources, strategy and performance	17	36

FINDINGS

The use of RBV theory in the healthcare literature has been slowly emerging in the field of public health service management inquiry over the last 15 years. However, RBV theory has been available for a longer period with Wernerfelt [18] and Barney [1] responsible for the broader development of the theory. Of the articles reviewed, all were post 2007 with 8 arising from 2010 onwards. This highlights that the use of RBV theory within the healthcare industry is relatively recent and raises questions as to why? Is it because the theory is not valued in the management of health service organisations? or is the theory too vague to be useful in understanding the health service management industry? [4,5] The USA had the highest number of articles identified in the review with three (3). The remaining were from Poland, two (2); Taiwan, two (2); Germany, Turkey, Denmark, United Kingdom and Australia with one (1) each. This distribution may reflect the restriction of the literature search to English language articles.

To assist in answering the research question for this study, a core objective of this review was to determine the range of

techniques used to examine healthcare organisations using RBV as the theory underpinning the study. Support in the empirical literature on the use of RBV theory reflects a transforming theory with the emergence of the dynamic capabilities theoretical approach. This approach focuses on specifically designed types of processes by which organisations can exploit resources for competitive advantage and sustained performance. [43]

RBV as a fundamental theory for the strategic management of public healthcare organisations, has been most widely acknowledged in the work of Bryson and others [4] where a strategic livelihood mapping tool for creating organisational strategy was proposed. Under this method, public organisation managers would be able to identify distinctive competencies that are linked to the organisations' aspirations and goals. This results in the creation of an organisational strategy that produces the greatest public value necessary to achieve a sustainable fit within the environment. Thus, the RBV approach to strategy formation and implementation is relevant and potentially useful for public organisations. However, further empirical research is needed to test the efficacy of defining how distinctive competencies can be useful within the Australian public healthcare setting.

A further study examining the use of RBV as an appropriate strategy for public organisations in challenging environments was identified in the work of Svejvig and Schlichter [44], which explored what constitutes value in public healthcare organisations by activating existing resources. Svejvig and Schlichter [44] identified that mapping the resources with capability, and with public value through their various relationships, provides the understanding for managers about how public value is created. This study recognised that 'healthcare professional perceived value' and 'learning' were important public value dimensions that needed to be identified to establish the motivation and efficiency that builds dynamic capabilities and competitive advantage for the organisation. Recognising the public value dimensions fosters a culture of learning which ultimately enables the organisation to respond to environmental challenges and equip them for the future.

Direct indication of RBV as an appropriate strategy for healthcare organisations can also be found in the work of Short and others [45] who examined strategic group approaches to achieving superior performance and found that resources and distinctive competencies were important to a hospital's financial performance and efficiency. That study found that strategic group membership influences performance variation, beyond that, accounted for by resources. Therefore, it seems plausible that effective public healthcare strategic and performance management should take distinctive competencies into their planning efforts.

Additionally, healthcare organisations investing in technological innovations can enhance resource value by improving clinical decision-making, patient care, financial performance, and administrative processes. [31,10,34,46] However, the adoption of new technologies is slow and there is often a failure to apply a systematic approach for developing timely organisational gap analysis. [24] Financial and competing priorities provide the biggest challenges for implementation. [10] The ever-increasing need and use of modern technologies in healthcare requires timely evaluations of their impact on the overall performance of the organisation. [34] Additionally, the adoption of tangible resources has been shown to enhance and build intangible VRIN resources. For example, Upadhyay [46] found the adoption of the Electronic Health Record (EHR) built on the hospitals safety culture which is typically characterised as a VRIN resource. This is because culture characteristically has a set of robust core values, is valuable, rare, inimitable and non-substitutable. As such the safety culture of an organisation is a VRIN resource because it is inherently complex, specific to an organisation, difficult to replicate, and has the ability to create superior performance and competitive advantage for the healthcare organisation. Given the need for modern healthcare settings to develop these distinctive competencies and capabilities, implementing the logic of RBV in the strategic management of healthcare organisations is appropriate.

Smith [47] identifies three distinctive resources competencies that are critical to an organisations competitive advantage: reputation; employee know-how; and organisational culture. Recently, emphasis has been placed on the need to change organisational culture to improve performance. [48] Smith [47] and Lee and others [37] recognise the role of organisational culture in building a competitive advantage by enabling organisations to develop unique abilities and processes which result in the development of leadership skills and overall well-being of the organisation. Strategic planning efforts often miss these key components in effective strategising and planning. However, whether these distinctive competencies will lead

to sustained success within the Australian healthcare context remains to be seen, and further empirical research is needed to explore this in more depth.

Some of the studies focused on analysing the impact on competitive advantage of a particular resource. [24,32,34,35,37] Three of the studies focused on strategic management orientation adopted by healthcare organisations and the impact of that on the organisation's performance as a whole. [38,3,5] Szymaniec-Mlicka [5] found in her study of public healthcare entities in Poland, that adopting RBV theory to public healthcare organisational management is beneficial, particularly in turbulent environments, as "…resource based strategic thinking has a positive impact on an organisation's performance" (p.287). Additionally, organisations valuing the importance of stakeholder engagement within their strategy resulted in a positive impact on the organisation's performance. [5]

These studies provide operationalised and conceptualised views of resources within the healthcare settings using RBV theory to focus on resources the organisation should build and enhance to create value. The primary objective of public healthcare organisations is to fulfil their mandate by providing healthcare to the community, hence creating stakeholder value. Thus, it can be assumed that to build a competitive advantage from public healthcare resources, organisations must develop resources through the recognition and management of distinctive competencies and capabilities relevant to their stakeholder interests. [49] Therefore, adopting RBV theory for determining resource value in public healthcare organisations appears to be relevant and potentially useful for health service managers to identify and use resources effectively and efficiently.

HOW CAN THE RESOURCE-BASED VIEW THEORY APPLY TO PUBLIC HEALTHCARE ORGANISATIONS?

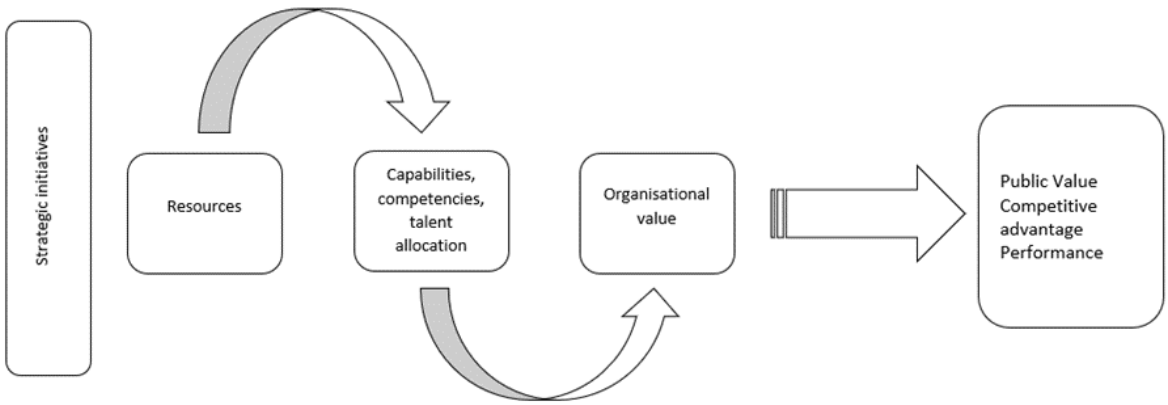
This review identified several gaps in the knowledge base regarding the use of resource-based theory within the public healthcare setting. Evident in the literature was the limited use of RBV in public health sector organisations with only thirteen (13) articles published over the last three (3) decades and more than half of those within the last ten (10) years. This may indicate that RBV as a theory is not valued or is too vague. However, given its acceptance within the strategic management field and the benefits identified in studies that have adopted this theory this assessment is unlikely.

Public healthcare organisations have been slow to adopt a more fiscal approach to healthcare delivery with only relatively recent changes in public dollar scrutiny and capping of funding allocations. The adoption of policies focusing on competition, contestability, and choice has compelled some organisations to look towards strategic management approaches that enhance value and performance in healthcare organisations.

PRACTICAL IMPLICATIONS

In order to clearly define strategic resource and the value that such resources add to an organisation's competitive advantage requires health service managers to be able to map the relationships between resources, capability and public value in order to understand how public value is created see figure 2. This was highlighted in a number of studies that identified particular resource capabilities and core competencies and their impact on organisational performance and competitive advantage. [24,31,35,34,37,32]

FIGURE 2 STRATEGIC RESOURCE MAPPING



Many strategic management researchers have focused on finding answers as to why some organisations outperform others. [6,20,50,49] Strategic decision-making in healthcare organisations tends to hold the resources that are critical for its operation (e.g., medical consultants) as having the greatest value. [5] In the same way that private organisations compete for resources, public organisations also face acquiring resources competitively. The competition between public organisations is based on achieving a competitive advantage that attracts a large portion of limited public resources. [50] This strategic management focus could be particularly important during times of fiscal restraint and political pressures within the environment. A competitive advantage may assist an organisation to survive and develop high quality efficient public health services. [50,8,49,38]

In the Australian public healthcare context, it may be beneficial to use RBV methodology in strategic management planning, but this requires further empirical study. Public healthcare organisations may want to explore this theory to understand how to develop resource capabilities and build public value that facilitates a competitive advantage for finite public resources. To maintain efficiency and performance whilst striving to strategically align the management of healthcare demands, while being adaptive and responsive to changes in the environment remains challenging. The funding restrictions and performance expectations increasingly demanded within the Australian public healthcare sector make it important for hospitals to leverage relevant resources in the identification of a competitive advantage and the effective application of strategic objectives that build public value. [38]

The trend towards examining capabilities and competencies hint at the possibility of the importance of these in determining an organisation's competitive position and performance capability. For the Australian healthcare industry, a conceptual-level approach to attaining competitive advantage and performance seems appropriate and will enhance the understanding of how and to what degree resources, competencies, and capabilities facilitate public healthcare organisations to build public value and achieve a competitive advantage and high performance.

In conclusion, further research is necessary to improve the understanding of the impact of the relationship between distinctive resource competencies controlled by public healthcare organisations and their performance. Understanding these relationships will be necessary for health service managers in developing strategic management plans that enhance organisational livelihood.

LIMITATIONS

This review used the same search terms for each of the databases used and did not use database-specific subject headings. The search performed was sensitive enough to cover all publications and technical searching strategies and these were checked by the other researchers. Scoping reviews are often considered a rapid review of the literature, and it would be incorrect to assume that this review method was less than thorough. To ensure the rigor of this review three academic professionals checked both information obtained and the literature searches.

CONFLICT OF INTEREST.

The Authors declare that there is no conflict of interest. Ethical clearance was not required for this review.

Reference

1. Barney JB. Firm resources and sustained competitive advantage. J Mgt. 1991; 17: 99-120.
2. Klein PG, Mahoney JT, McGahan AM, Pitelis CN. Resources, Capabilities, and Routines in Public Organizations. Rotman School of Management Working Paper No. 1550028. In Competitive Advantage Conference ; 2010; Atlanta.
3. Szymaniec-Mlicka K. Resource-based view in strategic management of public organizations – a review of the literature. Mgt. 2014; 18(2): 19-30.
4. Bryson JM, Ackerman F, Eden C. Putting the resource-based view of strategy and distinctive competence to work in public organizations. Pub Admin Rev. 2007; 67(4): 702-717.
5. Szymaniec-Mlicka K. Impact of strategic orientation adopted by an organisation on its performance, as shown on the example of public healthcare entities. Mgt. 2016; 20(2): 278-290.
6. Barney JB, Ketchen Jr.DJ, Wright M. The Future of Resource-Based Theory: Revitalization or Decline? J Mgt. 2011; 37(5): 1299-1315.
7. Fredricks E. Infusing flexibility into business to business firms: A contingency theory and resource-based view perspective and practical implications. Int J Mar Mgt. 2005; 34(6): 555-565.

8. Krupski R. Evolution of understanding organisation strategy. Stud and Mat Pop Econ. 2009;(2).
9. Kraatz MS, Zajac EJ. How organizational resources affect strategic change and performance in turbulent environments: Theory and evidence. Org Sci. 2001; 12(5): 632-659-7.
10. Crilly T, Jashapara A, Trenholm S, Peckham A, Currie G, Ferlie E. Knowledge mobilization in healthcare organizations: Synthesising evidence and theory using perspectives of organisational form, resource-based view of the firm and critical theory. Nat Ins H Res. 2013.
11. Hall J. Australian Health Care - The Challenge of Reform in a Fragmented System. T New Eng J Med. 2015; 373: 493-497.
12. Australian Institute of Health and Welfare. Health System Overview [Online]; Australian Government; 2022 July; [cited August,2022] Available from: https://www.aihw.gov.au/reports/australias-health/health-system-overview#_Toc30496981
13. Australian Medical Association. Media Release: Australia's Public Hospitals in a Constant State of Emergency due to funding shortfalls. AMA Public Hospital Report Card ; 2017.
14. Moore M. Creating Public Value: Strategic Management in Government Cambridge, Massachusetts: Harvard University Press; 1995.
15. Magid B, Murphy C, Lankiewicz J, Lawandi N, Poulton A. Pricing for safety and quality in healthcare: a discussion paper. Infect Dis Health. 2018 Mar;23(1):49-53. Available from: doi: 10.1016/j.idh.2017.10.001. Epub 2017 Dec 6. PMID: 30479304.
16. Salvi A, Petruzze F, Raimo N, Vitolla F. The relationship between ESG Disclosure and the Cost of Debt in the Healthcare Industry. In Handbook of Research on Healthcare Standards, Policies, and Reform. Pennsylvania: IGI Global; 2022.
17. Penrose E. The theory of the Growth of the Firm. Oxford: Basil Blackwell; 1959
18. 18. Wernerfelt B. A resource-based view of the firm.. Strat Mgt J. 1984; 5(2): 171-180.
19. Matthews J, Shulman AD. Competitive advantage in public-sector organizations: explaining the public good/sustainable competitive advantage paradox. J Bus Res. 2005; 58(2): 232-240.
20. Boyd BK, Bergh DD, Ketchen Jr. DJ. Reconsidering the Reputation-Performance Relationship: A Resource-Based View. J Mgt. 2010; 36(3): 588-609.
21. Edu AS. Positioning big data analytics capabilities towards financial service agility. J Inf Mgt. 2022; 74(4): 569-588.
22. Eden C, Ackermann F. Strategy making: The journey of strategic management London: Sage; 1998.
23. Bierly III PE, Damanpour F, Santoro MD. The application of external knowledge: organizational conditions for exploration and exploitation. Journal of Management Studies. 2009; 46(3): 481-509.
24. Tarafdar M, Gordon SR. Understanding the influence of information systems competencies on process innovation: A resource-based view. J Strat Inf Sys. 2007; 16(4).
25. Commonwealth of Australia. The Australian Health System [online]. Canberra: Australian Government; 2019 August. Available from: https://www.health.gov.au/about-us/the-australian-health-system.
26. Harper I, McCluskey S, O'Brien M, Anderson P. Competition Policy Review Final Report (Harper Review 2015). Canberra: Commonwealth of Australia; 2015 March 31 [cited 2022 Aug 2]. 548 p. Available from: https://www.australiancompetitionlaw.org/reports/2015harper-report.html#report
27. Hewitt JE. National competition policy and Australia's health care system: A look at the policy landscape with new eyes. J Law Med. 2018; 26(1): 103-127.
28. Productivity Commission. Improving human services through greater choice and competition. Canberra: Commonwealth of Australia; 2017 August [cited 2022 Aug 2]. Available from: https://www.pc.gov.au/news-media/pc-news/pc-news-august-2017/human-services-reforms
29. Newbert SL. Empirical research on the resource-based view of the firm: an assessment and suggestions for future research. Strat Mgt J. 2007; 28(2): 121-146.
30. Bello-Pintado A, Bianchi C. Workforce education diversity, work organization and innovation propensity. Eu J Inn Mgt. 2021; 24(3): 756-776.
31. Teoh SY, Pan SL, Ramchand AM. Resource management activities in healthcare information systems: A process perspective. Inf Sys Front. 2012; 14(3): 585-600.
32. Su S, Lai MC, Huang HC. Healthcare industry value creation and productivity measurement in an emerging economy. T Ser Ind J,. 2009; 29(7): 963-975.
33. Kwon J, Johnson ME. Healthcare Security Strategies for Regulatory Compliance and Data Security; 2013.
34. Haddad P, Schaffer JL, Wickramasinghe N. Evaluating the Business Value of CPOE for Cancer Care in Australia: A Resource Based View Perspective. In Australasian Conference on Information Systems; 2015; Adelaide.

35. Turkeli S, Ercek M. Designing a Capability-Focused Strategic Management Model for a Turkish Public Hospital: Learning from Failure. Sys Pract Action Res. 2010; 23(3): 353-370.
36. Wang CL, Ahmed PK. Dynamic capabilities: A review and research agenda. Int J Mgt Rev. 2007; 9(1): 31-51.
37. Lee WT, Hung SY, Chzu PYK. Influence of Knowledge Management Infrastructure on Innovative Business Processes and Market-Interrelationship Performance: An Empirical Study of Hospitals in Taiwan. J Glob Inf Mgt. 2011; 19(2): 67-89.
38. Kash BA, Spalding A, Johnson CE, Gamm L. Success factors for strategic change initiatives: A qualitative study of healthcare administrators' perspectives. J Hcare Mgt. 2014;: 65-8159.
39. Johnson G. Exploring corporate strategy Harlow: Financial Times-Prentice Hall; 2002.
40. Arksey J, O'Malley L. Scoping Studies: towards a methodological framework. Int J Soc Res. 2005; 8(1): 19-32.
41. Kmet LM, Cook LS, Lee RC. Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields Alberta: Alberta Heritage Foundation for Medical Research; 2004.
42. Page MJ, McKenzie PM, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. J. Clin. Epidemiol. 2021; 134: 178-189.
43. Gloede TD, Pulm J, Hammer A, Ommen O, Kowalski C, Groß SE, Pfaff H. Interorganizational relationships and hospital financial performance: a resource-based perspective. The Service Industries Journal. 2013 Oct 1;33(13-14):1260-74.
44. Svejig P, Schlicter BR. Resources, capabilities and public value creation in a healthcare IT project: an action research study. Int J Mg Proj Bus. 2021; 14(1): 131-149.
45. Short JC, Palmer TB, Ketchen Jr. DJ. Resource-Based and Strategic Group Influences on Hospital Performance. HCare Mgt Rev. 2002; 27(4): 7-17.
46. Upadhyay S, Weech-Maldonado R, Lemak CH, Stephenson A, Mehta T, Smith DG. Resource-based view on safety culture's influence on hospital performance: The moderating role of electronic health record implementation. Health care management review. 2020 Jul 1;45(3):207-16.
47. Smith AD. Resource Based View of the Firm: Measures of Reputation Among Health Service-Sector Businesses. H Mark Quart. 2008; 25(4): 361-382.
48. Parmelli E, Flodgren G, Beyer F, Baillie N, Schaafsma ME, Eccles MP. The effectiveness of strategies to change organisational culture to improve healthcare performance: a systematic review. Implementation Science. 2011 Dec;6(1):1-8.
49. Sharma S, Vrendenberg H. Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. Strat Mgt J. 1998; 79(8).
50. Fraczkiewicz-Wronka A, Szymaniec K. Resource based view and resource dependence theory in decision making process of public organisation - research findings. J Mgt. 2012; 16(2): 16.

ACHSM Asia-Pacific Journal of Health Management

REVIEW ARTICLE

BARRIERS AND FACILITATORS TO ACCESSING MEDICAL SERVICES IN RURAL AND REMOTE AUSTRALIA: A SYSTEMATIC REVIEW.

Harrison Thorn, Richard Olley*

Griffith University, Queensland Australia

Correspondence: hthornx2@gmail.com

ABSTRACT

OBJECTIVE

This qualitative review aims to identify and list the barriers and facilitators to accessing medical services for rural and remote Australians, within the current literature to inform policy development and highlight the need for further research.

METHODS

The review was guided by the PRISMA method. Boolean search strings identified relevant articles using the Griffith University Library electronic catalogue. The study included only English language research articles published between August 31st, 2018 and August 31st, 2021, focusing on facilitators and barriers within the Australian context considering both access and rurality/remoteness.

RESULTS

Thematic analysis of six articles identified ten barriers: communication, confidentiality, fear and shame, funding, geography, health behaviours, reliance on others, service provision, staffing, transport; and eight facilitators: collaboration/partnerships, communication, cultural safety funding, service provision, staffing, and telehealth, to accessing medical services in rural and remote Australia.

CONCLUSION

Ten barriers and eight facilitators to accessing medical services in rural and remote Australia were identified and listed from six articles identified through a qualitative review. This review identified a research gap regarding understanding the underlying challenges behind these barriers and facilitators and the implications for policy implementation to improve access to medical services.

KEYWORDS

barriers, facilitators, access, rural, remote, Australia

INTRODUCTION

Access to health care is defined as the 'timely use of personal health services to achieve the best possible outcomes'. [1] Many people face barriers to receiving healthcare due to the complex nature of healthcare systems. These barriers result in disparate health outcomes between segments of the population. [2]

Barriers that prevent or limit access to health services are accentuated in rural and remote communities, resulting in disparate outcomes for rural and remote Australians compared to their metropolitan neighbours. [3] Identifying barriers and facilitators to accessing medical services is a critical step for improving accessibility of services to the rural and remote population, thereby improving health outcomes. [2] Considerable research has been completed to identify these factors. However, the existing evidence base explores these factors individually and within isolated scenarios, with no current systematic review available relating to the Australian environment. Defining themes and problems across rural and remote communities informs the policy changes required at health services and governments to improve access and outcomes [4, 5].

The primary aim of this review is to analyse the available literature then identify and list the barriers and facilitators to accessing medical services in rural and remote Australia. It is hoped that identifying these will promote and inform effective policy solutions and service planning at the government and health services level.

BACKGROUND

Rural and remote communities experience personal obstacles such as increased health risk status, lower education rates and inequalities in employment and income status that influence how they engage with the health system and the outcomes they experience. [6] They also encounter external obstacles such as reduced access to health services, less health funding per capita, reduced service availability, reduced access to specialist and allied health clinicians and higher out of pocket costs for non-bulk-billed (Medicare Benefits Scheme) services. [7, 3]

As a result of these, rural and remote Australians – defined as those living outside the major cities by the ASGS 2016 – have reduced life expectancy, higher rates of mortality, disease, and preventable hospitalisations. [5] These outcomes are magnified for Indigenous communities, who make up 15% and 49% of Australia's remote and very remote populations, respectively, despite comprising 2.4% of the national population. [7]

The available literature describes these differences in health outcomes, the disparity in care provision, and the reduced access to healthcare for rural and remote Australians. Rural communities experience lower cancer survival rates, [8] increased stroke mortality, [9] increased cardiovascular disease mortality, [10] and reduced childhood leukemia survival rates. [11] When considering disparity in care provision, rural and regional populations are required to travel further to receive care from a reduced number of available services. [12] Breast cancer patients experience reduced breast reconstruction rates and overall mortality, [13] while hepatocellular patients have a reduced likelihood of preventative treatment, surgical resection and survival. [14] When considering reduced access, rural patients see reduced availability of trained staff and specialist advice, and a reduction in catheterisation services, supply of medications and timely follow up care. [15]

The causes credited to these disparities include reduced access to services, poor health risk status, differing education rates and inequalities in employment. [5] These broad descriptors are symptomatic of underlying practical barriers and facilitators that impact access to healthcare and the resulting clinical outcomes. An evidence base is growing beyond highlighting broad descriptors, research that investigates the specific barriers and facilitators to rural and remote Australians accessing healthcare. This research provides a detailed and practical understanding of the barriers present, their causal relationship to reduced access, and poorer clinical outcomes. However, there is currently no systematic review that evaluates and analyses this body of research in the Australian context.

Therefore, through the analysis of the current literature, this review aims to identify and analyse the underlying barriers and facilitators that cause the disparate access to health services for those living in rural and remote communities in Australia. This includes the barriers that currently exist, along with any facilitators that could promote improvement. By performing a systematic review and thematic analysis, barriers and facilitators across different age groups and levels of rurality can be identified to most effectively inform policy development and service planning to improve access and health outcomes in these communities.

METHOD

This qualitative review was completed using the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement. [16] Relevant peer-reviewed and scholarly journal articles were located using the Griffith University Library electronic catalogue, with articles

reviewed from all databases that returned results. These included BMJ, CINAHL, Medline, PubMed, Scopus and Wiley Online.

INCLUSION AND EXCLUSION CRITERIA

Due to the volume, and to assess the most contemporary of available literature, only English language articles published between August 31, 2018, and August 31, 2021, were included for review. The search was refined to include only academic, peer-reviewed materials with full text available online. Grey literature was not included. Articles were excluded if they proposed or studied solutions to identifiable barriers and facilitators, discussed facilitators or barriers within health systems outside the Australian context, or discussed barriers and facilitators in the context of access or the rurality/remoteness, but not both.

Access to certain high acuity services (e.g. acute neurosurgery and paediatric cardiothoracic) is not practical in the rural setting due to infrastructure costs, staffing availability and low demand. [17, 18] Articles were included if they described the access to medical services deliverable to the public regardless of location, such as primary and emergency care and mental health services. Many articles were captured during the review describing the implementation of telehealth as a means of improving access. As this review attempts to identify the barriers and facilitators rather than their solutions, these articles were excluded from the study.

IDENTIFICATION AND SELECTION OF EVIDENCE

Search term combinations were created with the assistance of Boolean operators. Two keyword combinations were used, delivering the following results: barriers AND rural AND remote AND access AND medical* AND Australia (3014 articles); facilitators AND rural AND remote AND access AND medical* AND Australia (881 articles).

The screening process was completed first by reviewing article titles, the abstracts and conclusions, and finally through the Standard Quality Assessment Criteria quality assessment tool. [19] The screening process applied the inclusion and exclusion criteria listed above during the first two review stages. After quality assessment, only articles with a score above 16/20 were included in the review.

THEMATIC ANALYSIS

Analysis commenced with the collation of results and key themes from each article. From this information, determinants were separated into either barriers or facilitators. Due to the volume and specificity of the results, the results identified were distilled into themes and subsequently listed in an inductive approach.

FIGURE 1. PREFERRED REPORTING ITEMS FOR SYSTEMATIC REVIEWS AND META-ANALYSES (PRISMA) DIAGRAM SUMMARISES FINDINGS AT THE OUTCOME LEVEL [20]

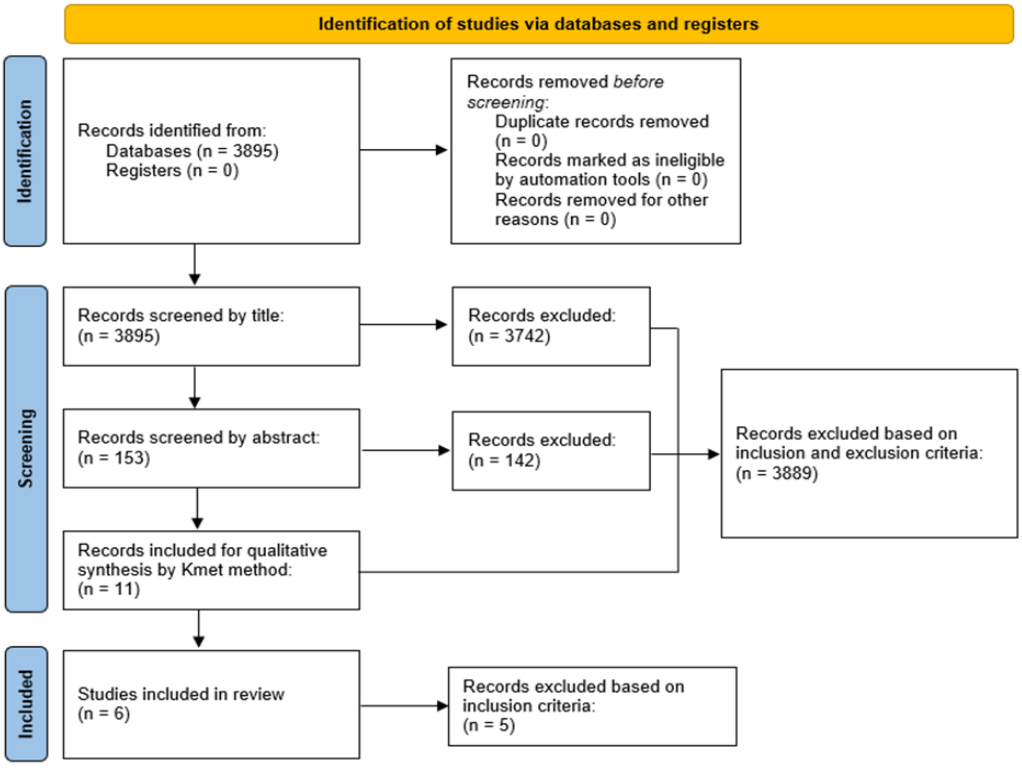


FIGURE 2. STANDARD QUALITY ASSESSMENT CRITERIA QUALITY REVIEW ASSESSMENT RESULTS

Paper	Question	Study design	Context	Connection to framework	Sampling Strategy	Data Collection	Data Analysis	Verification Procedure	Conclusions	Reflexivity	Total
Dolan et al., 2020	2	2	2	2	1	2	2	2	2	2	19
Keeves et al., 2021	2	2	2	2	2	2	2	2	2	2	20
Mitchell et al., 2020	2	1	2	2	1	1	1	2	2	0	14
Neville et al., 2020	-	-	-	-	-	-	-	-	-	-	0*
Nolan-Isles et al., 2021	2	2	2	2	2	2	2	2	2	1	19
Shukla et al., 2021	-	-	-	-	-	-	-	-	-	-	0*
Street et al., 2019	2	2	2	2	2	2	2	2	2	1	19
Taylor et al., 2021	2	2	2	2	2	2	2	2	2	1	19
Thompson et al., 2019	2	1	2	1	1	1	0	2	2	1	13
Warwick et al., 2019	2	2	2	2	2	2	2	2	2	2	20
Zurynski et al., 2021	-	-	-	-	-	-	-	-	-	-	0*

*Articles were excluded and not assessed during qualitative review after not meeting inclusion criteria.

RESULTS

TABLE 1. OUTCOME THEMES EMERGING IN THE LITERATURE INCLUDED IN THE PRESENT SYSTEMATIC REVIEW

Theme	Barrier or Facilitator	No. of studies	References
Communication	Both	5	Dolan et al., 2020, Keeves et. al., 2021, Nolan-Isles et. al., 2021, Street et. al., 2019, and Warwick et. al., 2019.
Funding	Both	4	Dolan et al., 2020, Keeves et. al., 2021, Nolan-Isles et. al., 2021, and Street et. al., 2019.
Service Provision	Both	6	Dolan et. al., 2020, Keeves et. al., 2021, Nolan-Isles et. al., 2021, Street et. al., 2019, Taylor et. al., 2021, and Warwick et. al., 2019.
Staffing	Both	5	Dolan et al., 2020, Keeves et. al., 2021, Nolan-Isles et. al., 2021, Street et. al., 2019, and Warwick et. al.,
Confidentiality	Barrier	2	Dolan et al., 2020, and Warwick et. al., 2019.
Fear and Shame	Barrier	2	Nolan-Isles et al., 2021, and Warwick et al., 2019.
Cultural Safety	Facilitator	2	Nolan-Isles et al., 2021, and Warwick et al., 2019.
Reliance on Others	Barrier	3	Dolan et al., 2020, Keeves et. al., 2021, and Nolan-Isles et. al., 2021.
Transport	Barrier	5	Dolan et al., 2020, Keeves et. al., 2021, Nolan-Isles et. al., 2021, Taylor et. al., 2021, and Warwick et. al., 2019.
Trust	Facilitator	3	Dolan et al., 2020, Nolan-Isles et. al., 2021, and Warwick et. al., 2019.

Telehealth	Facilitator	3	Dolan et. al., 2020, Keeves et. al., 2021, and Street et. al., 2019.
Collaboration/Partnerships	Facilitator	2	Dolan et al., 2020, and Nolan-Isles et al., 2021.
Geography	Barrier	4	Keeves et al., 2021; Nolan-Isles et. al., 2021, Street et. al., 2019, and Taylor et. al., 2021.

TABLE 2. STUDIES INCLUDED IN QUALITATIVE SYNTHESIS

No.	Author	Title	Summary
1.	Dolan E, Allott K, Proposch A, Hamilton M, Killackey E. Youth access clinics in Gippsland: Barriers and enablers to service accessibility in rural settings. Early Intervention in Psychiatry. 2020;14(6):734-740.	Youth access clinics in Gippsland: Barriers and enablers to service accessibility in rural settings	This qualitative study interviewed staff members and consumers of four youth access clinics (YACs) in the Gippsland region to identify the barriers and facilitators for youth accessing the YACs in Gippsland. The review identified a lack of service availability, service proximity, lack of staffing, reduced transport options and an overreliance on family members for transport as barriers to young people attending YACs. Improved funding, friendly and consistent staff, and partnerships between the community and YACs were identified as enablers to young people accessing YACs. The article concluded that providing additional outreach services, complimentary services, and improved funding in collaboration with headspace will continue to ensure the success of YACs in the Gippsland South Coast region.
2.	Keeves J, Braaf SC, Ekegren CL, Beck B, Gabbe BJ. Access to Healthcare Following Serious Injury: Perspectives of Allied Health Professionals in Urban and Regional Settings. International Journal of Environmental Research and Public Health. 2021;18(3):1230.	Access to healthcare following serious injury: perspectives of allied health professionals in urban and regional settings	This qualitative study interviewed community-based allied health professionals involved in post-discharge care to identify factors that affect access to healthcare post-discharge for people with serious injuries. The study found that complex systems and funding models, long wait times, administrative delays, inadequate numbers of allied health professionals and mental health services, and the reliance on others for transport and assistance were behind reduced access for people with serious injuries post-discharge from hospital. The study highlights that it is important to address non-clinical and administrative factors

			alongside clinical pathways when improving access to healthcare services.
3.	Nolan-Isles D, Macniven R, Hunter K, Gwynn J, Lincoln M, Moir R et al. Enablers and Barriers to Accessing Healthcare Services for Aboriginal People in New South Wales, Australia. International Journal of Environmental Research and Public Health. 2021;18(6):3014.	Enablers and barriers to accessing healthcare services for Aboriginal people in New South Wales, Australia	This study completed semi-structured interviews with healthcare delivery staff and stakeholders in communities with a high proportion of Aboriginal people from regional and remote locations, to investigate barriers and enablers to accessing healthcare services for Aboriginal people with chronic conditions living in regional and remote Australia. Themes were often identified as barriers and facilitators: improved coordination of healthcare services, communication between staff and patients, trust in services and cultural safety, reliable affordable and sustainable services, and distance and transport availability. The importance of these findings is heightened given the comparatively worse health outcomes seen in Indigenous populations, along with the burden of chronic disease on the nation's health. The study also introduces the importance of cultural safety between services and indigenous patients and emphasises the critical role of Aboriginal Health Workers (AHWs) and ACCHOs in health service delivery.
4.	Street TD, Somoray K, Richards GC, Lacey SJ. Continuity of care for patients with chronic conditions from rural or remote Australia: A systematic review. Australian Journal of Rural Health. 2019;27(3):196-202.	Continuity of care for patients with chronic conditions from rural or remote Australia	This systematic literature review seeks to identify the barriers and facilitators of achieving continuity of care for patients with chronic conditions from rural or remote Australia. The review assessed peer-reviewed journals between January 1990 and April 2018, with 12 studies included for qualitative analysis. Three key themes were identified as barriers and facilitators to continuity of care within rural and remote Australia: communication and coordination of health services, availability of resources, and location.
5.	Taylor D, Lange J, Laurence C, Beilby J, Kitson A, Barrie H et al. General practice access in regional and	General practice access in regional and remote Australia for ageing populations	This study completed a geospatial analysis linked to demographic information to examine if general practice locations in non-metropolitan South Australia and Western Australia are

	remote Australia for ageing populations. Geographical Research. 2020;59(1):6-15.		geographically accessible to frail and prefrail populations. Approximately 7% of WA and 1.5% of SA frail and prefrail populations were more than 60km from a GP practice. Future population analysis identified that this is likely to increase to 10% and 2% respectively by 2027, highlighting the geographical and transport-related barriers to receiving care and the ongoing service planning challenges as Australia's ageing population continues to increase.
6.	Warwick S, Atkinson D, Kitaura T, LeLievre M, Marley JV. Young Aboriginal People's Perspective on Access to Health Care in Remote Australia: Hearing Their Voices. Progress in Community Health Partnerships: Research, Education, and Action. 2019;13(2):171-181.	Young Aboriginal people's perspective on access to health care in remote Australia: hearing their voices	This qualitative study interviewed young Aboriginal people to identify barriers and enablers to accessing local health services in the remote town of Kimberley and surrounding communities. The review identified staffing, communication, confidentiality, shame, patient education and transport as barriers or enablers to accessing local health services. This study gives voices to young Aboriginal people and their experiences, providing specific and practical suggestions for service improvement. The study highlighted the role of shame as a barrier to accessing care and the importance of patient education to ensure patients know the purpose of the health service and when they can access various services.

DISCUSSION

This systematic literature review identified many barriers and facilitators to accessing medical services in rural and remote Australia, with the resulting themes listed in Table 1. In addition to identifying barriers and facilitators, the studies included detailed, practical examples of how these impact access, delivering insights that can aid future service planning and policy development.

Access was reduced when services received insufficient funding to provide appropriate staffing and resources and healthcare that was not Medicare Benefits Scheme bulk billed or free. A lack of staff and reduced continuity of essential staff (doctors, allied health, mental health), poor staff diversity (gender and ethnicity), and unfriendly and impersonal staff contributed to reduced uptake of services. Complex systems and funding models, a lack of services, inadequate services, and services at times not convenient to patients contributed to reduced utilisation of services. Similarly, poorly scheduled or lack of public transport, large travel distances and reliance on family or friends to attend services often acted as disincentives to service utilisation. Communication breakdowns between health services due to poor discharge planning and lack of referrals, and poor communication between staff and patients resulted in patients not receiving necessary follow up services, understanding medical advice or what services are available. Living in small communities reduces patient anonymity, and when combined with reliance on family and friends to access care, patients experienced reduced confidentiality and increased likelihood of shame. Both factors made it less likely for patients to access services. Finally, the provision of culturally safe models of care by

culturally aware staff is essential to optimising access to services by Indigenous people.

Analysis of the barriers and facilitators reveals characteristics about their effect on access. Many of these studies noted that the same obstacles act as facilitators when implemented effectively. Barriers and facilitators are often interdependent or reliant on one another to optimise access. For example, effective staffing can rely on adequate funding, and improved services models can reduce reliance on family and friends to receive care. Similarities also exist between some identified themes, such as transport and geography as these are important variables in rural and remote settings. Identifying and examining these relationships is critical for effective service planning and policy development.

When considering development and implementation of solutions to determinants of rural and remote health access, approaches need to be shaped by whether the specific challenges are systemic or endemic. Sourcing funding, recruiting staff, and creating cultural changes like communication, trust and cultural safety, can in some circumstances be done quickly (e.g., grant applications, advertising campaigns, enforcing governance and accountability practices). However, in others it can be a perpetual and unceasing endeavour (e.g., workforce or migration shortages and organisational culture change). Organisations need to assess which barriers or facilitators are contributing to their service offering, determine whether these determinants will require short or long-term solutions, then plan and develop innovative solutions to improve access to their services.

The qualitative nature of this review and the limited geographical and demographic of the results make them not generalisable. However, the practical examples identified in the results allows for consideration and comparison when evaluating and developing new and existing models of care to ensure that access is optimised. This review reinforced the findings of existing literature that determinants such as funding and staffing are significant barriers to accessing health services in rural and remote regions. [21, 22] The study also identified determinants that affect access in rural and metropolitan areas. Further work is recommended to assess which barriers and facilitators are unique to rural and remote health, and whether there are differences between rural and remote regions.

CONCLUSION

This qualitative review identified several determinants to access medical services in rural and remote Australia, with ten barriers and eight facilitators identified from the six high-quality research articles included. Access to services can be improved through the removal of barriers or the implementation of facilitators. Determinants of access can be inter-dependant or over-lapping, resulting in implications of applying practical strategies to improve access to services. Improvements can be achieved by addressing structural determinants and determinants influenced by day-to-day human decision-making. Further research is required to assess each determinant to understand any underlying challenges that need to be addressed to remove barriers or implement facilitators to aid the development of practical strategies and policies to improve access to services.

CONFLICTS OF INTEREST.

The secondary author is a Board member of the Australasian College of Health Service Management, the publisher of this journal. The authors declare there are no other conflicts of interest.

References

1. Office Of Disease Prevention And Health Promotion. Access to Health Services | Healthy People 2020 [Internet]. Healthypeople.gov. 2022. Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/access-to-health
2. Shukla N, Pradhan B, Dikshit A, Chakraborty S, Alamri AM. A Review of Models Used for Investigating Barriers to Healthcare Access in Australia. International Journal of Environmental Research and Public Health. 2020 Jun 8;17(11):4087.
3. Smith KB, Humphreys JS, Wilson MG. Addressing the health disadvantage of rural populations: How does epidemiological evidence inform rural health policies and research?. Australian Journal of Rural Health. 2008;16(2):56-66.
4. Macaulay B, McHugh N, Steiner A. Public perspectives on health improvement within a remote-rural island community. Health Expectations: an international journal of public participation in health care and health policy. 2021;24(4):1286-99.

5. Russell DJ, Zhao Y, Guthridge S, Ramjan M, Jones MP, Humphreys JS, et al. Patterns of resident health workforce turnover and retention in remote communities of the Northern Territory of Australia, 2013-2015. Hum Resour Health. 2017;15(1):52.
6. Australian Government Department of Health. National Strategic Framework for Rural and Remote Health. www1.Health.gov.au; Australian Government Department of Health. 2016. https://www1.health.gov.au/internet/main/publishing.nsf/Content/national-strategicframework-rural-remote-health
7. Australian Institute of Health and Welfare. Rural & remote Australians Overview - Australian Institute of Health and Welfare [Internet]. Australian Institute of Health and Welfare. 2019. Available from: https://www.aihw.gov.au/reports-data/population-groups/rural-remote-australians/overview
8. Afshar N, English DR, Chamberlain JA, Blakely T, Thursfield V, Farrugia H et al. Differences in cancer survival by remoteness of residence: an analysis of data from a population-based cancer registry. Cancer Causes & Control. 2020;31(7):617-629.
9. Dwyer M, Francis K, Peterson GM, Ford K, Gall S, Phan H, et al. Regional differences in the care and outcomes of acute stroke patients in Australia: an observational study using evidence from the Australian Stroke Clinical Registry (AuSCR). BMJ Open. 2021 Apr;11(4):e040418.
10. Jacobs J, Peterson KL, Allender S, Alston LV, Nichols M. Regional variation in cardiovascular mortality in Australia 2009–2012: the impact of remoteness and socioeconomic status. Australian and New Zealand Journal of Public Health. 2018;42(5):467-473.
11. Jessop S, Ruhayel S, Sutton R, Youlden DR, Pearson G, Lu C, et al. Are outcomes for childhood leukaemia in Australia influenced by geographical remoteness and Indigenous race? Pediatric Blood & Cancer. 2021 Feb 9;68(4).
12. Gardiner FW, Bishop L, McMahon K, Nwose EU, Connor S, Begun J, et al. Aeromedical retrievals for gastrointestinal disorders in rural and remote Australia: the need for improved access to specialist advice. Internal Medicine Journal. 2020 May;50(5):619–23.
13. Obeng-Gyasi S, Timsina L, Bhattacharyya O, Fisher CS, Haggstrom DA. Breast Cancer Presentation, Surgical Management and Mortality Across the Rural–Urban Continuum in the National Cancer Database. Annals of Surgical Oncology. 2020 Mar 23;27(6):1805–15.
14. Taye BW, Clark PJ, Hartel G, Powell EE, Valery PC. Remoteness of residence predicts tumor stage, receipt of treatment, and mortality in patients with hepatocellular carcinoma. JGH Open. 2021 Jun 5;5(7):754–62.
15. Thompson SC, Nedkoff L, Katzenellenbogen J, Hussain MA, Sanfilippo F. Challenges in Managing Acute Cardiovascular Diseases and Follow Up Care in Rural Areas: A Narrative Review. International Journal of Environmental Research and Public Health. 2019 Dec 15;16(24):5126.
16. Moher D, Liberati A, Tetzlaff J, Altman D. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. Journal of Clinical Epidemiology. 2009;62(10):1006-1012.
17. Beasley S. Understanding the responsibilities and obligations of the modern paediatric surgeon. Journal of Pediatric Surgery. 2015;50(2):223-231.
18. Kornelsen J, McCartney K, Williams K. Satisfaction and sustainability: A realist review of decentralized models of perinatal surgery for rural women. Rural and Remote Health. 2016;16(2):3749-3749.
19. Kmet LM, Cook LS, Lee RC. Standard quality assessment criteria for evaluating primary research papers from a variety of fields. 2004
20. Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. PRISMA 2020 Explanation and elaboration: Updated Guidance and Exemplars for Reporting Systematic Reviews. BMJ [Internet]. 2021 Mar 29;372(160):n160. Available from: https://www.bmj.com/content/372/bmj.n160
21. Fitts MS, Humphreys J, Dunbar T, Bourke L, Mulholland E, Guthridge S, et al. Understanding and responding to the cost and health impact of short-term health staffing in remote and rural Aboriginal and Torres Strait Islander community-controlled health services: a mixed methods study protocol. BMJ Open. 2021;11(8):e043902.
22. Wakerman J, Sparrow L, Thomas SL, Humphreys JS, Jones M. Equitable resourcing of primary health care in remote communities in Australia's Northern Territory: a pilot study. BMC Family Practice. 2017;18(1):75.
23. Corscadden L, Levesque JF, Lewis V, Strumpf E, Breton M, Russell G. Factors associated with multiple barriers to access to primary care: an international analysis. International Journal for Equity in Health [Internet]. 2018 [cited 31 October 2021];17(1). Available from: https://link.gale.com/apps/doc/A546082367/AONE?u=griffith&sid=summon&xid=c68d773b

24. Dolan E, Allott K, Proposch A, Hamilton M, Killackey E. Youth access clinics in Gippsland: Barriers and enablers to service accessibility in rural settings. Early Intervention in Psychiatry. 2020;14(6):734-740.
25. Keeves J, Braaf SC, Ekegren CL, Beck B, Gabbe BJ. Access to Healthcare Following Serious Injury: Perspectives of Allied Health Professionals in Urban and Regional Settings. International Journal of Environmental Research and Public Health. 2021;18(3):1230.
26. Nolan-Isles D, Macniven R, Hunter K, Gwynn J, Lincoln M, Moir R et al. Enablers and Barriers to Accessing Healthcare Services for Aboriginal People in New South Wales, Australia. International Journal of Environmental Research and Public Health. 2021;18(6):3014.
27. Street TD, Somoray K, Richards GC, Lacey SJ. Continuity of care for patients with chronic conditions from rural or remote Australia: A systematic review. Australian Journal of Rural Health. 2019;27(3):196-202.
28. Taylor D, Lange J, Laurence C, Beilby J, Kitson A, Barrie H et al. General practice access in regional and remote Australia for ageing populations. Geographical Research. 2020;59(1):6-15.
29. Warwick S, Atkinson D, Kitaura T, LeLievre M, Marley JV. Young Aboriginal People's Perspective on Access to Health Care in Remote Australia: Hearing Their Voices. Progress in Community Health Partnerships: Research, Education, and Action. 2019;13(2):171-181.

ACHSM Asia-Pacific Journal of Health Management

REVIEW ARTICLE

COVID-19 AND PALLIATIVE CARE: A BIBLIOMETRIC ANALYSIS

Suraj Kushe Shekhar

VIT Business School, Vellore Institute of Technology, Vellore, Tamilnadu, India

Correspondence: surajkushe@gmail.com; surajk.shekhar@vit.ac.in

ABSTRACT

COVID-19 continues to disrupt the life of people worldwide. One of the most vulnerable sections affected by the pandemic are very old and seriously ill people. The present study provides a detailed analysis of the trends in the global scientific production on COVID-19 and palliative care.

An analysis of the documents searched from the Scopus database was interpreted by Biblioshiny, an R-based software for bibliometric analysis. A descriptive examination of sources, authors, and records was done, and network analysis of conceptual, intellectual, and social structures.

The research revealed ongoing research on this topic in the recent two years. The United States, the UK, India, and Spain have all done extensive research on the subject. The study's findings may aid medical practitioners and policymakers in focusing on critical sections in palliative care in the context of COVID-19. The study also identifies crucial areas in the chosen issue and guides future researchers on developing themes, contexts, and possible collaborations.

KEYWORDS

COVID-19, palliative care, bibliometric analysis, Scopus

INTRODUCTION

Palliative care is a multidisciplinary medical healthcare strategy focused on improving patient outcomes and reducing pain in patients suffering from severe, life-threatening illnesses. [1] As medical systems become more stressed due to COVID-19 [2], delivering secure and reliable hospice care, including end-of-life care, becomes more critical and challenging. [3] Due to a lack of funds, some practitioners may be forced to choose who receives essential treatment and who does not. At the very least, strong hospice care must be offered for people who will not survive. COVID-19, on the other hand, renders this much more challenging. As people suddenly weaken, health personnel are overburdened, isolation is required, and relatives are instructed to just not contact or occupy the same room as dear ones. This predicamentis exacerbated in low-income and middle-income nations, where the healthcare system and palliative care services are in poor supply. It's also more difficult to maintain society hospice care safely. Many patients who are in need of it seem to be at risk of COVID-19, safety equipment is in insufficient supply, and rising death rates may overwhelm the current provision of services [4]

The World Health Organization (WHO) has made guidelines about keeping important health care services running throughout an outbreak, emphasizing vaccination, maternity care, emergency care, and chronic illnesses,

among many other things, but hospice care was left out. The author considers this a mistake. Palliative care should be prominently mentioned in COVID-19 response strategies at home and abroad. [4] During the pandemic, specialist palliative care services (SPCS) have a critical role. SPCS are perfectly positioned to take a strategic approach in crisis management planning, with core expertise in complicated symptom control, strategic planning in ambiguous situations, advocating and training, and assuring a sympathetic response. SPCS by that is expected to be exceeded, hence promoting and supporting significantly high hospice care throughout all care settings should be considered. SPCS has also created a Pain Management Outbreak Pack [1] to convey concise and precise knowledge, instructions, and tools to assist nonspecialist physicians who really need to offer hospice care. It is also a valuable tool for SPCS partners to adopt as they work together to address this worldwide crisis. [1] Policymakers must ensure that stimulants (such as opioids) and safety equipment are available, expand the use of telemedicine and video, talk about progress treatment plans, enhance planning and practice all across the health care workforce, and start embracing the responsibility of lay caretakers and the larger community. These pragmatic steps can improve the well-being of people with severe illnesses. Through physical ailment and mortality, anxiety and stress, and economic and institutional upheaval, a contagion is both a source of misery and a tremendous amplifier of it. Among the most important aspects of the solution ought to ease the suffering in all its manifestations.

BIBLIOMETRIC ANALYSIS

A statistical review of published scientific papers, books, or book chapters is known as bibliometric analysis, and it is a useful tool for measuring the influence of publishing in the scientific community. [5] Bibliometric analyses have been carried out in various domains. [6–10] However, no bibliometric research on COVID-19 and palliative care has been done to date. As a result, reviewing existing studies to enhance the COVID-19 inquiry and palliative care becomes critical. To review the descriptive and network analysis of the fragmented literature on COVID-19 and palliative care, this study used various bibliometric analytic techniques. In effect, this paper sketches a bibliometric analysis of empirical work on the impact of COVID-19 and palliative care. The study aimed to find the most productive countries, publications, researchers, institutes, trends, and collaborations in COVID-19 related to palliative research. The study output used descriptive analysis, social, intellectual, and conceptual structures to estimate the most commonly used terms, providing the scientific research communities with a full assessment of the implications of the COVID-19 pandemic on worldwide palliative care. The following are the research questions that were used in the study.

a. What are the worldwide trends in logical production on COVID-19 and palliative care?
b. What types of information might this pattern provide?
c. What is the future path of this field's research?

To uncover the research questions, the following research objectives were laid down.

a. To provide bibliometric visualization of 536 documents retrieved from the Scopus database.
b. To use Biblioshiny to visualize the pattern of quantitative data selected from various articles, sources, and authors.
c. To understand the conceptual, intellectual, and social structure on the theme 'COVID-19 and palliative care.'

MATERIALS AND METHODS

Aria and Cuccurullo [11] designed a workflow for bibliometric analysis, which was applied in this study. The science mapping tools developed by Börner [12] and Cobo [13] were also employed in the workflow. The five steps mentioned by Zupic and Cater [14] were also followed in this study to conduct bibliometric analysis. According to these authors, design, data collection, analysis, visualization, and interpretation are the five stages of bibliometric analysis. The first stage selected the three research objectives for the current study and identified the main keywords for data extraction from the Scopus database as 'COVID-19' and 'Palliative care.' Scopus is one of the most widely used bibliographic databases for bibliometric analysis due to several reasons such as comprehensive coverage, quality of data, citation metrics, user-friendly interface, and integration with other tools. [15-16] These reasons urged the researcher to use the Scopus database for bibliometric analysis. The keyword technique is beneficial for bibliometric analysis because it fits expert selection and reveals the domain's research competence in greater depth. There are two approaches to choosing keywords. High-level keywords are one option. The second set of keywords is aligned with the analysis theme and will

aid in exploring a large number of search spheres and their relationships at the micro-level. [17] The second method was applied in the research. A search using the keyword 'palliative care' yielded 180793 results when the search filter was restricted to 'all fields'. The researcher limited the

search to a microdomain level in order to visualise the pattern in relation to the current study, using the terms 'COVID-19' AND 'palliative care' and the search limited to article title, abstract and keywords. The study was also restricted to the type 'article'. The Scopus database yielded 536 documents as a result of this query. The study included a wide range of topics (specialist and generalist journals in Scopus). This aided in comprehending the scientific breadth of the selected field of study. [18] These documents were used to analyse data. The Scopus database was chosen for the study because of the large number of diverse journals and high-quality publications it contains. [19] The data was analysed in the second step using Biblioshiny [11], an open-source R-based tool. The third step was executed after the data gathering stage extracted the.bib file. In the third and fourth steps, i.e., the data analysis and visualisation stage, descriptive and network analysis (data visualisation) were performed. The investigation of numerous sources, authors, and documents was part of descriptive statistics. The analysis of conceptual structure (co-concurrence analysis, thematic maps, and factorial analysis), social structure (collaboration analysis), and intellectual structure (co-citation analysis) was carried out using network analysis. The interpretation of the data analysis was completed in step five under discussion.

RESULTS

DESCRIPTIVE ANALYSIS

As of December 2021, 536 research articles were retrieved from 233 journals from the Scopus database using the keywords and search strategy mentioned above. A total of 12,338 references were reported out of these sources. As COVID-19 was the period of consideration for the study, the study's period fell between 2020 to 2022. The period 2022 included the documents ahead of the production schedule. Average years from publication (0.412 years), Average citations per documents (5.022 citations), Average citations per year per document (2.855 citations), Keyword plus (2,392 items), Author's keywords (1,066 items) were also reported. There were 3,156 authors, 3,603 author appearances, 50 single-authored documents, and 3,106 multiauthor documents. Documents per author (0.17 documents), authors per document (5.89 authors), co-authors per document (6.72 co-authors), and collaboration index of 6.43 were also reported. Annual scientific production reported a 70.9% increase from 2020 to 2021.

THREE FIELD PLOT

The relationship between three fields is shown using three field plots [20] or Sankey plots, with the size of the component corresponding to the node's value. A three-field plot was executed with the top five items across keyword plus (middle field), countries (left field), and sources (right field). It was observed that all top countries and sources were using keyword plus such as 'human,' 'palliative therapy,' and 'pandemic' quite frequently in their publications (Figure:1).

SOURCES

Table 1 shows the top 10 journals publishing work related to COVID-19 and palliative care. Journal of Pain and Symptom Management was at the top spot with 68 articles, followed by the American Journal of Hospice and Palliative Medicine and Palliative Medicine. Journal of Social Wwork in End-of-life and Palliative Care was at the ninth spot with ten articles. About top local cited sources from reference list (Figure:2), Journal of Pain and Symptom Management topped the place listing followed by JAMA and Lancet. Source clustering through Bradford's law [21] indicated six journals in Zone 1 (core group), namely Journal of Pain and Symptom Management, American Journal of Hospice and Palliative Medicine, Palliative Medicine, Journal of Palliative Medicine, IndianJjournal of Palliative Care and BMJ Supportive and Palliative Care. The remaining journals were in Zone 2 and Zone 3. Journal of Social Work in End-of-life and Palliative Care was in Zone 2 with ninth ranking. Further, Table 2 indicated the source local impact (*h* index, *m* index, *g* index, and total global citation). Journal of Pain and Symptom Management topped the list, followed by Palliative Medicine and the American Journal of Hospice and Palliative Medicine. The journals had good source growth as well.

FIGURE1 THREE FIELD PLOT USING KEYWORD PLUS, COUNTRIES AND SOURCES

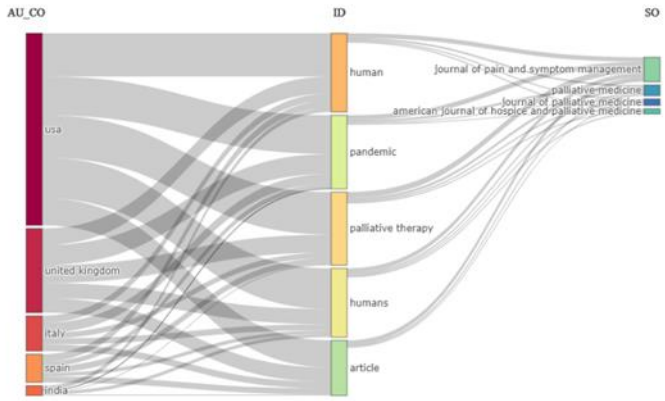


TABLE1 MOST RELEVANT JOURNALS

Sources	Articles
Journal of pain and symptom management	68
American journal of hospice and palliative medicine	30
Palliative medicine	27
Journal of palliative medicine	22
Indian journal of palliative care	19
BMJ supportive and palliative care	13
BMJ open	11
Medicina paliativa	11
Journal of social work in end-of-life and palliative care	10
Journal of hospice and palliative nursing	9

FIGURE 2 TOP LOCAL CITED JOURNALS

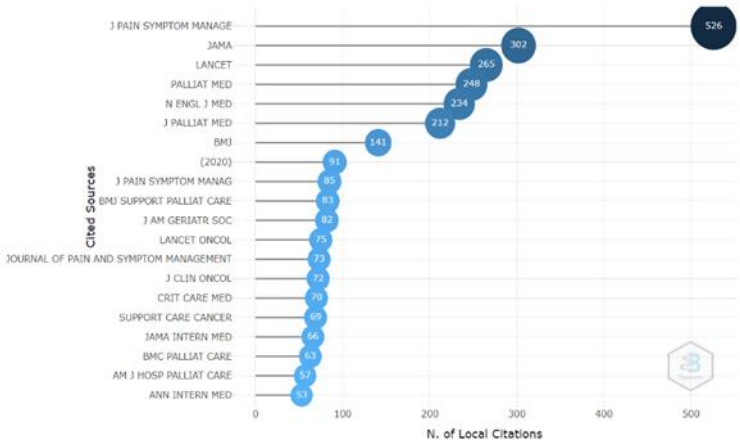


TABLE 2 SOURCE LOCAL IMPACT

Journal	*h* index	*g* index	*m* index	TC
Journal of pain and symptom management	18	34	9	1234
Palliative medicine	8	12	4	180
American journal of hospice and palliative medicine	6	8	3	72

Healthcare (Switzerland)	2	2	2	7
Indian journal of palliative care	4	5	2	43
JCO oncology practice	2	2	2	14
Journal of hospice and palliative nursing	2	2	2	6
Journal of palliative medicine	4	8	2	80
BMJ supportive and palliative care	3	5	1.5	29
JCO global oncology	3	3	1.5	36

*TC: Total global citation

AUTHORS, AFFILIATIONS, AND COUNTRIES

Bhatnagar was the most prevelevant author with ten articles, followed by Sleeman (9 articles) and Radbruch (7 articles). Benduduh topped the local citations (41 citations), followed by Hirsch (37 citations) & Lefaucheur (35 citations), and Rustichelli (30 citations). Author productivity supported Lotka's law. [22] Theproportion of authors who had written one document on COVID-19 and palliative care was 91.7%. It dropped to 5.4 % to 1.6% when the authors had written two and three papers on this theme, respectively. The top ten authors (local impact) is presented in Table 3 Higginson I J toped the *h,g,m* indices and total global citations. The University of California was the most prevelevant affiliation contributing 22 articles, followed by the University of Washington (21 articles) and Cahn school of medicine at mount sinai (19 articles). USA topped the single country publications followed by UK and India (Figure:3). The USA topped the list regarding country scientific production with 669 articles followed by the UK (276 articles) and Italy (132 articles). The USA was also the most cited (1,186 citations) country, followed by the UK (401 citations), Italy (80 citations), and India (73 citations)

MOST RELEVANT DOCUMENTS AND WORDS

Work by Wallace [23] was the most cited document with over 193 citations. Work by Calton [24] was the second most relevant document. This document had 173 citations. Work on COVID-19 pneumonia by George [25] was the third top article with over 98 citations. The top 20 globally cited documents are shown in Figure:4

FREQUENTLY USED WORDS.

Keyword plus analysis indicated humans, pandemic, beta coronavirus, etc., at the top of the list. This was backed up by a word cloud study (Figure 5). The size of the words in the word cloud is related to the number of times they appear in document. 'Human' was most frequently used word in word cloud analysis. This word was used 416 times, followed by humans (361 times) and pandemic (349 times). Word growth of top 5 words from 2020 to 2021 is shown in Table 4

TABLE 3 AUTHOR LOCAL IMPACT

Author	*h* index	*g* index	*m* index	TC	NP
Higginson IJ	5	8	2.5	196	8
Sleeman KE	5	7	2.5	195	7
Gibson A	1	1	0.5	193	1
Wallace CL	1	1	0.5	193	1
White P	1	1	0.5	193	1
Wladkowski SP	1	1	0.5	193	1
Abedini N	1	1	0.5	173	1
Calton B	1	1	0.5	173	1
Fratkin M	1	1	0.5	173	1
Maddocks M	4	5	2	128	5

*TC: Total global citation; NP: Number of papers

FIGURE 3 CORRESPONDING AUTHOR COUNTRY

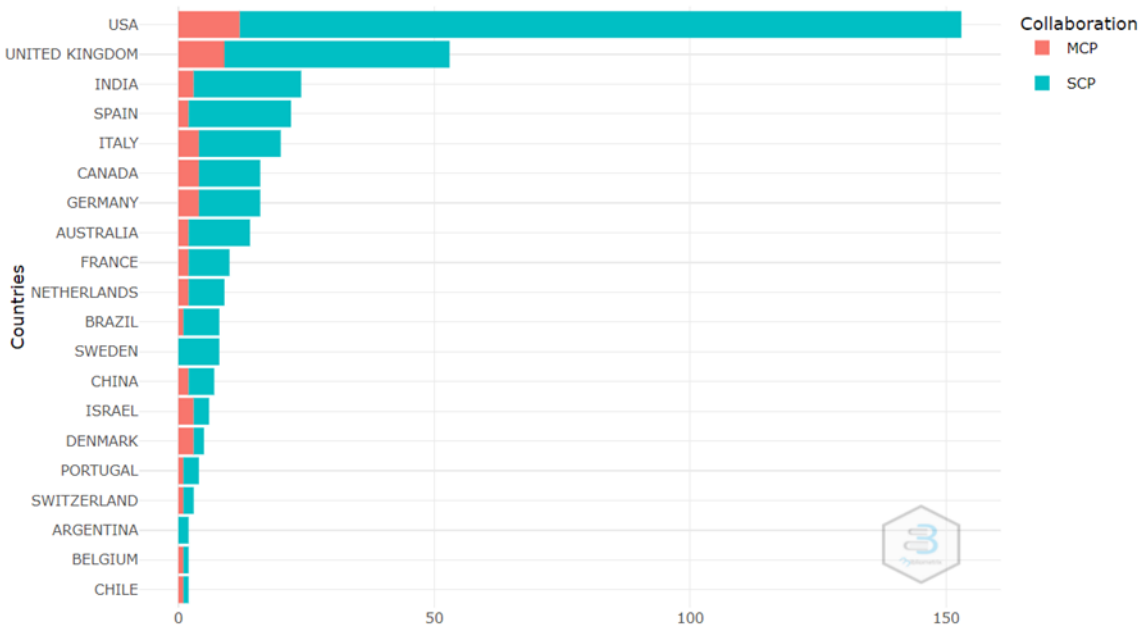


FIGURE 4 TOP 20 GLOBALLY CITED DOCUMENTS

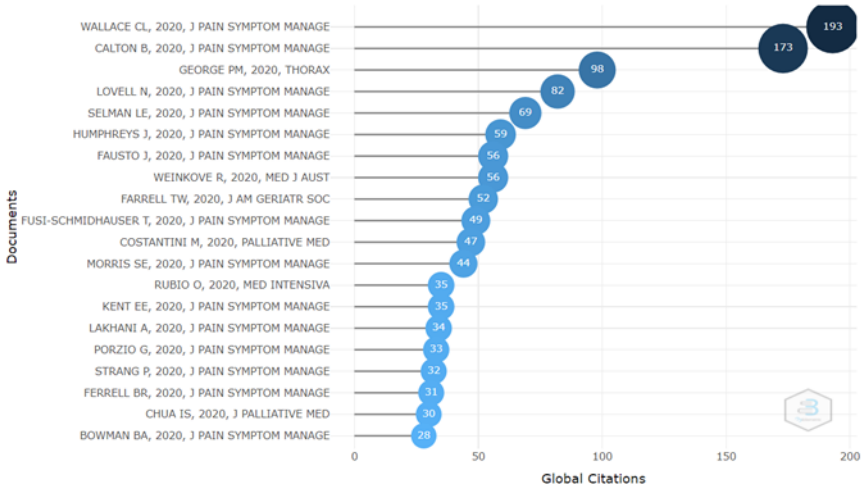


FIGURE 5 WORD CLOUD

TABLE 4 WORD GROWTH

Year	Human	Palliative therapy	Humans	Pandemic	Article	Palliative care
2020	185	191	154	196	130	118
2021	416	394	361	349	257	250

CLUSTERING

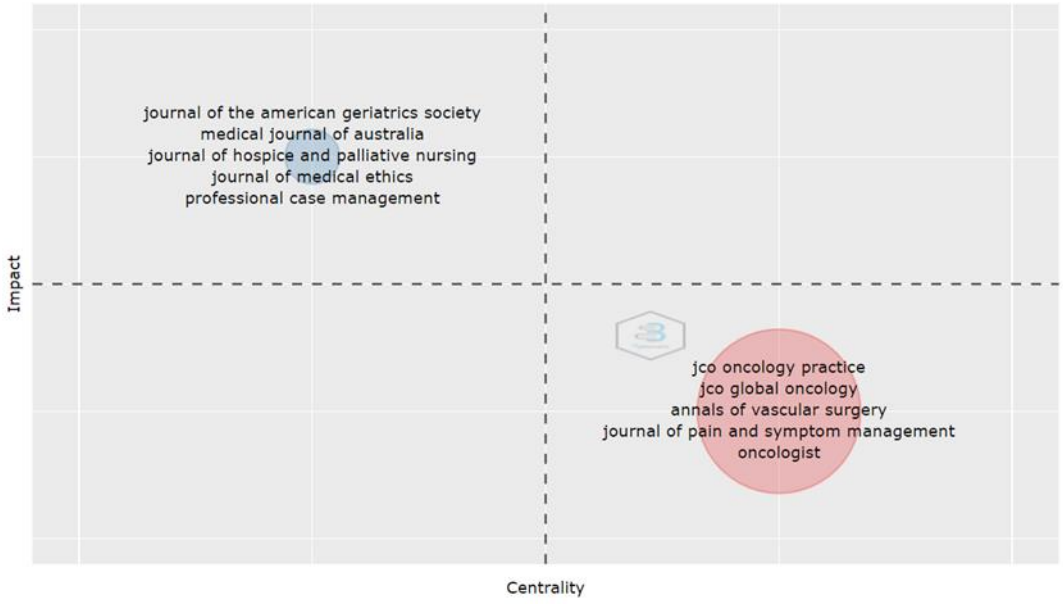
Clustering is the technique of grouping data items into several groups so that data kinds and sources in the same group are significantly more comparable than data points in different classes. [26] Put another way, the goal is to divide groups into clusters based on shared characteristics. The development of two clusters was indicated by journal coupling as evaluated by keywords plus, impact as measured by global citation score on 250 units, and minimum cluster frequency as 5. The cluster coupling were measured using centrality and impact. [27] The red cluster containing the journals had low centrality but high impact. The blue collection included journals with a low impact but high centrality.

CONCEPTUAL STRUCTURE

The conceptual structure depicts the connection between numerous themes, areas, and trends (11). The creation of three clusters was observed by a co concurrence analysis (using keyword plus), revealing the frequency of connected variables (Figure 7). The three colours denoted three distinct groupings. The distance (joining lines) between the nodes in the cluster indicated that they were related. Words represented the vertex, and the size of the nodes was proportional to the number of times it appeared. A co concurrence network using Louvain clustering algorithm, association as normalization, and number of nodes as 50 indicated the formation of three clusters. The first cluster (red) was centred around palliative care associated with COVID-19. The second cluster (blue) was clustered around coronavirus infection and associated diseases. The third cluster (red) was inclined towards hospitalizations and clinical studies related to significant age groups and genders.

A factorial analysis (Figure 8) using multiple correspondence analysis using keyword plus as field with the number of terms restricted to 50 indicated the formation of two clusters (Figure 8). The first cluster was related to pandemic and palliative care. The second cluster was on the clinical and controlled study with regard to gender and diverse age groups. The factorial analysis does not measure perfect cluster association. It gives an estimate of the number of clusters to help with future studies. [28]

FIGURE 6 CLUSTER COUPLING OF JOURNALS



*Journals per cluster were restricted **TO 5**.

FIGURE 7 CO CONCURRENCE NETWORK

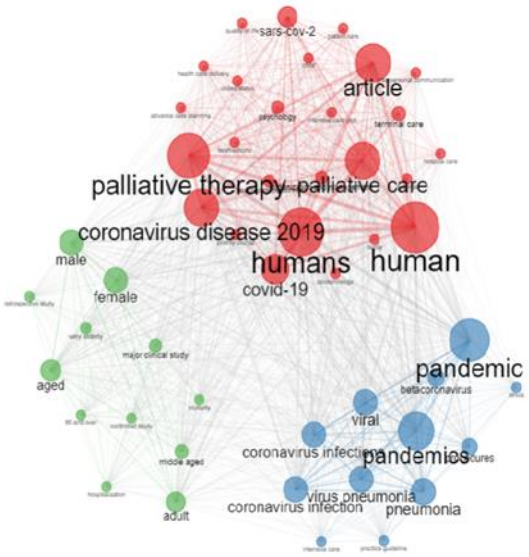
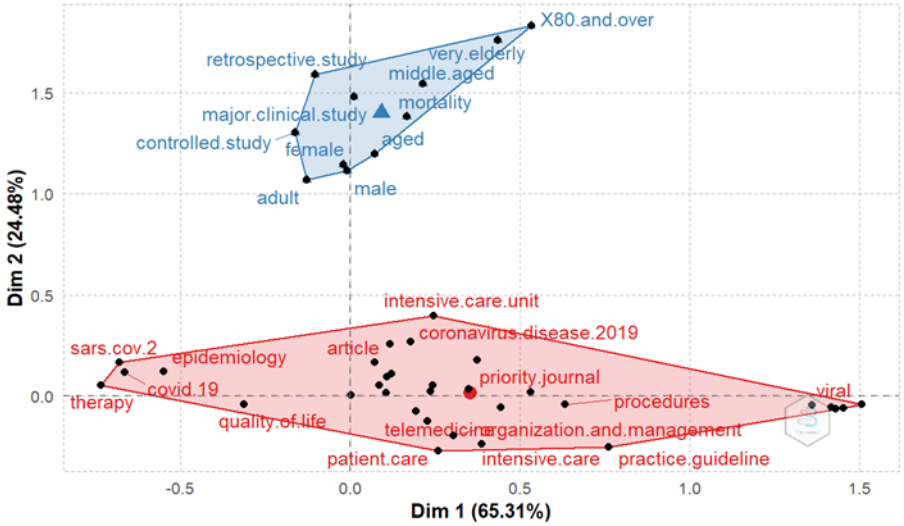


FIGURE 8 FACTORIAL ANALYSIS



THEMATIC MAP

Special distributions are indicated on thematic maps. [29] The map is built on co-word network analysis and grouping utilizing keywords, as inspired by. Based on centrality and density, the map is divided into four quadrants. The first quadrant is devoted to a fundamental concept (high density and low centrality). A motor theme is found in the second quadrant (high density and high centrality). The fourth quadrant (niche theme) is central yet sparsely populated. Low centrality and density characterize the final quadrant (emerging or waning theme). Thematic mapping of author's keywords indicated the formation of words into all four zones (Figure:8). Words such as covid, palliative care, pandemic, death, hospice, end of life, advance care planning, bereavement, social work, support care, and quality of life were falling into basic themes. Coronavirus, prognosis, palliative medicine fell into the motor theme. Covid, palliative, geriatrics, ethics, dying, challenges and social isolation fell into niche areas. Qualitative research, nursing and public health were into emerging areas (Figure:9).

COLLABORATION NETWORK

Collaboration network analysis (Figure:11) indicated the formation of five clusters. The USA collaborated mainly with Argentina, Canada, etc., forming the first cluster (red). The UK, Ireland, Singapore, etc., formed the second cluster (blue). Germany, Austria, Italy, etc., formed the third cluster (green). The final clusters were stand-alone clusters. The collaboration was between Denmark and Sweden (orange) and Portugal and Brazil (purple).

FIGURE 9 THEMATIC MAPS

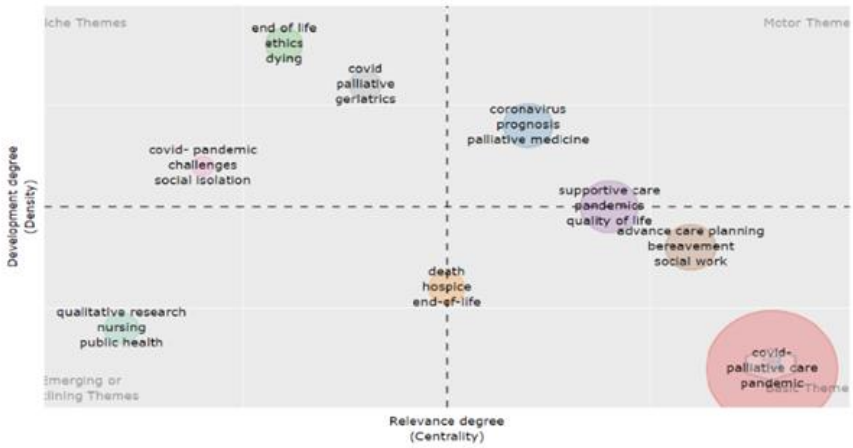


FIGURE 10 CO-CITATION ANALYSIS

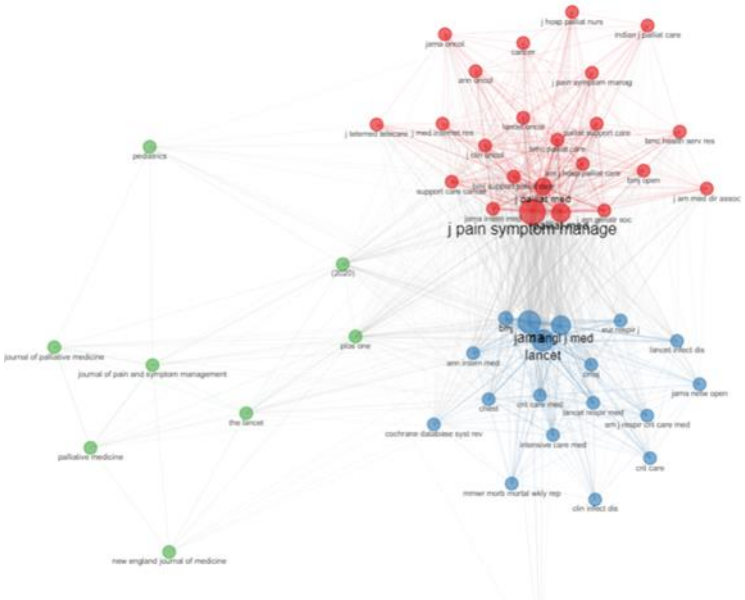
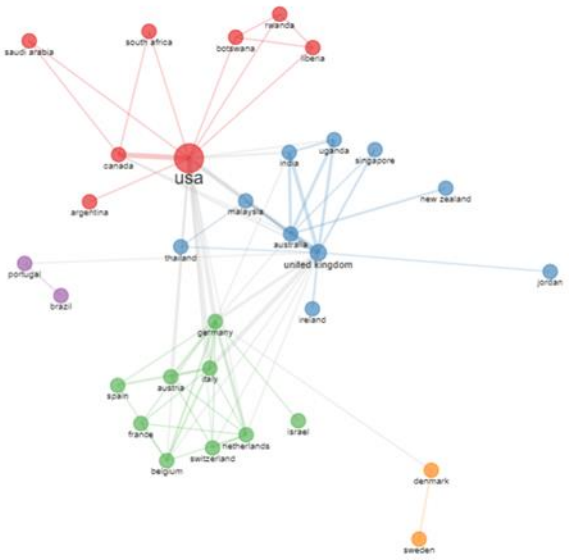


FIGURE 11 COLLABORATION NETWORK



DISCUSSION

From 2020 to 2022, Biblioshiny's bibliometric study [11] highlighted the importance of determining trends in terms of writers, journals, citations, affiliations, collaborations, documents, words, and numerous themes. Data was retrieved from the Scopus database because of its solid structure and the quality and amount of research sources. The analysis of the data revealed an increase in the number of publications relevant to the theme 'COVID-19' and 'palliative care' from 2020 to 2021. The average number of citations per document was reasonable. Between 2020 and 2021, there was a considerable increase in the number of publications produced, according to a study. This time period correlates with the spread of COVID-19, mutations, and exponential waves around the globe. The USA came out on top in the global citation. UK, Spain, Italy contributed the majority of the intellectual contributions, and their relationships with developing economies were progressing from infancy to maturity. The findings of such collaborative studies will assist medical practitioners in confidently planning their strategy in the face of COVID-19.

Bhatnagar, Sleeman and Radbruch were found to be the most productive authors. Benduduh, Hirsch, and Lefaucheur topped the local citations. Higginson I J topped various indices, according to the analysis. The investigation also indicated that journals like Journal of pain and symptom management, American journal of hospice and palliative medicine, and Palliative medicine had the most articles. The majority of the publications on the theme 'COVID-19 and 'palliative care' was from pain journals. Most of the pain journals were classified as zone 1, the most relevant and influential zone, according to Brandford law. Multidisciplinary publications were included in Zones 2 and 3. This allows academics to investigate the subtleties of COVID-19 and palliative care from a variety of interdisciplinary perspectives. In terms of research on COVID-19 and palliative care, the growth rate of the leading pain journals was entirely satisfactory. Pain management, palliative care, and hospitalizations were revealed by reviewing internationally cited publications. The examination of the conceptual structure points the researchers in the right direction for future research. The pandemic and palliative care cluster and the clinical and controlled study cluster could aid in better understanding of patient patterns. The results of the cluster patterns may help the medical practitioners to develop strategies matched to COVID-19 by understanding these clusters' designs and behaviour mechanisms.

The thematic mapping provided an exciting result. Much research was done in basic areas amidst the pandemic. Researchers may shift their focus from these areas. The motor theme areas have been well developed in literature and may help researchers focus on systematic literature reviews. More effort is needed to understand the nuances of niche themes to profile COVID-19 induced palliative care, such as geriatrics and its actions. COVID-19 generated qualitative research in less researched areas, particularly nursing and public health. These areas can appear to be better in future research areas.

LIMITATIONS AND FUTURE RESEARCH

The scope of the research was limited to documents acquired from the Scopus database and search limited to article titles, abstracts, and keywords. To have a deeper grasp of the patterns and trends, future research should focus on databases such as Google Scholar, Web of Science, Dimensions, and others. The majority of data analysis employed keyboard plus as the field. Other areas of research could be used in the future to estimate more outcomes. To better comprehend the existing literature pattern, the science mapping produced in this work could be enhanced with systematic literature reviews and meta-analyses. Future research could also look at comparison studies between countries involved in this field of study and others who aren't. It will aid in determining the many parameters that determine COVID-19-and palliative care.

CONCLUSION

The study looked at a bibliometric examination of COVID-19 and palliative care literature on a variety of topics and areas. The study could serve as a guide for academic practitioners interested in understanding the pattern of existing literature on COVID-19 and palliative care. During the previous two years, a significant quantity of research has been conducted on the subject. Using bibliometric mapping and descriptive analysis, the author investigated different trends in publications, consequences, and future research directions. The significant trends identified in this study may aid academicians, medical practitioners, and policymakers in developing palliative care plans in the face of the pandemic.

The bibliometric analysis of COVID-19 and palliative care used in the study has entailed reviewing relevant and

prominent literature particularly research articles. This analysis has provided significant insights into the trends and patterns in COVID-19 and palliative care research, including the most regularly explored themes, notable researchers and institutions, influential publications, and so on. The output of the study may help researchers discover research gaps and potential for further exploration concerning COVID-19 and palliative care, identifying areas that require extra research and places where previous research has been effective. Numerous data visualization techniques such as clustering, thematic maps, three-field plots, word clouds, and so on have helped in the interpretation of patterns and trends. This study can serve to guide future research in these areas, leading to a better knowledge of how to deliver appropriate palliative care to COVID-19 patients. Overall, a bibliometric analysis of COVID-19 and palliative care used in this study may contribute to the body of knowledge by providing a thorough understanding of the research on these topics, identifying research gaps and opportunities, and ultimately improving the quality of care provided to COVID-19 patients.

DECLARATION OF INTEREST STATEMENT

No potential conflict of interest

References

1. Ferguson L, Barham D. Palliative Care Pandemic Pack: A Specialist Palliative Care Service Response to Planning the COVID-19 Pandemic. J Pain Symptom Manage. 2020;60(1):e18-20.
2. Shekhar SK, Jose TP. COVID-19 and second wave: can India become self-sufficient in vaccines? Hum Vaccines Immunother [Internet]. 2021 [cited 2021 Oct 3];1–1. Available from: https://doi.org/10.1080/21645515.2021.1964890
3. Florêncio RS, Feitosa Cestari VR, de Souza LC, Flor AC, Nogueira VP, Magalhães Moreira TM, et al. Palliative care amidst the COVID-19 pandemic: Challenges and contributions. ACTA Paul Enferm. 2020;33:1-9.
4. Lancet T. Palliative care and the COVID-19 pandemic., The Lancet. 2020;395:1168.
5. Donthu N, Kumar S, Mukherjee D, Pandey N, Lim WM. How to conduct a bibliometric analysis: An overview and guidelines. J Bus Res. 2021;133:285–96.
6. Abhishek, Srivastava M. Mapping the influence of influencer marketing: a bibliometric analysis. Mark Intell Plan. 2021;39(7):979-1003.
7. Kurniasih N, Wanabuliandari S, Ristiyani. Bibliometrics analysis in articles of verbal bullying in schools. Libr Philos Pract. 2020;2020:1-10.
8. Rusydiana AS. Bibliometric analysis of journals, authors, and topics related to COVID-19 and Islamic finance listed in the Dimensions database by Biblioshiny. Sci Ed. 2021;8(1):72-8.
9. Knapczyk A, Francik S, Pedryc N, Hebda T. Bibliometric analysis of research trends in engineering for rural development. InProceedings of the 17th International Scientific Conference Engineering for Rural Development, Jelgava, Latvia 2018 May 23 (pp. 23-25).
10. Adesina OA, Opesade AO. Bibliometirc analysis of sickle cell anaemia literature on Nigeria listed in PubMed between 2006 and 2016. Libr Philos Pract. 2019:1
11. Aria M, Cuccurullo C. bibliometrix: An R-tool for comprehensive science mapping analysis. J Informetr. 2017;11(4):959–75.
12. Börner K, Chen C, Boyack KW. Visualizing knowledge domains. Annu Rev Inf Sci Technol. 2003;37:179–255.
13. Cobo MJ, López-Herrera AG, Herrera-Viedma E, Herrera F. Science mapping software tools: Review, analysis, and cooperative study among tools. J Am Soc Inf Sci Technol. 2011;62(7):1382–402.
14. Zupic I, Čater T. Bibliometric Methods in Management and Organization. Organ Res Methods. 2015;18(3):429–72.
15. Mishra M, Sudarsan D, Santos CAG, Mishra SK, Kar D, Baral K, et al. An overview of research on natural resources and indigenous communities: a bibliometric analysis based on Scopus database (1979–2020). Environmental Monitoring and Assessment. 2021:1-7.
16. Beovich B, Olaussen A, Williams B. A bibliometric analysis of paramedicine publications using the Scopus database: 2010–2019. Int Emerg Nurs. 2021;59:101077.
17. Chen G, Xiao L. Selecting publication keywords for domain analysis in bibliometrics: A comparison of three methods. J Informetr. 2016;10(1):212–23.
18. Massaro M, Dumay J, Guthrie J. On the shoulders of giants: undertaking a structured literature review in accounting. Accounting, Audit Account J. 2016;29(5):767–801.
19. Oakleaf M. Writing information literacy assessment plans: A guide to best practice. Commun Inf Lit. 2009;3(2):80–90.
20. Riehmann P, Hanfler M, Froehlich B. Interactive sankey diagrams. In: Proceedings - IEEE Symposium on Information Visualization, INFO VIS. 2005. p. 233–40.

21. Weerasinghe S. Citation Analysis of Library and Information Science research output for collection development. J Univ Libr Assoc Sri Lanka. 2017;20(1):1-18.
22. Manthiramoorthi M, Saravanakumar RR, Thirumagal A. Lotka's Law and Pattern of Author Productivity of Information Literacy Research Output. Libr Philos Pract. 2019: 2509.
23. Wallace CL, Wladkowski SP, Gibson A, White P. Grief During the COVID-19 Pandemic: Considerations for Palliative Care Providers. J Pain Symptom Manage. 2020;60(1):e70-6.
24. Calton B, Abedini N, Fratkin M. Telemedicine in the Time of Coronavirus. J Pain Symptom Manage. 2020;60(1:e12-4).
25. George PM, Barratt SL, Condliffe R, Desai SR, Devaraj A, Forrest I, et al. Respiratory follow-up of patients with COVID-19 pneumonia. Thorax. 2020;75(11):1009-16.
26. Mulay P, Joshi RR, Chaudhari A. Bibliometric study of bibliometric papers about clustering. Libr Philos Pract. 2020;1(1):1-21.
27. Yan E, Ding Y. Applying centrality measures to impact analysis: a coauthorship network analysis. J Am Soc Inf Sci Technol. 2009;60(10):2107-18.
28. Andrews JE. An author co-citation analysis of medical informatics. J Med Libr Assoc. 2003;91(1):47–56.
29. Tennekes M. Tmap: Thematic maps in R. J Stat Softw. 2018;84:1-39.
30. Cobo MJ, López-Herrera AG, Herrera-Viedma E, Herrera F. An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. J Informetr. 2011;5(1):146–66.
31. Hota PK, Subramanian B, Narayanamurthy G. Mapping the Intellectual Structure of Social Entrepreneurship Research: A Citation/Co-citation Analysis. J Bus Ethics. 2020;166(1):89–114.

ACHSM Asia-Pacific Journal of Health Management

REVIEW ARTICLE

RESIDENTIAL AGED CARE AND HOMELIKE ENVIRONMENTS: A SCOPING LITERATURE REVIEW OF VIEWS OF THE AGED CARE WORKFORCE

Naisim Sum[1], Jill Francis[2], Lucio Naccarella[3]*

1. The University of Melbourne, 207 Bouverie Street, Carlton, Vic, 3010, Australia.
2. School of Health Sciences, Faculty of Medicine, Dentistry and Health Sciences, The University of Melbourne, Grattan Street, Parkville, Vic, 3010, Australia.
3. Centre for Health Policy, Melbourne School of Population and Global Health, The University of Melbourne, 207 Bouverie Street, Carlton, Vic, 3010, Australia.

Correspondence: naisim.rua@gmail.com

ABSTRACT

Evidence exists of the benefits of homelike environments for residents of residential aged care facilities (RACF). To date, most research has focused on the perceptions, experiences, and quality-of-life outcomes of homelike environments from residents' perspectives. The views of the aged care workforce (ACW) about homelike environment in RACF is under-researched.

A scoping review was conducted of the PubMed, Medline, PsychInfo, CINAHL, and Scopus databases in April 2021. Search terms included: homelike environment; residential aged care; staff. Perspectives of ACW were synthesized using Rijnaard's framework, encompassing three key categories. Of 1,597 papers identified, 21 articles published from 1990 to 2021 met the eligibility criteria for review. The scoping review provided insights from nursing staff, facility managers, administrators, and also activity coordinators, laundry, and catering staff.

Eight key elements of homelike environments were identified, further classified into three key categories: (1) built environment (indoor and outdoor spaces); (2) psychological elements (residents' choices and control, maintaining residents' beliefs and habits); (3) social elements (relationships with residents, families, and staff, communal environments and maintaining contact with community). No important differences in themes across ACW groups were evident. Homelike environments were associated with higher job satisfaction, lower burnout, lower staff turnover and did not contribute to staff distress nor perceptions of reduced safety. Homelike environments are potentially beneficial for ACW.

Review findings can inform planning, implementation, and evaluation of homelike environments, to ultimately enhance outcomes for ACW and residents in RACFs.

KEYWORDS

Evaluation, homelike, residential aged care, scoping review, workforce

INTRODUCTION

Of the 1.3 million adults in Australia who received aged care services in 2018-19, 183,000 people were living in residential aged care facilities (RACF) [1]. Evidence exists that homelike environments are beneficial for RACF residents [2]. However, the term 'homelike environments' has been variously defined, including, "personal spaces where an individual has the freedom to make choices and decisions, feels safe and secure, recalls fond memories, and maintains a certain control level." [3 p.397]. Other key attributes of homelike environments include "flexible times for getting up and returning to sleep, resident engagement in household tasks, access to various snacks, family-style meal services, and resident control of portion size." [4 p. 20]. To date most research has focused on the perceptions, experiences, and quality-of-life outcomes of homelike environments from residents' perspectives. The views of the aged care workforce (ACW) about homelike environment in RACF is under-researched. Given the diversity of the ACW in RACF, and that residents and staff all utilise the same RACF space [5], researching ACW views is essential. Evidence exists that the built environment can play a vital role in supporting ACW to integrate resident involvement into their daily caring activities [6]. Since the role of ACW in homelike environment facilities is changing, and their responsibility has been increasing since the care is person-centred, with emphasis on individual well-being [2], understanding their views on homelike environment will be useful in physical planning and design of RACFs to establish a supportive environment for all ACW [6].

This paper reports on a scoping literature review to investigate and describe views of the ACW on homelike environments within RACFs. Two research questions are:

1. What are the key elements of homelike environments from an ACW perspective within RACFs?
2. What impacts do homelike environments have on the ACW within RACFs?

METHODS

A scoping literature review was conducted following the PRISMA checklist and comprised of five steps [7].

1. Identifying research questions
2. Identifying relevant studies: Searches were conducted of five databases (PubMed, CINAHL, Scopus, Medline, and PsycInfo). Reference lists were also checked and a grey literature search was also performed using Google Scholar. Key search terms included:
   1. Homelike environment terms: home* environment
   2. Residential aged care terms: care home, nursing home, residential aged care
   3. Staff terms: staff, employ*, worker*, assistant*
3. Selecting studies: The online software Covidence was used to screen titles and abstracts for suitable articles. Full-text reviews were conducted for articles meeting eligibility criteria.

Inclusion criteria

- Studies published in English from January 01, 1990 to January 01, 2021 given the substantial changes in legislations, demands, policies and commissions of inquiry into RACF.
- Studies targeting adults aged 65 years and over residing in RACFs
- RACF ACW, including clinical staff (nurses, allied health), non-clinical staff (activity coordinators, kitchen staff, managers), and unpaid staff (volunteers)
- Qualitative and quantitative, and mixed-method studies
- Studies investigating the key elements of homelike environments within RACFs
- Studies investigating the impacts of homelike environments within RACFs on the ACW

Exclusion criteria

- Studies targeting other types of aged care facilities such as Aged Care Retirement Villages
- Data collected from residents, family members, friends, and relatives.
- Opinion pieces and commentaries

4. Charting data: First author performed the extraction and synthesis, with each step critically discussed, debated, and confirmed with the other two authors. A data-charting table was developed and used to extract data from each study.

5. Collating, summarizing, and reporting the results: Thematic analysis was informed by the Framework method [8]. Homelike environment emerging themes were summarised using Rijnaard's three category framework [9]: (1) built environment elements; (2) psychological elements; (3) social

elements. Findings about the impacts of homelike environments were classified into three categories: positive impacts, negative impacts, and no impacts.

The first author (as part of his Master of Public Health Research Project) conducted the literature search and data analysis, and the other two authors (Supervisors) guided the study design and were involved in interpretation of findings and implications.

RESULTS

Of 1,597 papers identified, 21 articles published from 1990 to 2021 met the eligibility criteria and were reviewed (Figure 1). Table 1 presents study authors, aims, population and sample size, methods, and key themes. Study designs ranged from: quantitative design (questionnaires) (n=1), mixed-method study (n=1), and qualitative design (focus group discussion (FGD) and semi-structured interviews (SSI) (n=19). FGD (n=1) and SSI (n=3) were identified from grey literature. Table 2 summarises study scope, design and settings.

The reviewed literature included perspectives of a wide range of staff, including registered nurses/RNs and enrolled nurses/ ENs, facility managers, administrators, and to a lesser degree from activity coordinators, recreation assistants, and auditing, laundry, and catering staff.

FIGURE 1. FLOW CHART OF THE STUDY SELECTION

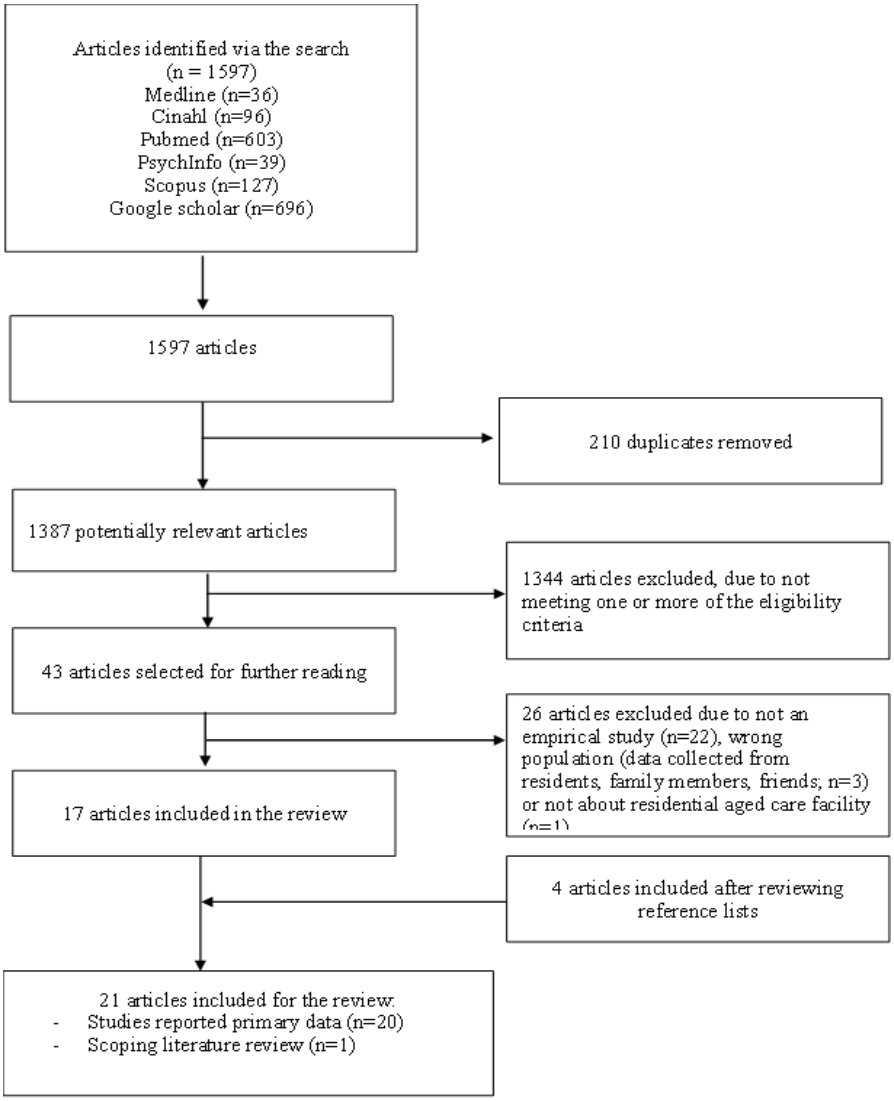


TABLE 1. CHARACTERISTICS OF EACH STUDY

Author (s)	Aims or purpose	Study population and sample size	Methods	Key themes
Adra et al. (2015) [10]	To explore the perspectives of quality of life for a sample of older residents, care staff and family caregivers.	20 residents, eight family caregivers and 11 care staff (female 73%, average age 37 years) from two care homes. Staff are eight registered nurses, two nurse managers, and three licensed practical nurses.	Semi-structured interviews	Maintaining spiritual beliefs Relationships with other residents, family members, and staff Engagement in meaningful activities
Ausserhofer et al. (2016) [11]	(1) To identify homelike residential care models for older care-dependent people with and without dementia, and (2) To explore the impact of these models on resident-, family-, and staff-related outcomes.		A scoping literature review	No significant benefits associated with physical and psychological outcomes for staff-related outcomes
Boekhorst et al. (2008) [12]	To determine the differences in job characteristics of nursing staff in group living homes and their influence on well-being.	183 nurses (female 94%, average age 37 years) in 20 group living homes 197 nurses (female 92%, average age 43 years) in 14 nursing homes	Questionnaires based on JDCS model and the Michigan model	The results indicate that nursing staff in group living homes have a higher job satisfaction and lower burnout than their colleagues in traditional nursing homes, because they have more control, fewer demands, and more social support from their co-workers.
Brown et al. (2016) [13]	To compare workforce characteristics and staff perceptions of safety, satisfaction, and stress between Green House (GH) and comparison nursing homes (CNHs).	13 GHs (female staff 96%, average age 46 years) and 8 comparisons Nursing Homes (female 86%, average age 42 years) in 11 states	Workforce data from human resources office and staff perceptions from surveys	GH environment may promote staff longevity and does not negatively affect worker's stress, safety perceptions, or satisfaction. Larger studies are needed to confirm findings.
Canham et al. (2017) [14]	To explore the meanings and experiences of home from the perspectives of paid staff members.	32 participants (female 91%): 18 residential care aides, one activities coordinator, five licensed practical nurses, three registered nurses, and five management staff members from two residential long-term care facilities	Semi-structured in-depth interviews	Private rooms with personal belongings Offering choices for residents Relationships with other residents, family members, and staff

Davison et al. (2019) [15]	To determine factors that facilitate or impede adjustment to residential aged care (RAC) from the perspectives of residents with dementia, families of residents with dementia and facility staff.	12 residents, 14 family members, 12 RAC staff members (female 92%, average age 43 years) from 14 RAC facilities in the Eastern and Southern regions of Metropolitan Melbourne	Qualitative: face to face interview	Private rooms with photographs Indoor décor Relationships with other residents, family members, and staff Participation in activities in the RACF
Ettelt et al. (2020) [16]	To examine how care home managers conceptualized the approach to delivering personalized care	24 care home managers from 24 small, medium, and large care homes	Semi structured interview	Respecting residents' wishes and decisions Relationships with other residents, family members, and staff Encourage residents to participate in domestic activities
Farvis (2006) [17]	To explore how the provisions of a home-like environment in long term residential aged care are interpreted from the perspectives of residents, family/friends, and staff	18 participants including 6 residents, 6 family/friends, 6 staff members (4 RNs, 1 personal care worker and a laundress) from three RACFs in Melbourne's west suburbs (female staff 100% average age 45 years)	Semi-structured interview	Private rooms with personal belongings Indoor décor The right to, and respect of privacy Choices of food Relationships with other residents, family members, and staff and communal entertainment
Fetherstonhaugh et al. (2016) [18]	To explore the ways in which direct care staff in Australian RACFs perceive that they support and facilitate decision making for people with dementia.	80 staff members from 14 RACFs in Victoria and Queensland including 15 RNs, 14 ENs, 42 personal care assistants/personal carers/assistants in nursing, 4 nurse unit managers, 1 Residential service manager, 1 Transitional care coordinator and 3 lifestyle/diversional therapist	Semi-structured interviews and focus group interviews	Offering different choices for their decision making
Hampson (2008) [19]	To understand more about the impact of the built environment, that is, the effect of the design and layout of the facility on the everyday life of residents.	16 staff including personal care workers, nursing staff, recreation officer, and registered nurse	Qualitative: small group interview	Private rooms Indoor spaces Outdoor spaces Cultural needs Family engagement
Jaye et al. (2015) [20]	To explore the ways in which two aged residential care facilities in New Zealand construct and present themselves through the stories told by those who live and work in them.	21 participants including RACF managers RNs (average age 50 years), care workers (average age 40 years), auditor, 4 residents and 5 family members	Qualitative: observational fieldwork, individual interviews, and group interviews	Indoor décor Offering autonomy for residents Maintaining residents' habit

Lee et al. (2016) [21]	To explore staff perceptions of the role of physical environment in dementia care facilities in affecting resident's behaviours and staff care practice.	15 staff members (female 94%) from 2 care homes including: two administrators, three nurses, one recreation assistant, eight care aides and one family member	Focus Group Discussions (FGDs)	Outdoor spaces Private rooms with personal belongings Small size of the facilities
Murphy et al. (2008) [22]	The aim of this study was to explore nurse managers' perceptions of quality of life of older adults living in residential care in Ireland and key policy issues	67 Managers sampled from 568 residential care facilities across Ireland	FGDs	Private rooms with en suite facilities Choice and control Close relations with family members Maintaining contact with their communities; Meaningful recreational activities based their needs and interest
Naccarella et al. (2018) [23]	To explore residential aged care (RAC) workplace design features that influence how RAC staff feel valued, productive, safe, like they belong and connected.	Nine staff from one RACF (female 78% average age 50 years)	A multistage qualitative research approach: photo elicitation with staff, individual interview with director and validity testing with an advisory committee	Indoor and outdoor spaces
Roberts (2016) [24]	To focus on the working relationships and care staff perceptions of their role in the regulation of resident risk and autonomy in one of the new Canadian care settings adopting the culture change model.	12 staff members from one long-term care facilities consisting of 4 households including director, activity director, eight care assistants and two registered nurses	Interviews and observation	Private rooms Indoor spaces Resident's choices
Shield et al. (2014) [25]	To determine the administrators' motivations for instituting change, understand which practices they chose to implement in their facilities, identify their challenges and strategies, and illustrate dynamics of decision and implementation processes	64 nursing home administrators sampled from 3695 nursing homes	Semi-structured telephone interviews	Outdoor spaces Indoor spaces
Suhonen et al. (2018) [26]	To describe nurse managers' perceptions of the care environment in nursing homes and how the residents' ability to function may be improved	Fourteen nurse managers from six nursing homes in Southern Finland (female 100%, average age 49 years)	An exploratory, descriptive qualitative design based on focus groups	Indoor and outdoor spaces Private rooms with personal belongings Offering choices Supporting personal cultures Communal environment: Outdoor activities

Sundarajoo (2017) [27]	To understand the lived experience of person-centred care in residential homes in New Zealand and Singapore, from the perspective of residents, family members and frontline caregivers.	30 residents, 10 family members and ten frontline caregivers (25 participants from Singapore and 25 from New Zealand (female staff 100%, average age 45 years in NZ and 26 years in Singapore	Semi-structured interviews	Offering residents' choices Personal interaction with staff
van Hoof et al. (2016) [28]	The goal of this study is to gain insight into the experiences and views of actual residents, their relatives and care professionals, in order to understand their needs in relation to the design of nursing homes and to promote a social context that facilitates person-environment integration.	26 staff (nurses and nursing aides)	A qualitative methodology: photography, in depth interview and FGDs	Building and interior design Autonomy and control Relationships with other residents, family members
Verbeek et al. (2012) [29]	To provide an in-depth insight into the experiences of family caregivers and nursing staff with daily care processes in small-scale living facilities	Participants for questionnaires: 130 family caregivers (67 in small-scale living facilities and 63 from regular wards), 309 nursing staff (101 from small-scale living (female 96%, average age 42 years) and 208 from regular wards (female 90%) In-depth interviews conducted in small-scale living facilities only: 13 family members and 11 nursing staff (female 73%, average age 34 years)	Questionnaires and semi-structured interviews	Positive Aspects of working in a small-scale living facility Involvement and personal contact with residents A feeling of being able to spend more time and attention on the residents Autonomy in day structure and the related responsibility and self-confidence
Wang et al. (2020) [30]	To explore the experiences of food choice and meal service in residential aged care facilities and its impact on autonomy, self-determination, and quality of life from the perspectives of both residents and staff.	14 participants (7 residents and 7 staff members) from two RACFs. Staff includes 1 catering assistant, 1 catering staff-chef, 2 RN, Manager (female staff 71%, average age 40 years)	An exploratory descriptive qualitative approach	The importance of food choices for residents

TABLE 2. STUDY SCOPE, DESIGN AND SETTINGS

Included Studies: Number and Design	Location
6 studies: 4 individual interviews and 2 focus groups	Australia
6 studies: 2 individual interviews, 2 focus groups, 1 quantitative (380 nursing staff from 34 facilities), 1 mix-method study	Europe (England, the Netherlands, Ireland, and Finland)
3 studies: 2 individual interviews, 1 focus group	Canada
2 studies; 1 individual interview, 1 observational study	USA
1 study: individual interview and focus group	New Zealand
1 study: individual interview and focus group	Cross country (New Zealand and Singapore)
1 study: Individual interview	Lebanon
1 scoping review of quantitative studies	OECD countries

Definitions and features of homelike environments.

Multiple definitions and features of homelike environment were identified (Table 3).

TABLE 3. DEFINITIONS AND FEATURES OF HOMELIKE ENVIRONMENT BY SEVERAL AUTHORS

	Homelike environment definitions and features
Farvis [31]	To provide a homelike environment, three major factors need to be considered: physical (private rooms with personal touches, flowers, plants in the garden; social (interpersonal relationship among residents, between residents and staff and between staff and families); psychological (with an emphasis on the facilitation of independence, individual choice, privacy, and dignity)
Fleming et al. [32]	A homelike environment includes maintaining residents' sense of self within a safe, comfortable, and familiar environment and access to the wider community. Over and above the physical environment, it is essential that residents can retain a sense of control and agency, and to preserve their individual routines and favourite activities as far as possible.
Molony [33]	A homelike environment includes spaces that enhance belonging, familiarity, navigation, and mastery. Residents have opportunities to truly be a part of the environment, through activity, relationship, and participation.
Rijnaard et al. [9]	The sense of home is influenced by 15 factors, divided into three themes: (1) psychological factors (sense of acknowledgement, preservation of one's habits and values, autonomy and control, and coping); (2) social factors (interaction and relationship with staff, residents, family and friends, and pets) and activities; and (3) the built environment (private space and (quasi-)public space, personal belongings, technology, look and feel, and the outdoors and location).

Table 4 summarises three key categories of homelike environments in terms of their presence or absence as reported in each study. An additional eight key elements of homelike environments were identified and classified into the three key categories [9].

1. Built environment elements: (1) indoor; (2) outdoor spaces.
2. Psychological elements: (3) residents' choices and control; (4) maintenance of residents' spiritual beliefs; (5) maintaining resident habits.
3. Social elements: (6) interpersonal relationships with residents, family members and staff; (7) communal environments; (8) maintaining contact with their community.

TABLE 4. THE KEY CATEGORIES OF HOMELIKE ENVIRONMENTS IN REVIEWED STUDIES

Authors	Country of Origin	Themes for homelike environments based on Rijnaard et al. 2016		
		Built Environments elements	Psychological elements	Social elements
Adra et al. (2015)	Lebanon	×	√	√
Canham et al. (2017)	Canada	√	√	√
Lee et al. (2016)	Canada	√	×	×
Roberts (2016)	Canada	√	√	×
Davison et al. (2019)	Australia	√	×	√
Farvis (2006)	Australia	√	√	√
Fetherstonhaugh et al. (2016)	Australia	×	√	×
Hampson (2008)	Australia	√	√	√
Naccarella et al. (2018)	Australia	√	×	×
Wang et al. (2020)	Australia	×	√	×
Jaye et al. (2015)	New Zealand	√	√	×
Sundarajoo (2017)	Singapore and New Zealand	×	√	√
Ettelt et al. (2020)	England	×	√	√
Murphy et al. (2008)	Ireland	√	√	√
Shield et al. (2014)	USA	√	×	×
Suhonen et al. (2018)	Finland	√	√	√
van Hoof et al. (2016)	Netherlands	√	√	√

CATEGORY 1: BUILT ENVIRONMENT ELEMENTS (N=12) [14,15,17,19-26,28]

Indoor spaces

Allowing residents to have private bedrooms with private bathrooms, and to decorate rooms with favourite personal belongings, was reported to be factors that made facilities feel homelike. Nurse managers [22] and personal care assistants [24] reported that it was very homelike when residents had private bedrooms with en-suite facilities that they did not have to share with other residents. Providing residents with private bedrooms with private bathrooms was fundamental to a good quality of life [22]. Homelike environments could also be created when residents were allowed to decorate private bedrooms with their favourite personal belongings and materials, such as photographs [14,21,26]. RNs also reported that residents would feel more at home when a right to privacy was granted and respected [17]. Homelike environments were also facilitated by interior decorations and furnishing to create a loving, relaxed, and a clean environment [15,17,19-21,23,25,26,28] including colourful artworks or murals on the walls, colour and quality materials in curtains, scented flowers and plants, natural sunlight, and hair salon access.

Outdoor spaces

Outdoor gardens were viewed as not only for residents and families to enjoy, but also relaxing places for staff. Personal care assistants and allied health staff reported that the garden was a quiet and relaxing place they could walk around if they had a bad day [23]. Administrators reported improved morale among residents and staff thanks to minor external changes, stating that gardens, and patio areas with flowers and a pleasing atmosphere, significantly improved the aesthetics of the building and staff morale [25]. However, outdoor spaces need to be safe and accessible, especially for individuals using wheelchairs and other movement assisting devices [21].

CATEGORY 2: PSYCHOLOGICAL ELEMENTS (N=14) [10,14,16-20,22,24,26-30]

Residents' choices and control

Catering staff reported that restricted food choices might have a negative impact on residents' appetite [30]. Most decisions about planning menus were centrally, so there was no room for individual variation and change at the facility level. Lack of autonomy at the local facility level was reported to lead to frustration among catering staff [30]. Staff also raised issues such as bulk and processed foods, food being over-cooked and poor-tasting, which they related to resident safety and their own professional duty of care for residents [30].

Maintaining residents' spiritual beliefs

Allowing residents to maintain their personal culture was reported in three studies with RNs [19], nurse managers [29] and clinical staff [10]. Maintaining and practicing spiritual beliefs offered a sense of purpose, meaning, spiritual nourishment and renewal, which improved quality of life [10]. Supporting individual culture was described as creating an environment that accommodated individuals' spirituality and spiritual needs by acknowledging each individual's cultural background [26]. Religious activities need to be arranged around seasonal holy days [26].

Maintaining residents' habits

Facility managers [16] and RNs [20] reported maintaining residents' habits as key to homelike environments. Household tasks kept residents active and engaged and formed part of what made residential aged care homelike [20]. It was also a way of maintaining continuity in residents' lives [16]. Maintaining residents' habits was often reported to be symbolic, with residents willing to assist staff if no longer being able to actually perform the task, or recalling that they actually do not like household tasks [16]. Allowing residents to participate in household chores also increased opportunities for staff to interact with residents beyond basic nursing care moments [29].

CATEGORY 3: SOCIAL ELEMENTS (N=10) [10,14 17,19,22,26-28]

Family members were noted to be experts about the residents and could play an important role in providing a sense of continuity from past to present, including through active support [10,15]. Family involvement was the main factor when settling new residents into a facility. Lifestyle coordinators, clinical managers, and personal care attendants reported that family members should be there at the facility regularly in the first few months to make residents feel safe and not abandoned [15].

Communal environments

Group activities were reported as providing an opportunity to give purpose in life, acquiring new skills, maintaining self-value, occupying time, and addressing boredom [15]. Examples of communal environments included festival-related activities and events such as Relatives' Day, Mother's Day, Christmas [26], craft sessions, small group

activities, communal entertainment [17], and meaningful recreational activities [22].

Maintaining contact with their community

Nurse managers [22] reported that residents should have opportunities to engage in social activities, highlighting the essential elements of planned provision, various options, and a choice about whether to engage. It was also important for residents to retain connection with their communities and for people from those communities to be sometimes engaged in activities at the facilities [22].

The impacts of homelike environments on the ACW

Of the 21 studies reviewed only four reported impacts of homelike environments on the ACW [11-13,29]. Three studies reported positive impacts [12,13,29], while one scoping review found no differences [11]. Brown et al. [13] compared workforce characteristics and staff perceptions of safety, satisfaction, and stress between Green Houses (GH) [34] and compared nursing homes (CNHs) and found that staff turnover was lower in GHs compared to CNHs. However, owing to a relatively small sample size and potential biases due to a low survey response rate [13], study results should be regarded as tentative.

A process evaluation of the experience of nursing staff in small-scale, homelike facilities in dementia care revealed that 93% of staff reported that if the work environment changed away from being homelike, they would leave work [29]. Moreover, 56% of staff employed in traditional nursing homes reported that they would like to work in homelike facilities. Three positive aspects of working in a small-scale, homelike facility were reported: (1) involvement and personal relations with residents; (2) having more time and attention for residents; and (3) being autonomous in structuring their day and the related responsibility and self-confidence associated with that [29]. Negative aspects of working in a small-scale, homelike facility [29] also exist. For example, staff reported that working alone they missed their team to discuss care problems, share responsibility and seek help. Staff shortages were also mentioned as staff felt that they could not spend enough time with residents. The emotional burden of homelike environments was also described by nursing staff as a negative aspect of working in them. While this process evaluation did not report impacts of homelike environments on staff [29], staff experiences of homelike environments are important process variables that need to be assessed when evaluating the measurable impacts of homelike environments.

A study on the effects on job satisfaction and burnout of working in group living homes [12] for older people with dementia revealed that nursing staff reported higher job satisfaction and lower burnout than those working in traditional nursing homes, due to more job control, less job demands and more social support from their colleagues [12]. However, a scoping literature review [11], found no evidence that homelike residential models enhanced staff-related outcomes such as higher job satisfaction or reduced caregiver burden/distress.

DISCUSSION

Homelike environment is a complex [11], dynamic, and subjective concept that has implications for residents, family members, and the ACW. The review revealed a lack of consensus about the definition of homelike environments. Multiple definitions emphasise (1) built environments, (2) social interactions and (3) psychological aspects, consistent with the three-category Rijnaard's framework that informed this review. These three key categories are also important contributing factors influencing a homelike environment [9,35], and also in alignment with the concept used by Eden Alternative [11] and GHs to create a homelike environment.

The current review of ACW views identified 8 specific key elements of homelike environments: (1) indoor and (2) outdoor spaces; (3) residents' choices and control; (4) maintenance of residents' spiritual beliefs and (5) habits; (6) interpersonal relationships between residents, family members and staff; (7) communal environments; and (8) maintaining contact with their community.

In the studies included in this review, nursing staff were predominantly female (89%) with an average age of 44 years, which is consistent with the findings from the Australian Aged Care Royal Commission [36] (87% of the direct care workers in residential care being female; median age of 46 years). This lends support to the possibility that, taken together, the included samples may be representative of the wider ACW. The review included the studies published from 1990 to 2021. However, the studies included in the review were published from 2006-2020, revealing that it took 16 years for key policy changes to result in the published research in the field.

Four key elements of homelike environments were mentioned most frequently by the ACW in the included studies: indoor spaces; outdoor spaces; residents' choices

and control; and interpersonal relationships with peers, family members, and staff. Four other elements were mentioned less often: maintaining residents' habits, spiritual beliefs, communal environments, and maintaining links with community. Maintaining links with the community was mentioned by staff as mattering to residents but no information was reported about whether the theme mattered to staff. This might be because the ACW has differing priorities and needs in defining homelike environments. By considering these differences, RACFs could generate solutions or interventions for creating homelike environments that consider all the elements that matter to benefit both ACW and residents.

Review findings are consistent with other published studies on the topic of homelike environments. Five of the key elements of homelike environments identified in this study were consistent with the elements in an environmental audit tool developed in Australia [37], which includes indoor spaces, outdoor spaces, maintaining residents' habits, communal environments and maintaining contacts with the community. Two key elements of homelike environments, indoor spaces, and outdoor spaces also emerged in the study investigating the architectural factors that contribute to a sense of home and how these factors could be implemented in design guidelines for the Netherlands [35]. However, the additional contribution of current review lies in the identification of three additional elements that were important to the ACW.

ACW's and resident perspectives were aligned. For example, one study proposed that physical, social and organizational characteristics should be incorporated in care concepts to create a homelike environment for residents with dementia [38]. Potential tensions also exist between perspectives. For example, greater resident choice and autonomy might increase staff workload and burnout [39]. When choices were provided, caution was needed in terms of financial and human resources [22]. Staff shortages were also mentioned by nursing staff in a small-scale, homelike facility [29]. RACFs may or may not have the financial resources to create a homelike environment.

Homelike environments were associated with higher job satisfaction, lower staff burnout; and did not contribute to staff distress nor perception of reduced safety. These positive associations were confirmed in a quasi-experimental, longitudinal study in the Netherlands [40]. However, the earlier scoping review (2016) found no difference in staff-related outcomes between homelike residential care models and traditional nursing home models [11].

The potential for positive impacts of small-scale, homelike care models, identified in this review, was consistent with findings of a recent Australian Royal Commission Report [1], recommending that a small-scale, homelike model for future RACFs needs to be available and requires immediate attention. However, it was argued that, without government intervention to steer the sector toward smaller-scale models, providers and developers would continue to build large-scale facilities. Strong leadership and appropriate financial support were required to encourage the building or upgrading of RACFs for more appropriate homelike residential aged care models.

STRENGTHS AND LIMITATIONS OF THE REVIEW

This scoping literature review used robust, inclusive, and replicable methods to identify relevant literature and to extract and synthesise evidence. The nature of a scoping literature review (which includes all identified studies, not only those appraised as being of high quality) gave a broad scope to provide and capture a comprehensive summary of the evidence on diverse homelike environments within RACFs. Rijnaard's framework proved to be a useful basis for synthesising and describing review findings.

This review was limited to the studies published in English from 1990 to 2021, hence relevant studies might have been missed. Most of the papers identified (n=20) were from high-income countries; there might be different perspectives from low- and middle-income countries. Fewer perspectives about key elements of homelike environments were identified from non-clinical staff and no perspectives from unpaid staff. This was a general aged care literature review without focusing on any specific aged care populations, such as older people living with dementia. Future studies could explore the perspectives of unpaid staff and non-clinical staff and in relation to specific aged care populations (e.g., older people living with dementia). Future studies could explore the perspectives of homelike environments within RACFs. Impact and economic evaluations were also required of homelike residential aged care environments. Prioritization exercises should also be conducted to gain better understanding of any tensions between residents' and ACW's perspectives; and how these tensions could be resolved.

The review identified a limited number of studies from mainly aged care nursing staff, facility managers, administrators, and to a lesser degree from activity coordinators, laundry, and catering staff. No perspectives about the key elements of homelike environments from unpaid staff were identified.

CONCLUSION

Eight key elements of homelike environments from the ACW's perspectives were identified. The National Aged Care Mandatory Quality Indicator Program (QI Program) in Australia requires all approved providers of residential aged care (RAC) services to collect and submit new quality indicators by July 2023 [41]. However, there are no RAC environment related indicators among the eleven quality indicators [41]. While evidence exists, that homelike environments are beneficial for ACWs, study findings can inform future planning, implementation, and evaluation of homelike environments, to ultimately improve the outcomes for the ACW and residents in RACFs. While this scoping review has identified some key priorities for enhancing RAC through homelike environments, more focused and systematic reviews are required on RAC environments to identify the key factors that support both residents and staff.

References

1. Royal Commission. Final Report [Internet]. Royal commission into aged care quality and safety. 2021. [cited 2021 May 15]. Available from: https://agedcare.royalcommission.gov.au/publications/final-report.
2. Verbeek H, van Rossum E, Zwakhalen SMG, Kempen GIJM, Hamers JPH. Small, homelike care environments for older people with dementia: a literature review. Int Psychogeriatr. 2009;21(02):252.
3. Peace S, Holland C. Homely residential care: a contradiction in terms? J Soc Policy. 2001 Jul 1;30.
4. Briller S, Calkins MP. Defining place-based models of care: Conceptualizing care settings as home, resort, or hospital. Alzheimers Care Today. 2000. [cited 2021 May 15];1(1). Available from: https://oaks.kent.edu/caedpubs/22
5. Cutler LJ. Physical environments of assisted living: research needs and challenges. The Gerontologist. 2007;47:68–82.
6. de Boer B, Beerens HC, Katterbach MA, Viduka M, Willemse BM, Verbeek H. The physical environment of nursing homes for people with dementia: traditional nursing homes, small-scale living facilities, and green care farms. Healthcare. 2018;6(4).
7. Peters MDJ, Godfrey CM, Khalil H, McInerney P, Parker D, Soares CB. Guidance for conducting systematic scoping reviews. Int J Evid Based Healthc. 2015;13(3):141–6.
8. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 2013;13(1):117.
9. Rijnaard MD, van Hoof J, Janssen BM, Verbeek H, Pocornie W, Eijkelenboom A, et al. The factors influencing the sense of home in nursing homes: a systematic review from the perspective of residents. J Ageing Res;2016.
10. Adra MG, Hopton J, Keady J. Constructing the meaning of quality of life for residents in care homes in the Lebanon: perspectives of residents, staff and family. Int J Older People Nurs. 2015;10(4):306–18.
11. Ausserhofer D, Deschodt M, De Geest S, van Achterberg T, Meyer G, Verbeek H, et al. "There's no place like home": a scoping review on the impact of homelike residential care models on resident-, family-, and staff-related outcomes. J Am Med Dir Assoc. 2016;17(8):685–93.
12. Boekhorst S te, Willemse B, Depla MFIA, Eefsting JA, Pot AM. Working in group living homes for older people with dementia: the effects on job satisfaction and burnout and the role of job characteristics. Int Psychogeriatr. 2008;20(5):927–40.
13. Brown PB, Hudak SL, Horn SD, Cohen LW, Reed DA, Zimmerman S, et al. Workforce characteristics, perceptions, stress, and satisfaction among staff in green house and other nursing homes. Health Serv Res. 2016;51: 418–32.
14. Canham SL, Battersby L, Fang ML, Sixsmith J, Woolrych R, Sixsmith A. From familiar faces to family: staff and resident relationships in long-term care. J Ageing Health. 2017;29(5):842–57.
15. Davison TE, Camoes-Costa V, Clark A. Adjusting to life in a residential aged care facility: Perspectives of people with dementia, family members and facility care staff. J Clin Nurs. 2019;28(21–22):3901–13.
16. Ettelt S, Williams L, Damant J, Perkins M, Wittenberg R. What kind of home is your care home? A typology of personalised care provided in residential and nursing homes. Ageing Soc. 2020;1–21.

17. Farvis MJ. The provision of a culturally sensitive home-like environment in residential aged care: experiences from Melbourne's West. :50.
18. Fetherstonhaugh D, Tarzia L, Bauer M, Nay R, Beattie E. "The red dress or the blue?": how do staff perceive that they support decision making for people with dementia living in residential aged care facilities? J Appl Gerontol Off J South Gerontol Soc. 2016;35(2):209–26.
19. Hampson R. Setting policy in concrete: the impact of the built environment on older people who live in residential aged care facilities. 2008.
20. Jaye C, Hale B, Butler M, McKechnie R, Robertson L, Simpson J, et al. One of us: Stories from two New Zealand rest homes. [cited 2021 Mar 9]. Available from: https://www.scopus.com/inward/record.uri?eid=2-s2.0-84941283194&doi=10.1016%2fj.jaging.2015.08.010&partnerID=40&md5=6c4c1bfd2fe771ad630bd9fba154d709
21. Lee SY, Chaudhury H, Hung L. Exploring staff perceptions on the role of physical environment in dementia care setting. Dementia. 2016;15(4):743–55.
22. Murphy K, O'Shea E, Cooney A. Nurse managers' perceptions of quality of life of older adults living in long-stay care in Ireland: is it time for a bill of rights? J Gerontol Nurs. 2008;34(3):47–55.
23. Naccarella L, Newton C, Pert A, Seemann K, Williams R, Sellick K, et al. Workplace design for the Australian residential aged care workforce. Australas J Ageing. 2018;37(3):194–201.
24. Roberts E. Negotiated risk and resident autonomy: Frontline care staff perspectives on culture change in long term care in Nova Scotia, Canada. Work Read Mass. 2016;54(4):837–51.
25. Shield RR, Tyler D, Lepore M, Looze J, Miller SC. "Would you do that in your home?" Making nursing homes home-like in culture change implementation. J Hous Elder. 2014;28(4):383–98.
26. Suhonen R, Karppinen T, Martín BR, Stolt M. Nurse managers' perceptions of care environment supporting older people's ability to function in nursing homes. J Nurs Manag. 2019;27(2):330–8.
27. Sundarajoo S. The lived experience of person-centred care in residential homes in New Zealand and Singapore: the perspectives of residents, frontline caregivers and family members. University of Otago; 2017 [cited 2021 Apr 20]. Available from: https://ourarchive.otago.ac.nz/handle/10523/7484
28. van Hoof J, Verbeek H, Janssen BM, Eijkelenboom A, Molony SL, Felix E, et al. A three perspective study of the sense of home of nursing home residents: the views of residents, care professionals and relatives. BMC Geriatr. 2016;16(1):169.
29. Verbeek H, Zwakhalen SMG, van Rossum E, Kempen GIJM, Hamers JPH. Small-scale, homelike facilities in dementia care: a process evaluation into the experiences of family caregivers and nursing staff. Int J Nurs Stud. 2012;49(1):21–9.
30. Wang D, Everett B, Brunero S, Northall T, Villarosa AR, Salamonson Y. Perspectives of residents and staff regarding food choice in residential aged care: a qualitative study. J Clin Nurs. 2020;29(3–4):626–37.
31. Farvis M. Residential aged care and a home-like environment. Aust Nurs J ANJ. 2003.
32. Fleming A, Kydd A, Stewart S. Care homes: the developing ideology of a homelike place to live. Maturitas. 2017;99:92–7.
33. Molony SL. The meaning of home: a qualitative metasynthesis. Res Gerontol Nurs. 2010;3(4):291–307.
34. Lum TY, Kane RA, Cutler LJ, Yu T-C. Effects of green house nursing homes on residents' families. Health Care Financ Rev. 2008;30(2):35–51.
35. Eijkelenboom A, Verbeek H, Felix E, van Hoof J. Architectural factors influencing the sense of home in nursing homes: an operationalization for practice. Front Archit Res. 2017;6(2):111–22.
36. Royal Commission. Final Report [Internet]. Royal commission into aged care quality and safety. vol 2. 2021 [cited 2021 May 15]. Available from: https://agedcare.royalcommission.gov.au/publications/final-report
37. Fleming R. An environmental audit tool suitable for use in homelike facilities for people with dementia. Australas J Ageing. 2011;30(3):108–12.
38. Verbeek H, van Rossum E, Zwakhalen SMG, Kempen GIJM, Hamers JPH. Small, homelike care environments for older people with dementia: a literature review. Int Psychogeriatr. 2009;21(02):252.
39. White HK, Corazzini K, Twersky J, Buhr G, McConnell E, Weiner M, et al. Prioritizing culture change in nursing homes: perspectives of residents, staff, and family members. J Am Geriatr Soc. 2012;60(3):525–31.
40. Zwakhalen SM, Hamers JP, van Rossum E, Ambergen T, Kempen GI, Verbeek H. Working in small-scale, homelike dementia care: effects on staff burnout symptoms and job characteristics. A quasi-experimental, longitudinal study. J Res Nurs. 2018;23(2–3):109–22.

41. The Australian Government Department of Health and Aged Care. The National Aged Care Mandatory Quality Indicator Program Manual 3.0-Part A [Internet]. [cited 2023 January 24]. Available from: https://www.health.gov.au/resources/publications/national-aged-care-mandatory-quality-indicator-program-manual-30-part-a

ACHSM Asia-Pacific Journal of Health Management

REVIEW ARTICLE

THE EFFECTIVENESS OF SCENARIO-BASED TRAINING OF CLINICIANS IN THE USE OF ELECTRONIC HEALTH RECORDS – A SYSTEMATIC REVIEW

*Richard Olley, Jeremy Hozynka**

Griffith University, Queensland Australia

Correspondence: j.hozynka@griffithuni.edu.au

ABSTRACT

The digitalisation of healthcare represents another change challenge for clinicians, and the most prominent of these is the Electronic Health Record (EHR). Adopting the EHR, including the training of clinicians of all disciplines, often does not occur effectively, which increases the risk of adverse events and the reduction in the quality and safety of clinical care. The competent use of the EHR requires clinician user training. One form of training is scenario-based. The questions asked of the literature in this SLR are what evidence exists as to the effectiveness of using scenarios to train clinicians in using the EHR, and is there a research gap in this evidence to inform future research?

To undertake this systematic review of the literature, the researchers implemented the PRISMA Method. Only highly ranked, health-related academic databases accessed through an electronic library catalogue were used to search for relevant peer-reviewed/refereed articles. The decision to apply the PRISMA method was based on the PRISMA statement, which safeguards comprehensive reporting and transparency to ensure inferred recommendations and interventions are based on the best available evidence.

6,898 records were returned from Boolean searches for articles published between November 2018 to November 2021. Five articles were included for greater analysis following exclusions by title review, abstract review, and quality assessment. Quality assessment of articles reporting empirical studies relating to the effectiveness of using scenarios in this type of training was performed using the standard quality assessment scoresheet by Kmet [48].

Three themes emerged from the literature. The centrality of workflow, clinician engagement are key, and scenario-based training is one of many training strategies implemented.

The authors found that further rigorous research studies are required to enhance the evidence body for the continued usage of scenario-based training of clinicians to effectively use the EHR, particularly as the digital landscape within health continues to evolve. Moreover, the authors posit that further research on scenario-based EHR training of clinicians should include:

1. Scenario-based training is just one part of a broader and blended EHR training suite.
2. Ensuring future studies encompass a diversity of all fields of clinical roles within the research and,
3. Include standardised terminology naming for clinicians' scenario-based EHR training within the studies.

KEYWORDS

Electronic Health Record, Electronic Medical Record, scenario based training, usability training.

INTRODUCTION

The digitalisation of healthcare is another change for clinicians [1] in a constantly changing clinical environment. One of the most significant changes in the digital health environment is the electronic health record (EHR), which improves documentation, clinical risk management, and prevention of errors [1]. This systematic literature review (SLR) establishes an evidence-base for scenario-based training of clinicians in the use of the EHR. The rationale for this project was to determine what empirical evidence is available to underpin the use of scenario-based training and if a research gap exists relating to the effectiveness of scenario-based training of clinicians in their adoption of the EHR.

The adequacy and appropriateness of clinical documentation are important considerations with patient complexity surging [2], clinical staff workloads increasing [3] and the ever-present need to document the quality and safety of clinical interventions and interactions increases. Also, budgetary pressures are ever-present and growing [4].

There are challenges to adopting Electronic Health Records (EHRs) for health professionals working clinically if EHR implementation does not occur effectively. An ineffective implementation may increase the risk of adverse events and a concomitant reduction in the quality and safety of patient care [5]. Implementing an EHR within a healthcare organisation requires extensive planning and preparation to avoid significant patient safety and efficiency implications, thus highlighting the need for effective training of clinicians in the use of the EHR utilising best-practice methods [1].

One method implemented for training in using and applying EHR systems is scenario-based training. This method is traditionally incorporated as a key training tool for clinicians to learn new skills within healthcare and utilises real-life situations related to the clinical workflow for staff to increase their level of competency within a training environment [6].

BACKGROUND

The contemporary EHR is advancing rapidly in modern healthcare's socio-technical environment. The quality and safety of future healthcare look more certain as digital integration between various systems, and medical devices evolve, as clinical decision support systems CDSS assist further and as the design and usability of EHR platforms improve [7-9]. Further technological development of the EHR with the added application of deep learning and artificial intelligence involvement embedded within the EHR will further help diagnose and manage disease [10-12]. The likelihood of the future EHR assisting the physician as a trusted clinical tool and guide is now more a reality than a concept [7, 12].

TRADITIONAL APPROACHES TO EHR TRAINING FOR CLINICIANS

Current models of EHR clinician training consist of initial user training covering EHR terminology, features and functionality taught by trainers within the classroom setting [13]. Fourteen years ago, Rockswold and Finnel found that this classroom-based training style was an insufficient training method [19]. These researchers found that 43% of participants experienced the training as inadequate, with 95% of participants reporting the training could be improved [19]. This traditional style of EHR training focuses primarily on basic EHR use and not on individual clinician workflows [13, 14]. Scenario-based EHR training could offer clinicians EHR workflow proficiency, tailoring EHR training to the clinician's unique workflow and information needs [13, 14].

THE RESEARCH QUESTION

The research question posed in this systematic review of the literature was:

What evidence supports the effectiveness of clinician scenario-based training as a training method in the competent use of electronic health records?

Findings from this SLR will help establish the evidence-base for using training strategies for clinicians as part of a broader training program and identify any research gap that exists. This research will help guide the necessity of future digital training programs in healthcare within Australia and globally.

LITERATURE REVIEW

THE CHALLENGES ASSOCIATED WITH PAPER BASED RECORDS

Healthcare documentation within paper-based medical records has historically born witness to the usage of inadequate documentation practices causing misinterpretation and have led to errors, adverse events,

and litigation [1, 7]. The literature reports poor documentation practices within paper-based health record systems. This includes the use of inconsistent and inappropriate terminologies and abbreviations and illegible writing of care plans by the broad health profession disciplines document in the health record [8]. Additionally, incomplete, and repetitive clinical documentation is more likely to have medico-legal implications [7, 9]. The evidence suggests that there is significant time spent retrieving and looking for medical records, and when these are retrieved the paper base of these records cause an inability of multiple clinicians to view a clinical record simultaneously and in real-time [1, 10]. Moreover, data extracted from paper-based medical records provides challenges for researchers and clinical coders due to the labour-intensive nature of searching for the relevant information from volumes of medical records [7, 9, 10]. To further confound efficient and effective clinical practice and research activities, data extraction is challenging because of the lack of standardised documentation and non-coded jargon observed within paper-based medical records [9].

THE BENEFITS OF ELECTRONIC HEALTH RECORDS (EHRS)

The use of the EHR has improved health care quality and aims to reduce the known issues with paper-based records [15]. There is increasing use of the data available from EHRs through concept extraction and standardised coding systems within clinical research, quality and safety measurements, capturing of occasions of service for funding purposes, and aiding CDSS [15]. There is significant evidence available to link the use of the EHR with improved patient outcomes such as:

1. Improved quality of care and lower mortality rates [16, 17].
2. EHR contributes toward stricter adherence to clinical practice guidelines [18].
3. Better standardisation of practice [19].
4. Superior medication safety through advanced monitoring of drug therapies [20].
5. A reduction in clinical errors [5].
6. Contributes to improved legibility of clinical documentation with easier interpretation and more proficient clinician workflow planning [5, 14].

Compared to paper-based health records, a major advantage of EHRs is the ease of retrieval and presentation of accessible data [21, 22]. Other reported benefits claim that clinical staff are more capable of patient prioritisation after EHR implementation, managing their time, and achieving greater service activity [23]. Communication within healthcare, particularly non-information technology (IT) related communication, has improved due to EHR usage [24]. The EHR may decrease costs for healthcare organisations [14]. Sharing health information has improved healthcare expenditure when health data is shared from the EHR with health information exchanges (HIE) throughout health services, communities, and regions, thus improving access to patient health information and lowering provider costs [14, 25]. The use of the EHR presents several challenges and issues for clinicians and service providers to overcome. Calder-Sprackman and colleagues found that implementing a new EHR affected emergency physician task allocation and efficiency [26]. Understanding how an EHR will impact workflow changes is essential to developing strategies that will uphold the quality of patient care [26].

Intensive care physicians report that their workflow in the intensive care unit became less efficient after using EHRs [27]. These researchers also reported that EHR navigation patterns amongst clinicians were highly variable and recommended a user-centred, task-based, case-scenario training framework as a suggested form of initial digital EHR training. It is apparent from the literature that organisations implementing an EHR must implement strategies to manage and mitigate these negative outcomes with insightful and clinician centric approaches.

There is an association between the type and quality of EHR training and user attitude [28]. Longhurst and colleagues described EHR training as directly correlating with EHR user satisfaction. An effective EHR training approach should focus beyond the initial beginner training and on user training and competency over time [32]. Kuek and Hakkennes assessed digital literacy levels and attitudes towards information systems amongst clinical staff before EHR implementation and found that 20% of staff reported anxiety using information systems [29]. These findings highlight the need to ensure effective staff engagement with targeted training to improve staff's digital literacy levels and confidence using the EHR [29]. This will lead to improvements in the quality of patient care and the preparedness of staff to use the EHR.

The utilisation of a case scenario training method of using virtual patients within a simulated electronic health record environment has some positive benefits regarding reducing

medication errors and improving clinicians' attitudes and perceptions of their readiness to use electronic health records for real-world healthcare [30, 31]. Integrating simulated electronic health records into a digital training program can address clinician documentation deficiencies, inefficiencies, and time-consuming clinician chart reviews, thus giving clinicians more one-to-one time for patient-oriented clinical work [30].

The deployment of scenario-based training, hypotheticals or simulation-based training within user training has seen improvements to patient safety [6]. Using a scenario-based training approach has served effectively within critical care, particularly latent threat identification training for critical, low frequency events, invasive procedural training, and training aimed at improving teamwork. Less evidence exists regarding the effectiveness of scenario-based training utilisation for implementing new technologies within the healthcare setting [6]. Forthcoming studies should evaluate interactive, scenario-based digital forms of training and report on outcomes related to costs, patient outcomes and clinician skills and behaviour [32].

CHALLENGES OF EHR IMPLEMENTATION

Despite the proposed benefits of EHR implementation, the transformation to digital healthcare could be cumbersome due to some required changes needed to models of care, service design, and notable changes to clinicians' workflows in how they carry out their job [1]. There is evidence of a relationship between EHR usage with clinician inefficiency and fatigue [33, 34]. As an example of this inefficiency, clinicians report spending a significant share of their time at work interacting with the EHR from perusing increasing amounts of patient-related data and from the substantial burden caused by the amount of documentation required. This demand has led many clinicians to work extra hours with the EHR outside of work periods, increasing the likelihood of clinician burnout [13]. Melnick and colleagues found a strong relationship between EHR usability and the risk of burnout amongst physicians, stating that the current EHR technology usability level is significantly lower than other technologies [35]. Clinician burnout can be directly associated with self-reported medical errors linked to poor EHR usability [13, 35, 36]. A focus on usability issues in training would be a beneficial approach to help reduce clinician burnout [33, 35]. Scenario-based approaches with patient simulation to better prepare clinicians to navigate and use the EHR more efficiently would benefit [37, 38].

Specifically relating to clinician usage of an EHR, incorporation of a computer within most patient encounters are required to ensure timely capture of that data [39]. In conjunction with the heightened privacy, confidentiality and security risks associated with having the live EHR on a computer within the patients' area, the computer itself within these patient encounters negatively impacts the clinicians' ability to build therapeutic relationships with patients, and the utilisation of scenario-based training has better prepared clinicians for computer-patient encounters [39].

Unsafe EHR clinician practices involving unfinalised notes and orders, pre-population and CDSS alert fatigue have led to safety errors [40]. Graber and colleagues found that safety errors related to EHR usage can be attributed to inadequate training [40]. The incorporation of education on safety issues and appropriate EHR digital use practices should feature in an effective training program [1, 40], and a blended scenario-based training approach has shown signs of reducing potential safety errors and improving clinician knowledge of possible risks in using an EHR [5, 41]. In preparation to manage the challenges mentioned above and issues related to EHR usability, potential interventions will need to focus on evidence-based training strategies to solve the problems associated with EHR training. This may include adjusting clinical workflows to function better with the EHR and improving the usability of the EHR through re-design in line with optimal workflows [1, 13, 28].

SCOPE

This systematic literature review sourced articles that were research reports, systematic literature reviews and meta-analyses that focussed on scenario-based training of clinicians. Articles were peer-reviewed and available online with full text, including an abstract. Articles were written in English and published between November 2018 and November 2022. This time interval chosen because of the rapid changes occurring in the digital health space meant that the most contemporary literature was reviewed systematically.

Inclusion and exclusion criteria incorporated within this SLR are set out in Table 3. For the reasons already outlined above. The Standard Quality Assessment Scoring Tool [46] was used to examine the quality of the remaining studies

further and each of the studies were assessed against the criteria-referenced statements in the tool. The quality of each of the studies included in the SLR were allocated a score out of a maximum of 100 and indicating the study's quality. In accordance with requirements set out by Kmet and colleagues [42], a score of more than 80% indicates a strong study, 70-80% indicates good quality, 50-69% is adequate, and less than 50% indicates the study was of poor quality. Any inconsistencies in scores between the reviewers were resolved via discussion until a consensus reached. The assessed quality of the included studies included in the review are presented in Table 3.

METHOD

To undertake this systematic review of the literature, the researchers implemented the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Method [43]. In accordance with this method, highly ranked, health-related academic databases accessed through the Griffith University electronic library catalogue were used to search for relevant peer-reviewed/refereed articles. Databases searched for article retrieval were Scopus, ProQuest, PubMed, and Web of Science. The decision to apply the PRISMA method was based on the PRISMA statement, which safeguards comprehensive reporting and transparency to ensure inferred recommendations and interventions are based on the best available evidence [44].

This review employed five keyword search strings using Boolean operators and truncation symbols listed in table 3., to search the Griffith University electronic library catalogue. Preliminary screening of articles firstly examined the title and excluded articles with titles not matching the inclusion requirements. Abstract screening followed with an examination of the abstracts of each article to assess their relevance to the research question relating to scenario-based training and its effectiveness in the training of clinicians in the use of EHRs as reported in Table 4.

Before the inclusion in the SLR the Kmet quality assessment score was applied to each included paper [45]. The 10-item checklist for qualitative studies and the 14-item checklist for quantitative studies are presented in Tables 1 and 2. These checklists provided Standard Quality Assessment Scores (SQAS) for each included paper undergoing quality analysis in this review [45] and determined if a paper met the scoring threshold for inclusion. For inclusion eligibility within this SLR, each study needed to score a quantitative SQAS of greater than or equal to 21 or a qualitative SQAS greater than or equal to 17. Mixed method studies were assessed using quantitative or qualitative SQAS depending on the design of the mixed methods study.

TABLE 1- STANDARD QUALITY ASSESSMENT SCORESHEET (SQAS) FOR QUALITATIVE STUDIES

Criteria		YES 2 points	PART 1 point	NO 0 points
1	Question/Objective sufficiently described?			
2	Study design evident and appropriate?			
3	Context for the study clear?			
4	Connection to a theoretical framework or wider body of knowledge?			
5	Sampling strategy described, relevant and justified?			
6	Data collection methods clearly described and systematic?			
7	Data analysis clearly described and systematic?			
8	Use of verification procedure(s) to establish credibility?			
9	Conclusions supported by the results?			
10	Reflexivity of the account?			

Kmet and Colleagues [45]

TABLE 2- STANDARD QUALITY ASSESSMENT SCORESHEET (SQAS)FOR QUANTITATIVE STUDIES

Criteria		YES 2 points	PART 1 point	NO 0 points
1	Question/Objective sufficiently described?			
2	Study design evident and appropriate?			
3	Method of subject/comparison group selection or source of information/input variables described and appropriate?			
4	Subject (and comparison group, if applicable) characteristics sufficiently described?			
5	If interventional and random allocation was possible, was it described?			
6	If interventional and blinding of investigators was possible, was it described?			
7	If interventional and blinding of subjects was possible, was it described?			
8	Outcome and (if applicable) exposure measures(s) well defined and robust to measurement/misclassification bias?			
9	Sample size appropriate?			
10	Analytic methods described/justified and appropriate?			
11	Some estimate of variance is reported for the main results?			
12	Controlled for confounding?			
13	Results reported in sufficient detail?			
14	Conclusions supported by results?			

Kmet and Colleagues [45]

TABLE 1- CRITERIA FOR INCLUSION AND EXCLUSION WITHIN THE SLR

INCLUSION CRITERIA	EXCLUSION CRITERIA
Articles published between November 2018 to November 2021. Scenario-based training of clinicians that mentions its effectiveness on clinicians using the electronic health record Peer-reviewed/Refereed Academic journal articles, literature, and systematic reviews Full text online (with abstraction available) Articles published in the English language	Articles published before November 2018. Articles that do not include "clinicians" or "training" or "EHR/EMR." Articles with a Qualitative SQAS Score <17. Articles with a Quantitative SQAS Score < 21.

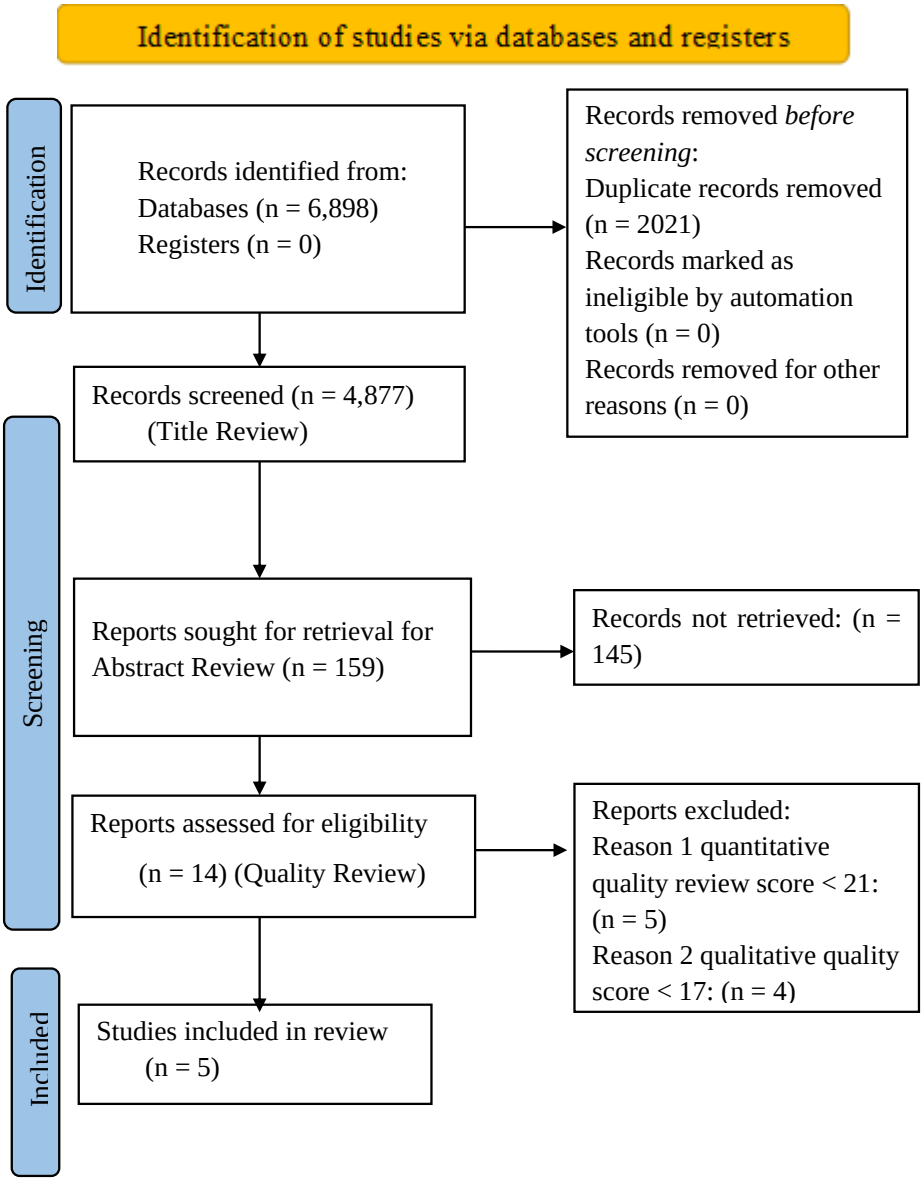
RESULTS

The results are reported in three distinct but related areas of keyword search string results (Table 4), the PRISMA flow diagram completion (Figure 1), and the thematic analysis of included articles to identify themes in the included literature. Table 4 reports the results returned from searching databases for each of the keyword search strings reported with a total of 6,898 records returned for all search strings. Table 4., also breaks down the records returned for each of the five search strings used.

TABLE 4- BOOLEAN SEARCH STRING RECORD RETRIEVAL RESULTS

Number	Keyword Search String	Records Returned
1	hypotheticals* AND training AND clinicians AND (electronic health record)	525
2	hypotheticals* AND training AND clinicians AND (electronic medical record	509
3	(case scenarios*) AND training AND clinicians AND (electronic health record)	2720
4	(case scenarios*) AND training AND clinicians AND (electronic medical record)	2693
5	(integrated workflow scenarios) AND training AND clinicians AND electronic medical record)	451
	TOTAL	6898

FIGURE 1- PRISMA FLOW SHEET [46]



Assessment of Articles for Inclusion in the SLR

The following table summarises the main thesis, findings and SQAS scores for the five articles included in this SLR.

TABLE 5- SUMMARY OF INCLUDED STUDIES

No.	Author	Title	Main Thesis and Findings	SQAS
1	Coons and Colleagues [37]	Virtual Electronic Health Record Technology with Simulation-Based Learning in an Acute Care Pharmacotherapy Course	This quantitative study explores whether incorporating a virtual EHR in conjunction with patient simulation provides a more authentic case scenario patient encounter in training pharmacy students; and if this approach better prepares pharmacy students for real world pharmacotherapy decision making. The main aims of this paper were to evaluate the influence the virtual EHR and patient simulation have on pharmacotherapy student learning efficiency and perception of their learning, namely: clinical skills, communication skills, and satisfaction. The findings were that using a virtual EHR in conjunction with patient simulation in training improved learning efficiency (measured by the time taken to the most suitable therapeutic recommendation) compared to just patient simulation. Students' perceptions of clinical skills, communication skills, and learning satisfaction were also improved from this type of approach. The paper concludes that the virtual EHR complements patient simulation by integrating a workflow into training that aligns with realistic patient encounters, therefore helping pharmacy students practice crucial pharmacist functions in a safe, interactive, simulated setting.	22 Quant
2	Smith and Scholz [31]	Impact of a simulated electronic health record on	The quantitative study examined the effect of using a simulated	21

No.	Author	Title	Main Thesis and Findings	SQAS
		pharmacy students' perceptions of preparedness for clinical practice	EHR in the training of third year pharmacy students within practice labs and via case studies course series. Student performance and students' perceptions of preparedness to use an EHR in clinical practice after using the simulated EHR were evaluated. Student performance was measured before and after implementing a simulated EHR within the pharmacy training regime. Student grades were compared using acute patient care and ambulatory care Advanced Pharmacy Practice Experiences (APPEs), comparing student performance for those who received the simulated EHR intervention (class of 2016) against those who did not (class of 2015). A questionnaire was used to determine students' perceptions of preparedness to use an EHR. The study's findings were that there were no significant differences in the implementation of a simulated EHR within the third-year pharmacy student training compared to overall student performance on acute patient care and ambulatory care APPEs. Students' perception of preparedness to use an EHR was significantly improved from the pre and post intervention questionnaire after incorporating simulated EHR within the pharmacy training program.	(Quant)
3.	Ting and colleagues [41]	Nursing education and training on electronic health record systems: An integrative review	This integrative review explores interventions to facilitate the best available evidence-based education and training for nurses on EHR systems. Data were extracted from diverse designs, including fifteen eligible studies	19 (Qual)

No.	Author	Title	Main Thesis and Findings	SQAS
			evaluated using a mixed-method appraisal tool. The findings were organised into three common themes: delivery method, education and training content, and evaluation of outcomes. Outcome measures were evaluated through users' self-reported confidence, knowledge, satisfaction, and perception of the efficacy of the EHR systems training. The integrative review highlighted using authentic blended training approaches rather than just classroom based learning to enhance clinician EHR training. The approaches to training recommended methods that target the nursing clinical workflow, encompassing interactive material with simulation training, e-learning and nurse superusers or peer coaches, thus effectively engaging nurses in the integration of the EHR within their daily nursing workflow and improving EHR adoption. The review also cited an absence of and a need for early and ongoing collaboration with frontline nurses (end-users) to understand unique clinical workflows in addressing their EHR learning needs.	
4	Scott and colleagues [1]	Going digital: a checklist in preparing for hospital-wide electronic medical record implementation and digital transformation	This study sought to develop a checklist to prepare hospitals for EHR implementation and digital transformation. The checklist development encompassed formal methodologies, including literature reviews, interactive multidisciplinary workshops with informatic leads from across Queensland and reviews and feedback from senior clinical	17 (Qual)

No.	Author	Title	Main Thesis and Findings	SQAS
			leaders. The study resulted in developing comprehensive evidence based checklist with several focus areas including organisational considerations, technical considerations, cultural considerations, management of digital disruption syndromes, plans for further improvement of patient care, and training considerations. The checklist's suggestions regarding training factors concentrated on user training, go-live planning, and sequence, point of care "at the elbow" digital support, and prioritisation of digital training of staff. The study recommended training to focus on EHR use in specific clinical work environments, with the utilisation of hands-on demonstration sessions and hands-on dress rehearsals within simulated work environments using mock patent profiles within EHR training domains ('sandpits') to engage and allow staff to practice various clinical scenarios and workflows in a practice setting. Scenario-based training utilising clinical workflow was also to be further supported by: web-based tutorials and portals containing comprehensive training resources and materials; usage of practice laboratories and EHR related problem-solving exercises, access to frontline superuser and digital support staff and help desks; and proficiency testing of user competence to efficiently interact with the EHR.	
5	Champagne-Lanabeer and	Integrating Diverse Disciplines to Enhance Interprofessional	This study examined interprofessional education (IPE) clinical simulation training using	18 (Qual)

No.	Author	Title	Main Thesis and Findings	SQAS
	colleagues [47]	Competency in Healthcare Delivery	an EHR, and Standardised Patients (SP) had on interprofessional collaboration and communication. This paper included student participants from diverse disciplines such as medicine, nursing, dentistry, public health, and informatics. A pre and post-test quasi-experimental design were employed, where data was collected via the Interprofessional Collaborative Competency Attainment Survey (ICCAS) and through qualitative evaluations from SPs. The objective of this study was to evaluate the data from ICCAS and SPs as to whether IPE EHR simulations improved professional communication and collaboration. Some findings demonstrated how interprofessional simulation based EHR training improved collaboration by 15.9% between pre and post-test scores. Additionally, other ICCAS competencies of communication, teamwork and conflict management were also observed to show significant improvements after IPE EHR simulations. This study concluded that improved collaboration is fostered when blending clinical and non-clinical roles within clinical EHR simulations.	

DISCUSSION

The thematic analysis that examined the major themes explored in each included study were extracted exploring the kinds of relationships or associations demonstrated by the included study positive or adverse effects of scenario-based clinician training and the number of studies that found a positive or negative association between variables explored in the paper. It must be emphasised that some papers could be classified into more than one of the identified themes as can be observed in the results reported in table 5. From this thematic analysis three definitive themes relative to scenario-based training of clinicians to use the EHR emerged:

TABLE 6- EMERGED THEMES FOLLOWING THEMATIC ANALYSIS

No	Theme	Articles Included in Theme
1	Centrality of Workflow	[1, 37, 41]
2	Clinician Engagement is Key	[1, 31, 37, 41, 47].
3	One of Many	[1, 37, 41].

CENTRALITY OF WORKFLOW

Contemporary scenario based EHR training of clinicians should encompass and cater for all clinical specialties, environments and disciplines and their specific, unique clinical workflows [1, 37, 41]. Incorporating a virtual EHR complements patient simulation when integrating the clinician's specific workflow into training aligns with more realistic patient encounters, thus helping clinicians practice vital clinical functions within the EHR in a safe, interactive, and simulated setting [37]. Scott and colleagues suggest 'hands-on' dress rehearsals within simulated work environments using mock patient profiles within EHR training domains to engage and allow staff to practice various clinical scenarios and clinical workflows in a practice setting [1].

Workflow incorporation in training has improved EHR usage by clinicians when there is the added utilisation of nurse superusers or peer coaches within the scenario-based training, to effectively engage clinicians within daily clinical workflow [1, 41]. Once clinicians are working in the live system, continued utilisation of these support staff will further enhance EHR adoption by clinicians [1].

CLINICIAN ENGAGEMENT IS KEY

The engagement of clinicians, who are the end-users of the EHR, within the design and delivery of scenario-based training is imperative to ensure EHR training is designed with designated clinical workflows in mind and delivered by clinical staff who understand these workflows [1, 41]. The review by Ting and colleagues cited that currently, within EHR training programs, there was an absence of and a need for early and ongoing collaboration with frontline nurses to understand their unique clinical workflows in addressing clinicians' distinctive EHR learning needs [41]. In developing training regimes, the engagement of multidisciplinary team members and clinical leads regarding their specific clinical workflows is important [1].

Scenario-based EHR training has empowered clinicians to have an improved perception of skills and preparedness to use the EHR [31, 37]. Students' perceptions of clinical skills, communication skills, and learning satisfaction have improved when using scenario based EHR training [37]. Clinicians' perception of preparedness to use an EHR was evident in pharmacy training that utilised a simulated EHR, and it is asserted that this finding should also be a factor in any clinician EHR training program [31]. Broader research throughout clinical disciplines, outside of the pharmacy sphere, regarding clinician perception of skills and preparedness, would further support this evidence base.
The use of interprofessional simulation based EHR training when a diverse mix of clinical and non-clinical roles are included in the training sessions has seen substantial improvements in fostering interprofessional collaboration [47]. These researchers also assert that communication, teamwork, and conflict management within the interdisciplinary team significantly improved after the interprofessional EHR simulations were completed.

ONE OF MANY (TRAINING STRATEGIES)

Scenario-based training is an important part of just one of many necessary training strategies within a broader catalogue of EHR training offerings. Scenario-based EHR training of clinicians has improved their ability to use the EHR [38] effectively. These researchers found the usage of a virtual EHR in conjunction with patient simulation in training improved learning efficiency, as the time clinicians took to arrive at the most suitable therapeutic recommendation improved compared to just patient simulation alone [38].

A blended EHR training approach targeting individual clinician workflow and interactive scenario-based training and simulation, with the added employment of frontline nurse superusers, peer coaches and classroom-based proficiency testing of user competence to interact with the EHR [1, 42] efficiently, is proposed. Complimentary wider-ranging training modalities as part of a training package with scenario-based EHR training, such as e-learning, web-based tutorials and portals containing comprehensive training materials and access to practice laboratories with EHR related problem-solving exercises have also been put

forward as part of an effective blended EHR training approach [1, 41].

IMPLICATIONS FOR FUTURE EHR PROJECTS

Further high-quality vigorous research studies are required to enhance the evidence body for the continued usage of scenario-based training of clinicians to effectively use the EHR, particularly as the digital landscape within health continues to evolve. Considerations for further research on scenario based EHR training of clinicians should include:

1. Scenario-based training is just one part of a broader and blended EHR training suite.
2. Ensuring future studies encompass a diversity of all fields of clinical roles within the research and,
3. Include standardised naming of the terminology for clinicians' scenario based EHR training within the studies.

CONCLUSION

This systematic review of the literature demonstrates a considerable research gap that will prove fertile ground for ongoing research and, therefore, the development of effective and efficient training of all health professional disciplines to use this important digital transformation of healthcare consumers' clinical records. This is evidenced by only five papers meeting the inclusion criteria. These five papers found a positive relationship between scenario-based training of clinicians and their effective usage of the EHR. However, further robust and high-quality studies are required to bridge the apparent research gap in this area. Although existing limitations of studies and the identified research gap, the body of evidence is strong enough to suggest scenario-based training is effective for training clinicians in the use of the EHR. However, it is recommended that scenario-based training is used as just one part of a more comprehensive clinician EHR training approach.

RECOMMENDATIONS

It is recommended that:

1. Scenario-based training is incorporated within EHR training programs to effectively train clinicians and used as part of a broader suite of EHR training modalities within a training package.
2. The utilisation and engagement with the breadth of interdisciplinary clinicians spanning the array of known clinical settings within the development and delivery of scenario based EHR training programs for clinicians are essential.
3. Engagement with front end clinicians will help facilitate the embedding of unique clinician workflows within specific EHR training tailored to the individual nuances of each clinical role, serving to improve their ability to use the EHR.

LIMITATIONS

The limitations of this Systematic Literature Review include those caused by the usage of non-standard and sometimes broad definitions. As a result, there is a lack of standardised terminology for scenario-based training. The terms: case scenarios, simulation, dress rehearsals and virtual EHR were used relating to studies focusing on scenario based EHR training of clinicians.

More equitable representation of clinical disciplines and their specialities is required and it is recognised that there was an under-representation of some clinical specialties and disciplines within the evidence base. This highlights the need for more diversity within the roles of clinician participants in studies enquiring into scenario-based training of clinicians in their use of the EHR. This limitation illustrates that not all healthcare professional disciplines that require the use of the EHR have garnered sufficient evidence about the success or otherwise of scenario-based training to use EHR, which is discipline-specific.

Finally, there is a limitation in this SLR due to the lack of credible research contextualised to the Australian experience.

References

1. Scott IA, Sullivan C, Staib A. Going digital: a checklist in preparing for hospital-wide electronic medical record implementation and digital transformation. Aust Health Rev. 2019;43(3):302-13.
2. Eriksson CO, Stoner RC, Eden KB, Newgard CD, Guise JM. The Association Between Hospital Capacity Strain and Inpatient Outcomes in Highly Developed Countries: A Systematic Review. J Gen Intern Med. 2017;32(6):686-96.
3. Greaves J, Goodall D, Berry A, Shrestha S, Richardson A, Pearson P. Nursing workloads and activity in critical care: A review of the evidence. Intensive Crit Care Nurs. 2018;48:10-20.
4. Owens J, Singh G, Cribb A. Austerity and Professionalism: Being a Good Healthcare Professional in Bad Conditions. Health Care Anal. 2019;27(3):157-70.

5. Herrmann-Werner, Holderried M, Loda T, Malek N, Zipfel S, Holderried F. Navigating Through Electronic Health Records: Survey Study on Medical Students' Perspectives in General and With Regard to a Specific Training. JMIR Med Inform. 2019;7(4):e12648.
6. Barker LT, Bond WF, Vincent AL, Cooley KL, McGarvey JS, Vozenilek JA, et al. A novel in situ simulation framework for introduction of a new technology: the 3-Act-3-Debrief model. Adv Simul (Lond). 2020;5:25.
7. Trigueros O, Blanco A, Lebena N, Casillas A, Perez A. Explainable ICD multi-label classification of EHRs in Spanish with convolutional attention. Int J Med Inform. 2022;157:104615.
8. Dinh-Le C, Chuang R, Chokshi S, Mann D. Wearable Health Technology and Electronic Health Record Integration: Scoping Review and Future Directions. JMIR Mhealth Uhealth. 2019;7(9):e12861.
9. Ritchie J, Welch B. Categorization of Third-Party Apps in Electronic Health Record App Marketplaces: Systematic Search and Analysis. JMIR Med Inform. 2020;8(5):e16980.
10. Jones OT, Calanzani N, Saji S, Duffy SW, Emery J, Hamilton W, et al. Artificial Intelligence Techniques That May Be Applied to Primary Care Data to Facilitate Earlier Diagnosis of Cancer: Systematic Review. J Med Internet Res. 2021;23(3):e23483.
11. Obeid JS, Khalifa A, Xavier B, Bou-Daher H, Rockey DC. An AI Approach for Identifying Patients With Cirrhosis. J Clin Gastroenterol. 2021;Publish Ahead of Print.
12. Si Y, Du J, Li Z, Jiang X, Miller T, Wang F, et al. Deep representation learning of patient data from Electronic Health Records (EHR): A systematic review. J Biomed Inform. 2021;115:103671.
13. Mohan V, Garrison C, Gold JA. Using a New Model of Electronic Health Record Training to Reduce Physician Burnout: A Plan for Action. JMIR Med Inform. 2021;9(9):e29374.
14. Adjerid I, Adler-Milstein J, Angst C. Reducing Medicare Spending Through Electronic Health Information Exchange: The Role of Incentives and Exchange Maturity. Information Systems Research. 2018;29(2):341-61.
15. Alzoubi H, Alzubi R, Ramzan N, West D, Al-Hadhrami T, Alazab M. A Review of Automatic Phenotyping Approaches using Electronic Health Records. Electronics. 2019;8(11):1235.
16. Kruse CS, Beane A. Health Information Technology Continues to Show Positive Effect on Medical Outcomes: Systematic Review. J Med Internet Res. 2018;20(2):e41.
17. Lin SC, Jha AK, Adler-Milstein J. Electronic Health Records Associated With Lower Hospital Mortality After Systems Have Time To Mature. Health Aff (Millwood). 2018;37(7):1128-35.
18. Granit V, Grignon AL, Wuu J, Katz J, Walk D, Hussain S, et al. Harnessing the power of the electronic health record for ALS research and quality improvement: CReATe CAPTURE-ALS and the ALS Toolkit. Muscle Nerve. 2022;65(2):154-61.
19. Moerenhout T, Fischer GS, Devisch I. The elephant in the room: a postphenomenological view on the electronic health record and its impact on the clinical encounter. Med Health Care Philos. 2020;23(2):227-36.
20. Zhu A, Zeng D, Shen L, Ning X, Li L, Zhang P. A super-combo-drug test to detect adverse drug events and drug interactions from electronic health records in the era of polypharmacy. Stat Med. 2020;39(10):1458-72.
21. Rosenfield D, Harvey G, Jessa K. Implementing electronic medical records in Canadian emergency departments. CJEM. 2019;21(1):15-7.
22. Herrmann-Werner A, Holderried M, Loda T, Malek N, Zipfel S, Holderried F. Navigating Through Electronic Health Records: Survey Study on Medical Students' Perspectives in General and With Regard to a Specific Training. JMIR Medical Informatics. 2019;7(4).
23. Eden R, Burton-Jones A, Grant J, Collins R, Staib A, Sullivan C. Digitising an Australian university hospital: qualitative analysis of staff-reported impacts. Aust Health Rev. 2020;44(5):677-89.
24. Holmgren AJ, Pfeifer E, Manojlovich M, Adler-Milstein J. A Novel Survey to Examine the Relationship between Health IT Adoption and Nurse-Physician Communication. Appl Clin Inform. 2016;7(4):1182-201.
25. Bailey JE, Pope RA, Elliott EC, Wan JY, Waters TM, Frisse ME. Health information exchange reduces repeated diagnostic imaging for back pain. Ann Emerg Med. 2013;62(1):16-24.
26. Calder-Sprackman S, Clapham G, Kandiah T, Choo-Foo J, Aggarwal S, Sweet J, et al. The impact of adoption of an electronic health record on emergency physician work: A time motion study. J Am Coll Emerg Physicians Open. 2021;2(1):e12362.

27. Coleman C, Gotz D, Eaker S, James E, Bice T, Carson S, et al. Analysing EHR navigation patterns and digital workflows among physicians during ICU pre-rounds. Health Inf Manag. 2021;50(3):107-17.

28. Longhurst CA, Davis T, Maneker A, Eschenroeder HC, Jr., Dunscombe R, Reynolds G, et al. Local Investment in Training Drives Electronic Health Record User Satisfaction. Appl Clin Inform. 2019;10(2):331-5.

29. Kuek A, Hakkennes S. Healthcare staff digital literacy levels and their attitudes towards information systems. Health Informatics J. 2020;26(1):592-612.

30. Bureš V, Čech P, Husáková M, Kokštein Z, Kříž P, Krylová K, et al. Use of virtual medical cases as a learning tool in medicine. Interactive Learning Environments. 2020;29(2):231-46.

31. Smith JN, Scholtz JM. Impact of a simulated electronic health record on pharmacy students' perceptions of preparedness for clinical practice. Curr Pharm Teach Learn. 2018;10(12):1624-30.

32. Tudor Car L, Soong A, Kyaw BM, Chua KL, Low-Beer N, Majeed A. Health professions digital education on clinical practice guidelines: a systematic review by Digital Health Education collaboration. BMC Med. 2019;17(1):139.

33. Gonzalez JJ, Houchens N, Gupta A. Quality & safety in the literature: May 2021. BMJ Qual Saf. 2021;30(5):432-6.

34. Khairat S, Coleman C, Ottmar P, Jayachander DI, Bice T, Carson SS. Association of Electronic Health Record Use With Physician Fatigue and Efficiency. JAMA Netw Open. 2020;3(6):e207385.

35. Melnick ER, Dyrbye LN, Sinsky CA, Trockel M, West CP, Nedelec L, et al. The Association Between Perceived Electronic Health Record Usability and Professional Burnout Among US Physicians. Mayo Clin Proc. 2020;95(3):476-87.

36. Menon NK, Shanafelt TD, Sinsky CA, Linzer M, Carlasare L, Brady KJS, et al. Association of Physician Burnout With Suicidal Ideation and Medical Errors. JAMA Netw Open. 2020;3(12):e2028780.

37. Coons JC, Kobulinsky L, Farkas D, Lutz J, Seybert AL. Virtual Electronic Health Record Technology with Simulation-Based Learning in an Acute Care Pharmacotherapy Course. Pharmacy (Basel). 2018;6(4).

38. Miller ME, Scholl G, Corby S, Mohan V, Gold JA. The Impact of Electronic Health Record-Based Simulation During Intern Boot Camp: Interventional Study. JMIR Med Educ. 2021;7(1):e25828.

39. Ray S, Bellone J, Zupec N, Bartelme K. Retention of Students' Ability to Incorporate a Computer into Simulated Patient Encounters. Am J Pharm Educ. 2018;82(10):6748.

40. Graber ML, Siegal D, Riah H, Johnston D, Kenyon K. Electronic Health Record-Related Events in Medical Malpractice Claims. J Patient Saf. 2019;15(2):77-85.

41. Ting J, Garnett A, Donelle L. Nursing education and training on electronic health record systems: An integrative review. Nurse Educ Pract. 2021;55:103168.

42. Kmet LM, Cook LS, Lee RC. Standard quality assessment criteria for evaluating primary research papers from a variety of fields. 2004.

43. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. J Clin Epidemiol. 2009;62(10):1006-12.

44. Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. BMJ. 2015;350:g7647.

45. Kmet L, Cook L, Lee R. Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields. University of Alberta Libraries; 2004.

46. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ. 2021;372:n71.

47. Champagne-Langabeer T, Revere L, Tankimovich M, Yu E, Spears R, Swails JL. Integrating Diverse Disciplines to Enhance Interprofessional Competency in Healthcare Delivery. Healthcare (Basel). 2019;7(2):75.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

KNOWLEDGE, ATTITUDE, AND PRACTICE AMONG HEALTHCARE PROFESSIONALS REGARDING MYTHS OF COVID-19 VACCINATION: A CROSS-SECTIONAL QUESTIONNAIRE STUDY AND DEMYSTIFICATION

Lokesh Kumar S[1], Zameera Naik[2], Arun Panwar[2], Sridhar M[2], Vaishali Keluskar[2], Ram Surath Kumar K[3]*

1. Department of Oral Medicine, Radiology, and Special Care Dentistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), 162, Poonamalle High Road, Chennai- 600077, Tamil Nadu, India.
2. Department of Oral Medicine and Radiology, KAHER's KLE Vishwanath Katti Institute of Dental Sciences, KLE Academy of Higher Education and Research (KAHER), JNMC Campus, Belagavi- 590010, Karnataka, India.
3. Department of Public Health Dentistry, KAHER's KLE Vishwanath Katti Institute of Dental Sciences, KLE Academy of Higher Education and Research (KAHER), JNMC Campus, Belagavi- 590010, Karnataka, India.

*Correspondence: lokemar95@gmail.com

ABSTRACT

BACKGROUND:

COVID-19 vaccine is the mighty weapon opted by all the countries across the globe in an attempt to eradicate the fatal COVID-19 pandemic. The myths of the COVID-19 vaccine are spreading widely, causing a hindrance to this noble preventive measure. The prevalence of such myths among healthcare professionals may be toxic and deadly.

AIM AND OBJECTIVES:

To assess the knowledge, attitude, and practice of the healthcare professionals regarding the myths on COVID-19 vaccination and to demystify them.

MATERIALS AND METHODS:

An 18-item questionnaire evaluating knowledge, attitude, and practice based on the existing myths on COVID-19 vaccination was circulated through Google Forms® among 412 healthcare professionals of six disciplines belonging to a private university. The responses obtained were subjected to statistical analysis using the SPSS® 20 software package.

RESULTS:

A total of 385 health professionals participated in this study. The majority of them reported medium knowledge (165) and positive attitude (273) with the mean knowledge and attitude scores of 3.82 ± 1.55 out of 6 and 4.3 ± 1.58 out of 7, respectively. Even though 312 participants got vaccinated, 73 of them failed to receive it. The knowledge scores showed a high statistically significant difference among the participants of different designations ($p=0.001$), but not with gender, field, and staff with different years of experience ($p>0.05$). The attitude scores were statistically different among participants of fields and designation ($p<0.05$) but not among genders ($p=0.31$) and staff with different years of experience ($p=0.87$). Knowledge and attitude scores showed a positive linear correlation and a high statistically significant difference ($p<0.001$).

CONCLUSION:

This study recommends more enhanced education programs on COVID-19 vaccination for health professionals and demands an improved knowledge, attitude, and practice among health professionals to achieve the goal of 100% vaccination so as to eradicate the COVID-19 pandemic.

KEYWORDS
COVID-19; COVID-19 vaccines; health personnel; knowledge; attitude; immunization programs; cross-sectional studies; vaccines in developing countries.

INTRODUCTION

The World Health Organization (WHO) office in China was alerted by the Health Authority of China on 31st December 2019 about the outbreak of 27 pneumonia cases of unknown etiology in its Wuhan city of Central China.[1] Since then, the viral disease had spread to the whole world involving almost all countries at an exponential rate, making it a global health emergency. WHO first termed the causative agent as 2019-novel-Corona Virus(2019-n-COV), which was later renamed by the Corona Virus Study Group to be Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2) that causes the disease called Corona Virus Disease 2019 (COVID-19).[2] After thorough surveillance of the etiology, mode of spread, symptoms, severity, and fatality on a global scale, WHO declared the SARS-CoV-2/ corona virus disease (COVID-19) outbreak as a Public Health Emergency of International Concern (PHEIC) or a pandemic on 30th January, 2020.[3]

Human life has been affected in all dimensions, such as in terms of physical, mental, social and behavioral well-being by putting the world to halt.[4,5,6,7] WHO Global COVID-19 statistics reported a total of 559,469,605 confirmed cases of COVID-19, including 6,361,157 deaths as of 18th July, 2022.[8] The Governments of all the countries are making mammoth efforts and facing a gargantuan struggle to bring the situation under control by adopting measures like lockdown, restrictions, other important political decisions, and especially mass-scale vaccination drives which seem to be a promising measure.[9]

Various researchers around the world started their research on vaccine development since the outbreak and few reaped successes despite the isolation of 30 different strains across the globe in just 6 months.[10] As of 11th January 2022, a total of 22 COVID-19 vaccines across the globe have been added within the WHO Emergency Usage Listing (EUL)/ Prequalification (PQ) process, with a few finalized among them.[11] The focus of the global Target Product Profile (TPP) for COVID-19 vaccine is on vaccination for people under a high-risk category like healthcare workers, to provide long-term protection and rapid inception of immunity in outbreak settings.[12] A total of 12,130,881,147 vaccine doses have been administered globally as of 11th July 2022. [8]

India launched its vaccination drive on 16th January 2021, starting with healthcare and frontline workers [13], and achieved 1,991,138,096 vaccine doses as of 11th July 2022 including the general population.[14] {Covishield™} from Serum Institute of India Pvt Ltd and {Covaxin™} from Bharat Biotech, India were the two vaccines administered in India's vaccination drive, where healthcare workers being mostly vaccinated with the former. Despite the massive efforts undertaken by the Government to develop a safe and efficacious vaccine, hesitance to accept the vaccine among the people is still persistent.[15]

Myth is a folklore genre, that consists of stories/ narratives, playing an important role in people's daily life.[16] Despite the awareness campaigns among the public to get vaccinated, several myths and misconceptions prevail among the public regarding COVID-19 vaccines. These myths are spread by word of mouth and social media that may convince the public the other way, reducing the needed health practices, resulting in dangerous health hazards. Such beliefs can be harmful to society since they cause clamor and disarray among the population. They also hamper the Government's goals and efforts to eradicate and control the COVID-19 pandemic. Healthcare professionals play a pivotal role in creating awareness and promoting vaccination drive among the general public that demands superior knowledge about the facts on the COVID-19 vaccine. To the best of our knowledge, there are no studies in the literature that assess the prevalence of myths/misconceptions or knowledge about COVID-19 vaccination among healthcare professionals. Hence, the current study is first of its kind and aims to assess the knowledge, attitude, and practice among healthcare professionals regarding myths/misconceptions on COVID-19 vaccination and to demystify them with facts.

METHODS

The myths regarding COVID-19 vaccination could be hazardous, especially if it is prevailing among healthcare

professionals. In order to assess the same and demystify with scientific facts, the present questionnaire cross sectional study was conducted among the health professionals involving post-graduates, teaching staff, and teaching staff cum consultants between 20 to 65 years of age from the six constituent colleges of a private University in Belagavi District of North Karnataka, India who were included by simple random sampling.

Ethical clearance from the Institutional Research and Ethics Committee (Ref No: 1445) was received for this study. The study was conducted in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as amended in 2013.

The sample population involved the participants from the six disciplines of healthcare namely Medicine, Dentistry, Nursing, Physiotherapy, Ayurveda and Pharmacy.

A self-designed 18-item pre-validated questionnaire, based on the myths/misconceptions regarding COVID-19 vaccine, known to prevail among the general public obtained from the various internet sources like the official sites of Centres for Disease Control and Prevention (Department of Health and Human Services, USA), University of Missouri Healthcare, IndiaToday etc., was used. A pilot study was conducted using the prefinal version of the questionnaire among the 30 health professionals to check for any problems related to ambiguity of words, understanding the questionnaire, and other associated problems. The reliability of the questionnaire was checked by utilizing the Cronbach"s alpha test and the value of Cronbach's alpha coefficient was 0.85. The validity of the self-designed questionnaire was checked using face validity (86%) and content validity ratio (0.79). The sample size was estimated to be 376 using the formula $n= (Z_{1-\alpha/2} + Z_{1-\beta})^2 (SD_1^2 + SD_2^2)/ (\bar{x}_1 - \bar{x}_2)^2$, where z= 1.96, α= 5%, 1-β= 90%, SD_1= 2.81, SD_2= 4.92, $\bar{x}_1$= 6.18, and $\bar{x}_2$= 5.23 (derived from pilot study).

After getting prior permission from the respective college authorities, the questionnaire was distributed to the healthcare professionals in the {Google Forms®} link format, (this questionnaire is available at https://forms.gle/CUx2pdqCuyesqFfb9) by visiting them in person and giving them enough time to fill, without any time limit. All the questions were set as being mandatory to answer. The questionnaire comprised of 18 questions which involved 16 closed-ended questions (1 evaluated the previous experience, 6 evaluated knowledge, 7 evaluated attitude, and 2 evaluated the practice regarding COVID-19 vaccination) and 2 open-ended questions demanding to reason. The questionnaire link was sent to a total of 412 health professionals and this cross-sectional study spanned 2 months from May to June 2021.

Knowledge scores were calculated based on the participants' responses to the 6 knowledge-based questions, where the correct and incorrect responses were coded as "1" and "0" respectively. Hence, the maximum knowledge score was set at 6 and was graded as follows: 0-2= low, 3-4= medium, and 5-6= high. Similarly, the correct and the incorrect response in regard to 7 attitude-related questions were coded as "1" and "0" respectively. Thus, the maximum attitude score was set at 7 and was graded as follows: 0-3= negative and 4-7= positive. The responses from the pilot study were excluded from the main analysis.

STATISTICAL ANALYSIS:

The data obtained were subjected to statistical analysis using {IBM-SPSS® 20, USA} software package. The normality distribution of the study data was assessed by the Shapiro-Wilk test to find it out to be not normally distributed ($p<0.05$). Consecutively, descriptive statistics for the frequency distribution and percentage of healthcare professionals, Chi-square test for the association between the variables of the study and knowledge and attitude questions, Mann-Whitney U test for the significance among gender, and Kruskal-Wallis test for the significance among the other study variables were applied. Additionally, the correlation between the knowledge and attitude scores was evaluated by Spearman's rank correlation coefficient test whereas, their association with the demographic details of the healthcare professionals was analyzed by simple linear regression and multivariate linear regression analysis. The statistical significance was set at $p \leq 0.05$ for all the tests.

RESULTS:

A total of 385 responses (185 males and 200 females) were recorded out of the 412 invited health professionals with a response rate of 93.44%, who were participants from fields of Medicine (92), Dentistry (118), Nursing (44), Physiotherapy(68), Pharmacy(32), and Ayurveda(31). The maximum number of participants were post-graduates (304) and others being teaching staff (23) and teaching

staff cum consultants who were in clinical practice (58). Among the staff, the majority of them had an experience of 0-4 years (21) and 4-8 years (20) whereas others had above 8 years (40). The characteristics of the health professionals who participated in the study are given in Table 1.

All the health professionals received the {COVISHIELD™} vaccine manufactured by the Serum Institute of India Pvt Ltd. Among the 385 health professionals, 312 got themselves vaccinated and 73 did not take the vaccination. The reasons given for not getting vaccinated included the question on the safety of the vaccine, chances of testing positive even after vaccination, possible side effects and death, the emergence of different new strains of COVID-19 virus, lactating mother, and incomplete clinical trials.

TABLE 1: CHARACTERISTICS OF THE STUDY PARTICIPANTS

Characteristics	n (%)
Gender	
Male	185 (48.1)
Female	200 (51.9)
Total	385 (100)
Field	
Medicine	92 (23.9)
Dentistry	118 (30.6)
Nursing	44 (11.4)
Physiotherapy	68 (17.7)
Pharmacy	32 (8.3)
Ayurveda	31 (8.1)
Designation	
Post-graduates	304 (79)
Teaching staffs	23 (6)
Teaching staff and consultants	58 (15.1)
Experience among the staffs	
0-4 years	21 (26)
4-8 years	20 (24.6)
>8 years	40 (49.4)
Total	81 (100)

Fifty-three health professionals answered that they had been tested positive for COVID-19 infection before, out of which, 45 participants still took the vaccine and 8 of them did not take it. The majority of the health professionals (306) considered the COVID-19 vaccine to be safe, whereas 23 considered it to be unsafe and 56 did not know regarding the safety of the vaccine. Interestingly, 43 of the 306 participants who considered the vaccine to be safe did not get vaccinated and 14 of the 23 participants who considered the vaccine to be unsafe got vaccinated. On the other hand, 35 of the 56 participants who did not know whether the COVID-19 vaccine is safe got vaccinated. The responses of the health professionals for the questions on COVID-19 vaccination and its myths/ misconceptions are presented in Table 2.

TABLE 2: RESPONSES FOR THE QUESTIONS ON COVID-19 VACCINATION AND ITS MYTHS/ MISCONCEPTIONS AMONG HEALTH PROFESSIONALS

Question	Response	Medicine	Dentistry	Nursing	Physiotherapy	Pharmacy	Ayurveda	p-Value
		Number (% within group)						
Were you tested positive for COVID-19 before?	Yes	20 (37.7)	14 (26.4)	4 (7.5)	8 (15.1)	4 (7.5)	3 (5.7)	0.32
	No	72 (21.7)	104 (31.3)	40 (12)	60 (18.1)	28 (8.4)	28 (8.4)	
Have you got vaccinated for COVID-19?	Yes	76 (24.4)	110 (35.3)	38 (12.2)	62 (19.9)	12 (3.8)	14 (4.5)	0.00*
	No	16 (21.9)	8 (11)	6 (8.2)	6 (8.2)	20 (27.4)	17 (23.3)	
Do you feel COVID-19 Vaccine safe?	Yes**	84 (27.5)	90 (29.4)	32 (10.5)	52 (17)	30 (9.8)	18 (5.9)	0.00*
	No	8 (34.8)	5 (21.7)	0 (0)	8 (34.8)	0 (0	2 (8.7)	
	I don't know	0 (0)	23 (41.1)	12 (21.4)	8 (14.3)	2 (3.6)	11 (19.6)	

Do you feel COVID-19 Vaccine trials are being rushed?	Yes No** I don't know	46 (26) 24 (17.9) 22 (29.7)	69 (39) 39 (29.1) 10 (13.5)	10 (5.6) 18 (13.4) 16 (21.6)	26 (14.7) 30 (22.4) 12 (16.2)	14 (7.9) 12 (9) 6 (8.1)	12 (6.8) 11 (8.2) 8 (10.8)	0.001*
COVID-19 Vaccine will change your DNA	True False** I don't know	6 (31.6) 66 (24.7) 20 (20.2)	3 (15.8) 83 (31.1) 32 (32.3)	2 (10.5) 32 (12) 10 (10.1)	6 (31.6) 44 (16.5) 18 (18.2)	2 (10.5) 24 (9) 6 (6.1)	0 (0) 18 (6.7) 13 (13.1)	0.34
COVID-19 vaccine has mild side effects like headache, nausea, chills, myalgia etc	True** False I don't know	88 (23.9) 4 (44.4) 0 (0)	115 (31.3) 2 (22.2) 1 (12.5)	44 (12) 0 (0) 0 (0)	68 (18.5) 0 (0) 0 (0)	30 (8.2) 2 (22.2) 0 (0)	23 (6.3) 1 (11.1) 7 (87.5)	0.00*
COVID-19 vaccine has severe side effects such as allergic reactions in majority	True False** I don't know	40 (33.6) 32 (18.8) 20 (20.8)	46 (38.7) 49 (28.8) 23 (24)	10 (8.4) 22 (12.9) 12 (12.5)	10 (8.4) 36 (21.2) 22 (22.9)	6 (5) 20 (11.8) 6 (6.3)	7 (5.9) 11 (6.5) 13 (13.5)	0.001*
COVID-19 vaccine causes infertility	True False** I don't know	4 (28.6) 64 (26.8) 24 (18.2)	2 (14.3) 72 (30.1) 44 (33.3)	2 (14.3) 26 (10.9) 16 (12.1)	4 (28.6) 44 (18.4) 20 (15.2)	0 (0) 16 (6.7) 16 (12.1)	2 (14.3) 17 (7.1) 12 (9.1)	0.35
Do you think people who had been diagnosed with COVID-19 don't need to receive the vaccine?	Yes No** I don't know	14 (26.9) 58 (21) 20 (35.1)	16 (30.8) 83 (30.1) 19 (33.3)	12 (23.1) 32 (11.6) 0 (0)	2 (3.8) 60 (21.7) 6 (10.5)	2 (3.8) 26 (9.4) 4 (7)	6 (11.5) 17 (6.2) 8 (14)	0.00*
One can get COVID-19 infection from COVID-19 vaccine	True False** I don't know	26 (37.1) 58 (22.5) 8 (14)	17 (24.3) 80 (31) 21 (36.8)	10 (14.3) 34 (13.2) 0 (0)	8 (11.4) 48 (18.6) 12 (21.1)	4 (5.7) 22 (8.5) 6 (10.5)	5 (7.1) 16 (6.2) 10 (17.5)	0.001*
Once we receive the vaccine, we	True False**	40 (31) 30 (17.9)	40 (31) 50 (29.8)	10 (7.8) 28 (16.7)	22 (17.1) 32 (19)	8 (6.2) 16 (9.5)	9 (7) 12 (7.1)	0.13

would test positive for COVID- 19 (from the vaccine itself)	I don't know	22 (25)	28 (31.8)	6 (6.8)	14 (15.9)	8 (9.1)	10 (11.4)	
Do you think if you are not at risk of severe complications of COVID-19, you need not get vaccinated?	Yes No** I don't know	6 (10.5) 66 (24.6) 20 (33.3)	12 (21.1) 94 (35.1) 12 (20)	14 (24.6) 26 (9.7) 4 (6.7)	10 (17.5) 48 (17.9) 10 (16.7)	8 (14) 18 (6.7) 6 (10)	7 (12.3) 16 (6) 8 (13.3)	0.001*
Do you feel that you will be at greater risk for other infections due to reduced immunity after getting vaccinated for COVID-19?	Yes No** I don't know	8 (18.6) 60 (22.1) 24 (34.3)	11 (25.6) 87 (32) 20 (28.6)	6 (14) 38 (14) 0 (0)	6 (14) 52 (19.1) 10 (14.3)	6 (14) 20 (7.4) 6 (8.6)	6 (14) 15 (5.5) 10 (14.3)	0.005*
Do you think vaccine trials being halted means there are problems with the drug candidates?	Yes No** I don't know	28 (27.5) 38 (25.9) 26 (19.1)	37 (36.3) 36 (24.5) 45 (33.1)	12 (11.8) 20 (13.6) 12 (8.8)	10 (9.8) 36 (24.5) 22 (16.2)	8 (7.8) 10 (6.8) 14 (10.3)	7 (6.9) 7 (4.8) 17 (12.5)	0.022*
Do you think you need not wear a mask or follow social distancing guidelines after COVID-19 vaccination?	Yes No** I don't know	12 (18.8) 78 (25.2) 2 (16.7)	17 (26.6) 96 (31.1) 5 (41.7)	8 (12.5) 36 (11.7) 0 (0)	14 (21.9) 54 (17.5) 0 (0)	6 (9.4) 26 (8.4) 0 (0)	7 (10.9) 19 (6.1) 5 (41.7)	0.019*
Do you feel COVID-19 vaccine is the answer to the end of corona virus infection?	Yes No** I don't know	14 (15.4) 74 (29.4) 4 (9.5)	30 (33) 66 (26.2) 22 (52.4)	16 (17.6) 28 (11.1) 0 (0)	18 (19.8) 44 (17.5) 6 (14.3)	6 (6.6) 24 (9.5) 2 (4.8)	7 (7.7) 16 (6.3) 8 (19)	0.00*

*Statistically significant p≤0.05, **correct respon

KNOWLEDGE ABOUT COVID-19 VACCINATION AND MISCONCEPTIONS

The majority of the health professionals (165) had a medium knowledge score whereas, 139 and 81 participants had high and low knowledge scores respectively [Figure 1]. A Kruskal-Wallis test depicted that there was no significant difference (p>0.05) in the knowledge scores between the

health professionals of different fields, the staffs with different years of experience (0-4 years, 4-8 years, and >8 years), however, showed a high statistically significant difference between the different designations (p=0.001). A Mann-Whitney U test showed that there was no significant difference in the knowledge scores between the health professionals of different gender (p=0.84) [Table 3]. The mean knowledge score among the health professionals was 3.82 ± 1.55 out of 6 with the highest in teaching staff cum consultant (4.64 ± 2) among designations and in staffs with the experience of 4-8 years (4.7 ± 1.34). The knowledge scores of postgraduates, teaching staff, staff with experience of 0-4 years and above 8 years were 3.72 ± 1.53, 3.39 ± 1.61, 4.05 ± 1.85, and 3.95 ± 1.50 respectively.

FIGURE 1: KNOWLEDGE SCORE AMONG HEALTH PROFESSIONALS.

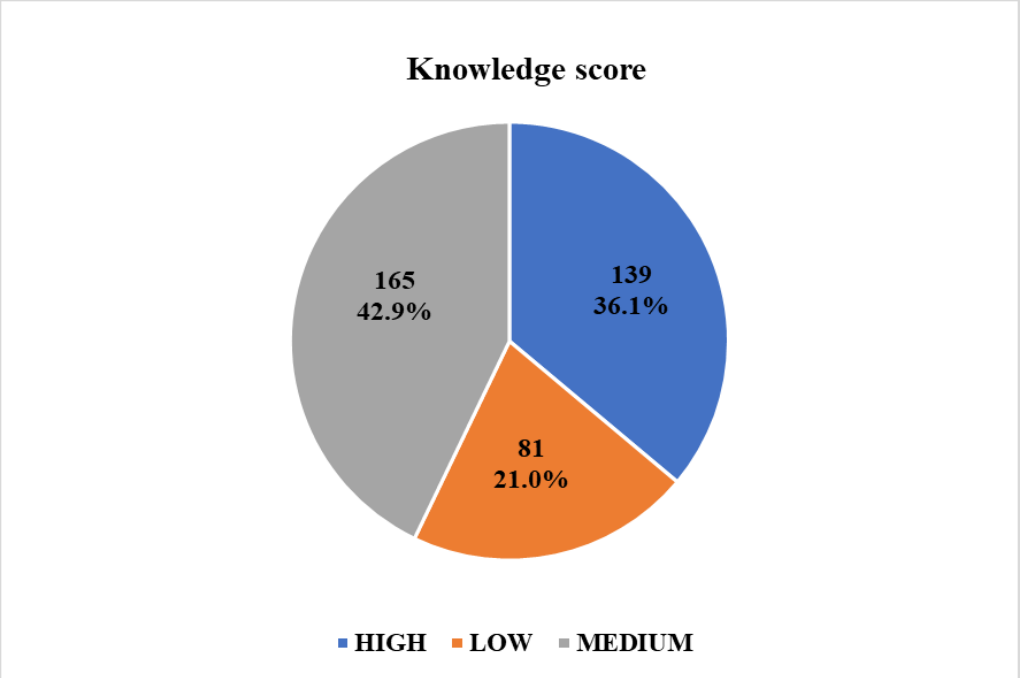


TABLE 3: KNOWLEDGE SCORES AMONG HEALTH PROFESSIONALS

Knowledge score	(n) mean ± SD							
	Medicine	Dentistry	Nursing	Physiotherapy	Pharmacy	Ayurveda	Rank	p-value
Total**	(92) 3.67 ± 1.44	(118) 3.89 ± 1.94	(44) 4.23 ± 1.49	(68) 4.00 ± 1.47	(32) 4.00 ± 1.30	(32) 4.00 ± 1.30	-	0.09
Based on gender***								
Male	(84) 3.69 ± 1.50	(44) 4.11 ± 2.33	(14) 4.86 ±1.41	(16) 3.88 ± 1.41	(8) 4.50 ± 0.53	(19) 3.11 ± 1.88	194.18	0.84
Female	(8) 3.50 ± 0.53	(74) 3.76 ± 1.67	(30) 3.93 ± 1.46	(52) 4.04 ± 1.49	(24) 3.83 ± 1.43	(12) 3.17 ± 1.64	191.91	
Based on designation**								
Post-graduate	(82) 3.71 ± 1.36	(92) 3.61 ± 1.65	(24) 4.42 ± 1.28	(48) 3.92 ± 1.51	(30) 4.00 ± 1.34	(28) 2.96 ± 1.77	186.37	0.001*
Teaching Staffs	(2) 3.00 ± 0.00	(13) 3.69 ± 1.49	(2)	(6) 3.67 ± 1.86	(0) -	(0) -	161.15	

			1.00 ± 0.00					
Teaching staff and consultant	(8) 3.50 ± 2.33	(13) 6.08 ± 2.84	(18) 4.33 ± 1.46	(14) 4.43 ± 1.09	(2) 4.00 ± 0.00	(3) 4.67 ± 0.58	240.40	
Based on years of experience among staff**								
0-4 years	(8) 3.25 ± 2.31	(2) 4.00 ± 1.90	(6) 5.00 ± 1.55	(4) 4.00 ± 1.15	(0) -	(1) 5.00 ± 0.00	40.19	0.16
4-8 years	(2) 4.00 ± 0.00	(6) 4.00 ± 1.90	(6) 4.67 ± 1.03	(6) 5.67 ± 0.52	(0) -	(0) -	49.25	
>8 years	(0) -	(18) 4.72 ± 1.41	(8) 2.75 ± 1.58	(10) 3.40 ± 1.07	(2) 4.00 ± 0.00	(2) 4.50 ±0.71	37.30	

*Statistically significant p≤0.05, **Kruskal-Wallis Test, ***Mann-Whitney U Test.

ATTITUDE ABOUT COVID-19 VACCINATION AND ITS MISCONCEPTIONS

The majority of the health professionals (273) had a positive attitude towards the COVID-19 vaccination but on the other hand, 112 participants had a negative attitude [Figure 2]. There was a statistically significant difference in the attitude scores ($p<0.05$) between the health professionals of different fields and different designations but was not significant between the staff with different years of experience ($p=0.87$) when tested by the Kruskal-Wallis test. Mann-Whitney U test for the attitude scores between the male and female health professionals depicted that they were not statistically significant with a p-value of 0.31 [Table 4]. The mean attitude score among the participants was 4.3 ± 1.58 out of 7 with the highest in teaching staff cum consultant among designations and in staff with experience of 4-8 years (4.80 ± 1.28). The attitude scores of postgraduates, teaching staff, staff with experience of 0-4 years and above 8 years were 4.21 ± 1.61, 4.09 ± 1.47, 4.52 ± 1.40, and 4.6 ± 1.5 respectively.

FIGURE 2: ATTITUDE SCORE AMONG HEALTH PROFESSIONALS

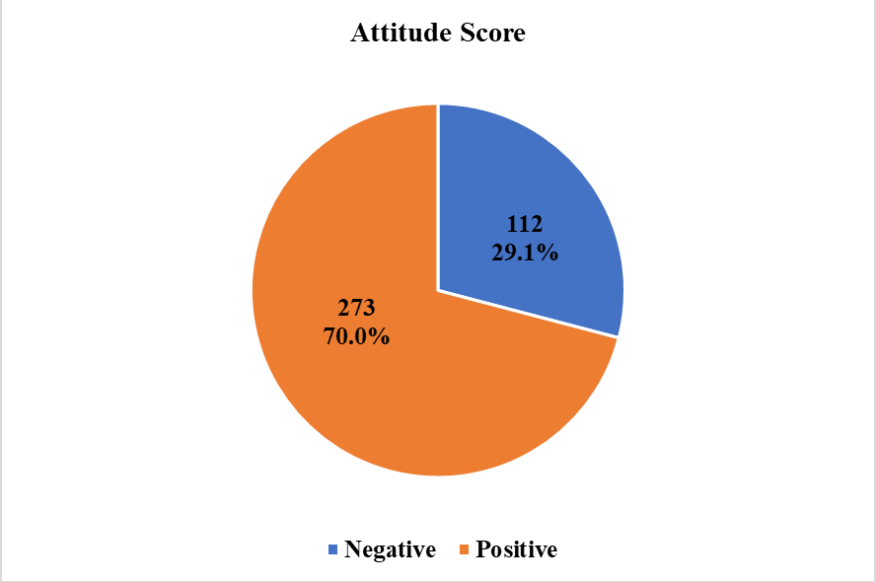


TABLE 4: ATTITUDE SCORES AMONG HEALTH PROFESSIONALS

Attitude score	(n) mean ± SD							
	Medicine	Dentistry	Nursing	Physiotherapy	Pharmacy	Ayurveda	Rank	p-value
Total**	(92) 4.39 ± 1.33	(118) 4.19 ± 1.55	(44) 4.41 ± 1.45	(68) 4.74 ± 1.85	(32) 4.38 ± 1.13	(31) 3.23 ± 1.84	-	0.002*
Based on gender***								
Male	(84) 4.52 ± 1.32	(44) 4.11 ± 1.42	(14) 4.14 ± 1.51	(16) 4.63 ± 1.71	(8) 4.25 ± 0.46	(19) 3.11 ± 1.85	187.12	0.31
Female	(8) 3.00 ± 0.00	(74) 4.24 ± 1.64	(30) 4.53 ± 1.43	(52) 4.77 ± 1.91	(24) 4.42 ± 1.28	(12) 3.42 ± 1.88	198.44	
Based on designation**								
Post-graduate	(82) 4.29 ± 1.32	(92) 4.05 ± 1.62	(24) 4.50 ± 1.64	(48) 4.71 ± 1.86	(30) 4.40 ± 1.16	(28) 3.18 ± 1.89	187.40	0.02*
Teaching Staff	(2) 6.00 ± 0.00	(13) 4.15 ± 1.14	(2) 3.00 ± 0.00	(6) 3.67 ± 2.07	(0) -	(0) -	176.93	
Teaching staff and consultant	(8) 5.00 ± 1.31	(13) 5.23 ± 1.01	(18) 4.44 ± 1.20	(14) 5.29 ± 1.64	(2) 4.00 ± 0.00	(3) 3.67 ± 1.53	228.71	
Based on years of experience among staff**								
0-4 years	(8) 5.25 ± 1.39	(2) 4.50 ± 0.71	(6) 4.00 ± 0.89	(4) 4.50 ± 1.73	(0) -	(1) 2.00 ± 0.00	56.78	0.87
4-8 years	(2) 5.00 ± 0.00	(6) 4.00 ± 1.26	(6) 5.00 ± 1.79	(6) 5.33 ± 0.52	(0) -	(0) -	60.73	
>8 years	(0) -	(18) 4.94 ± 1.16	(8) 4.00 ± 0.76	(10) 4.60 ± 2.46	(2) 4.00 ± 0.00	(2) 4.50 ± 0.71	56.66	

*Statistically Significant p-value≤0.05, **Kruskal-Wallis Test, ***Mann-Whitney U Test.

PRACTICES REGARDING COVID-19 VACCINATION AND ITS MISCONCEPTIONS

A greater number (312, 81.04%) of the health professionals got themselves vaccinated for COVID-19 infection, but 73 (18.96%) participants did not receive the vaccine that showed a high statistically significant difference among the different fields (p<0.001) using Chi-square test. The majority of the participants (309) answered that we should still need to wear a mask and follow the social distancing guidelines after COVID-19 vaccination, on the other hand, 64 of them answered that we need not follow, and 12 health professionals did not know what to be done. This was statistically significant, with a p-value of 0.019 among the health professionals of different fields.

ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND KNOWLEDGE/ATTITUDE SCORES

Simple linear regression analysis depicted a significant relationship between knowledge with designation (p=0.003, R=0.150) and years of experience among staff (p=0.026, R=0.113) but not with gender (p=0.981, R=0.001) and field (p=0.801, R=0.013). It also showed a significant relationship

between attitude with designation (p=0.009, R=0.132) but not with gender (p=0.550, R=0.031), field (p=0.149, R=0.074), and years of experience among staff (p=0.067, R=0.094). Multiple linear regression analysis revealed that the better knowledge scores were significantly associated with designation (p=0.003) but not with gender (p=0.76) and fields (p=0.68) having a positive correlation (R=0.152), whereas better attitude scores were significantly associated with designation (p=0.01, R=0.132) but not with gender (p=0.21) and field (p=0.07) having a positive correlation (R=0.166) [Table 5].

RELATIONSHIP BETWEEN THE KNOWLEDGE AND ATTITUDE SCORES

A positive linear correlation (r= +0.431) and a high statistically significant difference (p<0.001) between the knowledge and attitude scores among the health professionals were found by the Spearman's rank correlation coefficient test. The field-wise correlation data are presented in Table 6.

TABLE 5: MULTIVARIATE LINEAR REGRESSION ANALYSIS FOR THE ASSOCIATION BETWEEN DEMOGRAPHIC VARIABLES AND KNOWLEDGE AND ATTITUDE SCORES OF HEALTH PROFESSIONALS

Predictor		Coefficient β	SE	t	CI	p-value
Knowledge	Constant	3.36	0.30	11.30	2.76-3.96	0.00*
	Gender	0.05	0.16	0.31	-0.27-0.37	0.76
	Field	-0.02	0.05	-0.41	-0.12-0.08	0.68
	Designation	0.32	0.11	2.99	0.11-0.53	0.003*
Attitude	Constant	3.84	0.31	12.39	3.23-4.45	0.00*
	Gender	0.21	0.17	1.25	-0.12-0.54	0.21
	Field	-0.10	0.05	-1.83	-0.20-0.01	0.07
	Designation	0.30	0.11	2.74	0.08-0.51	0.01*

*Statistically significant p≤0.05

TABLE 6: CORRELATION BETWEEN KNOWLEDGE AND ATTITUDE SCORES AMONG HEALTHCARE PROFESSIONALS OF DIFFERENT FIELDS**

Groups	r	p- value
Medicine	+0.289	0.005*
Dentistry	+0.451	0.000*
Nursing	+0.379	0.011*
Physiotherapy	+0.436	0.000*
Pharmacy	+0.340	0.057
Ayurveda	+0.640	0.000*
Total	+0.431	0.000*

*Statistically significant p-value≤0.05, **Spearman's rank correlation coefficient test

DISCUSSION:

COVID-19 vaccine is considered an efficient measure to achieve herd immunity against this fatal pandemic.[17] Despite the efforts made by the governments to get all their citizens vaccinated, certain hurdles influence the people's acceptance of the COVID-19 vaccine, the most important being the myths/ misconceptions that are prevalent and shared through the various social media platforms which were also faced by the previous vaccination drives of rubella, mumps, measles, and polio.[18,19] In a survey conducted in 2020, almost one-third or more of the population globally answered that they might not receive

the first COVID-19 vaccines questioning their efficacy, side effects, and rushing through the regulatory approval procedures.[20] This study was conducted among the health professional population, as they are very crucial for creating awareness and promoting the COVID-19 vaccine owing to their direct interactions with the public. The prevalence of these myths/misconceptions among healthcare professionals may prove toxic as they are responsible for being the advocates and ambassadors for the vaccination drive.

The majority of the participants (58%) felt that the vaccine trials are being rushed (171) or they did not know regarding them (56). But, like any other vaccine, the COVID-19 vaccine went through all the rigorous processes of safety reviews and clinical trials as prescribed by the Food and Drug Administration (FDA) agency [21], without skipping any of the steps although it had been developed in a short record timeframe and given an approval under EUA as biologics license approval (BLA) mandates a long time. The Phase III trials were conducted on a large number of human volunteers same as any large vaccine trials in the United States and internationally.[22] Vaccines generally entail a timeline of 10.7 years on an average [22], and hence the COVID-19 vaccine research was built on the previous decade's research on the corona virus than mere start after the outbreak.[23] This was made possible because of the unprecedented collaboration and investment of the researchers, government, and organizations worldwide. In this current study, 267 health professionals (69.35%) answered correctly that the COVID-19 vaccine will not alter the host's DNA. The pioneer vaccines which were granted EUA contained messenger RNA (mRNA) that instructs the cells to produce the "spike protein" that is responsible for creating the antibodies. The mRNA gets translated into polypeptides in the cytoplasm and never enters the cellular nucleus where the DNA is present. Moreover, the body disposes the mRNA after the generation of immunity and cellular DNA similar to COVID-19 virus sequences on in-vitro overexpression of LINE-1 or HIV-1 reverse transcriptase in HEK cell lines [24] but, lacks evidence relevant to human clinical medicine.[23] About 215 (55%) health professionals answered that the COVID-19 vaccine causes severe allergic reactions such as anaphylactic reactions in the majority which is not true as it can only cause mild side effects such as fever, chills, and malaise that are known to be present with all vaccinations.

Anaphylactic reactions are extremely rare, and experts recommend not to receive the vaccine if there is known history of severe allergic reactions to the ingredients of the vaccine. Around 62.07% of the participants (239) answered correctly that the COVID-19 vaccine does not cause infertility. A myth/false information on social media stated that the vaccine makes the immune system fight against syncytin-1, a mammalian placental protein present in women which causes infertility in women.[25] But, despite the spike protein and placental protein sharing a homologous amino acid sequence, it cannot produce infertility as it is short to cause such an effect. Also, there is a rumor that COVID-19 vaccines contain actual aborted fetal tissues but, such vaccines like {AstraZeneca Oxford}, {CanSinoBio}, and {Johnson & Johnson} have been propagated for many years, no longer contain the actual fetal tissue remnants. Even the Vatican has recommended that the health benefits of these vaccines overshadow the moral opposition of vaccines developed from these cell lines.[26]

Even the people who had been diagnosed with COVID-19 infection before, still need to receive the vaccine as the natural immunity may vary from person to person and it is still unknown that how long the same may last.[27] The researchers are yet to understand the confounding factors completely like the longevity of the antibodies targeting the SARS-CoV-2 spike protein, which is shorter than expected actually.[28] It is noteworthy that the people who had been infected and still received the vaccine had a 140-fold boost in antibodies against the spike protein from peak pre-vaccine levels.[29] This was answered right by a larger number of health professionals (276/ 71.68%), and it is a fact that we can still be benefited from the vaccine despite the previous infection history. It's a myth that one can get COVID-19 infection from the COVID-19 vaccine which was contradicted by 70 (18.1%) health professionals whereas 57 (14.1%) of them did not know. One cannot get COVID-19 infection from the vaccine as it contains the attenuated form and not the live virus.[30] 129 (33.5%) of the health professionals answered that one would test positive for COVID-19 after receiving the vaccine by itself which is again a misconception. The tests for COVID-19 infection require samples from the respiratory system to detect the presence of the virus however, there is no live virus in the vaccines to affect the test results. But it is possible to acquire COVID-19 infection after receiving the vaccine before the start of full protection.[31]

It is a misconception that the people who are not at risk for severe complications of COVID-19 infection need not get themselves vaccinated, as all need to get vaccinated

regardless of the risk due to the chance of spreading to others on acquiring the disease, and this was answered right by 268 (69.6%) participants. It is thought wrong that one will be at greater risk for other illnesses after receiving the vaccine due to reduced immunity. Instead, the vaccine boosts immunity against COVID-19 infections and does not increase the risk for other diseases. None of the authorized vaccines have the live form of the virus.[31] Only 147 (38.18%) of the 385 health professionals answered right that the vaccine trials being halted doesn't mean that there are problems with the drug candidates. In a vaccine trial, all the effects including the adverse effects and even other effects that are not caused due to or related to the study to be noted and analyzed. Halting a trial and resuming it are the safety mechanisms to protect the volunteers of the trial until the effect is thoroughly investigated and studied.[32] Around 80% of the participants (309) believed rightly that the practices of handwashing, masking, and following the social distancing guidelines to be followed even after the vaccination as all these measures are mandated necessary by The Ministry of Health and Family Welfare (MoHFW) until a sufficient number of populations gets vaccinated and the duration of protection of the vaccine is unknown. This highlights the importance of following the appropriate COVID-19 protocols and guidelines until further recommendations from the healthcare agencies and public health experts. Almost 23.63% of the healthcare professionals (91) answered that the COVID-19 vaccine would be an answer to the end of the corona virus which is not true. Although vaccines in the past have played a pivotal role to eradicate the smallpox and reduce the incidence rate of polio, it took many years to achieve such a success. Vaccination to almost all citizens is a tedious and time-consuming process, especially with new vaccines and the virus is known to mutate. These question the long-term efficacy of the vaccine and also, the method of natural immunity cannot be resorted, as the fatality rate of COVID-19 infection is very high. Hence, believing that a vaccine would be an answer to the end of this pandemic is highly audacious at this point.

One another myth/misconception is that the vaccine has a tracking or surveillance device which was false information that was circulated in a video form on social media. A syringe maker in America, {ApiJect Systems Corp®} has an optional variant of its product with an embedded microchip that enables the administrator to find the origin of the vaccine and however, the microchip is not injected into the body. Additionally, there is a fear spreading that vaccine trials might cause inadvertent consequences like the 1950-60s tragedy of using thalidomide for the treatment of early pregnancy nausea.[23]

In the current study, though 79% of the health professionals had medium to high knowledge scores, 21% of the health professionals still projected a low knowledge score level which requires additional enhancement of knowledge and awareness among the health professionals. Although 70% had a positive attitude score, 29.1% had a negative attitude score demanding a change in attitude towards the COVID-19 vaccination as they have the responsibility to eliminate the vaccine hesitancy among general public. It is also depicted that the better knowledge levels led to a better attitude towards the COVID-19 vaccination among the health professionals. It is a good sign that 81% of the health professionals had got vaccinated, in turn trusted and supported the vaccination drive.

LIMITATIONS:

This study was conducted in a small sample size of health professionals of a single university. Future studies could be undertaken involving a larger population of health professionals from multiple centers, with a uniform sample size among the fields.

CONCLUSIONS

Even though the participants had a high standard of knowledge, attitude and practice, there were a considerable percentage of participants with low knowledge and negative attitude towards vaccines for COVID-19. Hence, the findings of the study demand a more enhanced, stronger, and accessible health education programs for the health professionals to improve their knowledge, attitude and practices regarding COVID-19 vaccination drive to reduce the vaccination hesitancy among the general public and to motivate all the citizens to get vaccinated against this deadly pandemic, thereby achieving a complete eradication in the near future.

LIST OF ABBREVIATIONS:

- (WHO)- World Health Organization;
- (2019-n-CoV)- 2019-novel-Corona virus;
- (SARS-CoV-2)- Severe Acute Respiratory Syndrome Corona Virus-2;
- (COVID-19)- Corona Virus Disease 2019;
- (PHEIC)- Public Health Emergency of International Concern;
- (EUL)- Emergency Usage Listing;

- (PQ)- Prequalification;
- (TPP)- Target Product Profile;
- (USA)- United States of America;
- (FDA)- Food and Drug Administration;
- (BLA)- Biologic license approval;
- (DNA)- Deoxyribonucleic acid;
- (mRNA)- messenger ribonucleic acid;
- (MoHFW)- Ministry of Health and Family Welfare.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE:

This cross-sectional study was approved by the Institutional Research and Ethics Committee, KLE VK Institute of Dental Sciences, Belagavi, India with the reference number: 1445 and the consent for participation in the study was obtained from all the participants prior to the enrolment in the study.

CONSENT FOR PUBLICATION:

The authors hereby consent for publication of this work in this journal.

AVAILABILITY OF DATA AND MATERIALS:

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

COMPETING INTERESTS:

The authors declare that they have no competing interests.

FUNDING AND SUPPORT: Nil.

AUTHORS' CONTRIBUTIONS:

Lokesh Kumar S (LKS), Zameera Naik, and Vaishali Keluskar contributed to the design, concepts and definition of the intellectual content. LKS, Arun Panwar and Sridhar M collected, compiled and interpreted the data. Ram Surath Kumar K did the statistical analysis. LKS prepared the manuscript and all the authors read before approving the manuscript.

ACKNOWLEDGEMENT:

We would like to acknowledge the support of the respective institution heads of KLE Academy of Higher Education and Research, Belagavi for permitting to conduct the study and study participants for giving their valuable time for participation in the study.

References:

1. World Health Organization. COVID-19 – China. Available from: https://www.who.int/emergencies/disease-outbreak-news/item/2020-DON229 Accessed on July 19, 2022.
2. Gorbalenya AE, Baker SC, Baric RS, et al.. Severe acute respiratory syndrome-related coronavirus: The species and its viruses –a statement of the Coronavirus Study Group. bioRxiv. 2020;2020.02.07. doi: https://doi.org/10.1101/2020.02.07.937862
3. Burki TK. Coronavirus in China. Lancet Respir. 2020;8(3):238. doi: https://doi.org/10.1016/s2213-2600(20)30056-4
4. Chopra S, Ranjan P, Singh V, Kumar S, Arora M, Hasan MS, et al. Impact of COVID-19 on lifestyle-related behaviours- a cross-sectional audit of responses from nine hundred and ninety-five participants from India. Diabetes Metab Syndr. 2020;14(6):2021-30. doi: https://doi.org/10.1016/j.dsx.2020.09.034
5. Kumari A, Ranjan P, Sharma KA, Sahu A, Bharti J, Zangmo R, et al. Impact of COVID-19 on psychosocial functioning of peripartum women: a qualitative study comprising focus group discussions and in-depth interviews. Int J Gynaecol Obstet. 2021;152(3):321-7. doi: https://doi.org/10.1002/ijgo.13524
6. Mazumder A, Bandhu Kalanidhi K, Sarkar S, Ranjan P, Sahu A, Kaur T, et al. Psycho-social and behavioural impact of COVID 19 on young adults: qualitative research comprising focused group discussion and in-depth interviews. Diabetes Metab Syndr. 2021;15(1):309-12. doi: https://doi.org/10.1016/j.dsx.2020.12.039
7. Chakrawarty A, Ranjan P, Kalanidhi KB, Kaur D, Sarkar S, Sahu A, et al. Psycho-social and behavioral impact of COVID-19 on middle-aged and elderly individuals: a qualitative study. J Educ Health Promot. 2021. 10(1):269. doi: https://doi.org/10.4103%2Fjehp.jehp_1458_20
8. WHO Health Emergency Dashboard, WHO (COVID-19) Homepage. Available from: https://covid19.who.int/. Accessed July 19, 2022.
9. Koirala A, Joo YJ, Khatami A, Chiu C, Britton PN. Vaccines for COVID-19: the current state of play. Paediatr Respir Rev. 2020;35:43-9. doi: https://doi.org/10.1016/j.prrv.2020.06.010
10. Yao HP, Lu X, Chen Q, Xu K, Chen Y, Cheng L, et al. Patient-derived mutations impact pathogenicity of SARS-CoV-2. 2020. Available from: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3578153
11. Guidance document- Vaccines. Status of COVID-19 Vaccines within WHO EUL/PQ evaluation process. Available from: https://extranet.who.int/pqweb/sites/default/files/doc

uments/Status_of_COVID-19_Vaccines_within_WHO_EUL-PQ_evaluation_process-16June2021_Final.pdf. Accessed July 19, 2022.

12. World Health Organization (WHO) (2020) WHO Working Group Target Product Profiles for COVID-19 Vaccines. Available from: https://www.who.int/publications/m/item/who-target-product-profiles-for-covid-19-vaccines . Accessed on July 19, 2022
13. Ministry of Health and Family Welfare. Frequently asked questions [cited 2021 Mar 20], Available from: https://www.mohfw.gov.in/covid_vaccination/vaccination/index.html. Accessed on July 19, 2022.
14. WHO Health Emergency Dashboard, WHO (COVID-19). Global-India. Available from: https://covid19.who.int/region/searo/country/in. Accessed July 19, 2022.
15. Harrison EA, Wu JW. Vaccine confidence in the time of COVID-19. Eur J Epidemiol. 2020;35(4):325-30. doi: https://doi.org/10.1007/s10654-020-00634-3
16. Grover S, Sahoo S, Mehra A, Avasthi A, Tripathi A, Subramanyan A, et al. Psychological impact of COVID-19 lockdown: An online survey from India. Indian J Psychiatry. 2020;62(4):354. doi: https://doi.org/10.4103/psychiatry.indianjpsychiatry_427_20
17. Fontanet A, Cauchemez S. COVID-19 herd immunity: where are we?. Nat Rev Immunol. 2020;20(10):583-4. doi: https://doi.org/10.1038/s41577-020-00451-5
18. Vulpe SN, Rughinis C. Social amplication of risk and probable vaccine damage": A typology of vaccination beliefs in 28 European countries. Vaccine. 2021;39(10):1508-15. doi: https://doi.org/10.1016/j.vaccine.2021.01.063
19. Ahmed SS, Schur PH, MacDonald NE, Steinman L. Narcolepsy, 2009 A (H1N1) pandemic influenza,and pandemic influenza vaccinations: what is known and unknown about the neurological disorder, the role for autoimmunity, and vaccine adjuvants. J Autoimmun. 2014;50:1-1. doi: https://doi.org/10.1016/j.jaut.2014.01.033
20. Gadoth A., Halbrook M., Martin-Blais R., Gray A., Tobin N.H., Ferbas K, et al. Assessment of COVID-19 vaccine acceptance among healthcare workers in Los Angeles. Medrxiv. 2020. doi: https://doi.org/10.1101/2020.11.18.20234468
21. US Food & Drug Administration (FDA). Vaccine Development – 101. Available from: https://www.fda.gov/vaccines-blood-biologics/development-approval-process-cber/vaccine-development-101
22. Pronker ES, Weenen TC, Commandeur H, Claassen EHJHM, Osterhaus ADME. Risk in vaccine research and development quantified. PLoS One. 2013;8(3):e57755. doi: https://doi.org/10.1371/journal.pone.0057755
23. Hotez P, Batista C, Ergonul O, Figueroa JP, Gilbert S, Gursel M, et al. Correcting COVID-19 vaccine misinformation: Lancet Commission on COVID-19 vaccines and therapeutics task force members. E Clinical Medicine. 2021;33:100780. doi: https://doi.org/10.1016/j.eclinm.2021.100780
24. Zhang L., Richard A., Khalil A., Wogram E., Ma H., Young R.A., et al. SARS-CoV-2 RNA reverse-transcribed and integrated into the human genome. Biorxiv. 2020. doi: https://doi.org/10.1101/2020.12.12.422516
25. Gong, R, Peng, X, Kang, S, Feng, H, Huang, J, Zhang, W, et al. Structural characterization of the fusion core in syncytin, envelope protein of human endogenous retrovirus family W. Biochem Biophys Res Commun. 2005;331:1193–200. doi: https://doi.org/10.1016/j.bbrc.2005.04.032
26. 24. Vatican (2020). Congregation for the doctrine of the Faith: note on the morality of using some anti-COVID-19 vaccines. Available from: https://www.vatican.va/roman_curia/congregations/cfaith/documents/rc_con_cfaith_doc_20201221_nota-vaccini-anticovid_en.html. Accessed on July 19, 2022.
27. Baraniuk C. How long does covid-19 immunity last?. Bmj. 2021;373. doi: http://dx.doi.org/10.1136/bmj.n1605
28. Ibarrondo FJ, Fulcher JA, Goodman-Meza D, Elliott J, Hofmann C, Hausner MA, et al. Rapid decay of anti-SARS-CoV-2 antibodies in persons with mild covid-19. N Engl J Med. 2020;383(11):1085-7. doi: https://doi.org/10.1056/nejmc2025179
29. Manisty C, Otter AD, Treibel TA, McKnight Á, Altmann DM, Brooks T, et al. Antibody response to first BNT162b2 dose in previously SARS-CoV-2-infected individuals. Lancet. 2021;397(10279):1057-8. doi: https://doi.org/10.1016/s0140-6736(21)00501-8
30. World Health Organization, EPI. WiN, Infodemic management. Update on COVID-19 vaccines & immune response dated 28th February 2020. Available from: https://www.who.int/docs/default-source/coronaviruse/risk-comms-updates/update52_vaccines.pdf?sfvrsn=b11be994_4 Accessed July 19, 2022.

31. Centres for Disease Control and Preventions. Myths and facts about COVID-19 Vaccines. Available from: https://www.cdc.gov/coronavirus/2019-ncov/vaccines/facts.html. Accessed July 19, 2022.
32. Venkatagopalan P. Debunking the myth related to COVID-19 vaccines dated February 4, 2021. Available from: https://www.indiatoday.in/information/story/debunking-myths-related-to-covid-19-vaccines-1763959-2021-01-29 Accessed July 19, 2022.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

ASSESSMENT OF HEALTHCARE SERVICE PROVISION TO PEDIATRIC PATIENTS WITH CHRONIC DISEASES DURING THE COVID-19 LOCKDOWN

Nehal M. El-Koofy[1], Mortada H. El-Shabrawi[1], Mai Mohamed Abd Elhamed[1], Marwa M. Zein[2], Ramy Saleh Morsy Abdelghany[3], Eman Aly Abdelaziz[1]*

1. Department of Pediatrics, Faculty of Medicine, Cairo University, Manial, Cairo, Egypt
2. Department of public health and community medicine, Faculty of Medicine, Cairo University, Manial, Cairo, Egypt
3. Department of Pediatrics, Egyptian Armed Forces College of Medicine, Egypt

Correspondence: marwa.zein@cu.edu.eg

ABSTRACT

BACKGROUND:

The Coronavirus disease 2019 (COVID-19) pandemic's impact on essential health services is of great concern. The most important step in managing any patient with chronic disease is compliance with follow-up visits.

AIM:

This study aims to assess healthcare services during the period of the COVID-19 pandemic lockdown regarding chronic patient visits and care, as well as to assess patient satisfaction with the provision of healthcare services during the lockdown period.

METHODS:

A cross-sectional study was performed at Cairo University Specialized Children Hospital, Egypt, through an interview questionnaire with the caregivers of chronic patients about the health care services throughout the COVID-19 pandemic from December 2020 to July 2021.

RESULTS:

More than 60% were satisfied with the healthcare service provision during the COVID-19 pandemic lockdown. Satisfaction toward medical sub-specialties was significantly higher than that of surgical ones. Patients who attended for follow-up markedly decreased during the lockdown.

CONCLUSION:

During the COVID-19 pandemic, healthcare service provision was negatively affected. Follow-up of chronic patients and continued medical care were challenging points.

KEYWORDS

COVID-19; pandemic; health services; pediatrics; chronic patients

INTRODUCTION

Severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) infection, also described as Coronavirus disease 2019 (COVID-19), erupted as an outbreak in China in December 2019 [1]. The World Health Organization (WHO) declared this outbreak a public health emergency, and COVID-19 was designated as a pandemic [2]. The pandemic effects are not only related to physical health that lead to morbidity and mortality from the disease itself, but also have a range of negative social, economic, and political consequences [3]. The COVID-19 pandemic had caused significant disruption in the delivery of health services, particularly in resource-limited countries that sent a message of the importance of building strong and resilient health systems [4].

Patients with chronic illnesses, like obesity, cardiovascular disease, diabetes, and kidney disease, are more likely to experience serious difficulties and pass away from COVID-19 throughout the pandemic. Additionally, it is possible that skipping routine follow-up care will harm the patient's health [5]. Fear of contracting COVID-19 can lead people to avoid healthcare facilities, and strict lockdowns to combat the pandemic can influence people's socioeconomic status and ability to access medical facilities [6].

Evaluation of patients' satisfaction with healthcare services has clinical significance to patients to adhere to treatment [7]. The power of reality in the healthcare system has been significantly impacted by reports that COVID-19 hurts method and treatment adherence, increases treatment dissatisfaction, and causes patients to cease receiving treatment and follow-up [8]. In this survey, our objective was to evaluate the availability of healthcare services during the shutdown of the COVID-19 pandemic and to discover to what extent patients were satisfied with the health services provided during the shutdown.

METHODS

STUDY DESIGN:

Epidemiological, observational cross-sectional, analytical study.

STUDY SETTING:

Medical and surgical outpatient clinics of the Specialized Children Hospital and El-Mounira Children Hospital, Cairo University, Egypt.

STUDY POPULATION:

Pediatric patients less than 14 years of age with chronic diseases requiring regular follow-up visits at the specialized chronic outpatient clinics of medical and surgical sub-specialties.

SAMPLING TYPE AND TECHNIQUE:

Using Open Epi, Version 3 [9], the sample size was recorded by a single population proportion formula:

Sample size n = (DEFF*Np(1-p))/ ((d2/Z21-a/2*(N-1)+p*(1-p)).

Taking a proportion of 44.6% of patients' satisfaction in North Shoa Health Care Facilities during the COVID-19 pandemic [10]. The minimum sample size was 408 when considering a 95% confidence interval, a 5% marginal error, and a 10% non-response rate.

The study participants' sample was convenient (close to the researcher's hand during the data collection period).

STUDY DURATION:

From December 2020 to July 2021.

DATA COLLECTION TOOL:

A questionnaire was derived from the Arabic version of the modified client satisfaction questionnaire (CS-42) [11], and updated to evaluate the effect of the COVID-19 pandemic lockdown period on routine follow-up visits of chronic patients.

DATA COLLECTION TECHNIQUE:

The researchers collected data through an interview questionnaire with the patient's caregivers after obtaining verbal consent.

The questionnaire consisted of five parts:

1. Socio-demographics
2. Follow-up before pandemic
3. Follow-up during the pandemic and access to services such as laboratory, radiology, and pharmacy
4. Affordability of service
5. Assessment of patient satisfaction

STATISTICAL ANALYSIS:

The accuracy and coherence of data were checked. On the computer, pre-coded data were entered using Microsoft Office Excel software 2019 version). The pre-coded data were then transferred and referred to the IBM SPSS Statistics 26 (Statistical Package of Social Science Software), a program for performing statistical analysis.
Qualitative variables were described as frequency and percentage, quantitative variables were described as mean and standard deviation (SD).

Chi-square and Fisher's exact tests were used to compare qualitative variables, with (p-value ≤ 0.05) considered statistically significant.

RESULTS

A total of 445 caregivers completed the interview questionnaire. The mean age of the patients was 7.2 ± 3.8 years; 273 (62.3%) of the patients were males and 165 (37.7%) were females. More than 80% of the patients' caregivers were mothers with a mean age of 36±7 years. Regarding the education status of the caregiver, 51.1% of primary or secondary school graduates, 9% of university, 0.5% of postgraduates, 1.4% can read and write, and more than one-third (38.2%) of them were illiterate.

Access to the hospital was far (distance) for 64.4% of the patients. More than 90% of them reached the hospital with two or more transportation means, and more than 80% of journeys to the hospital took more than one hour. Transportation costs more than 50 LE ($2.7) for more than 60% of patients. More than 60% of the patients come for follow-up three times or more per year, as shown in Table 1. Regarding follow-up visits during the COVID-19 pandemic lockdown, more than half (54.6%) of the interviewees said that follow-up in the hospital was not affected by the COVID-19 pandemic lockdown and attended follow-up during the lockdown. Moreover, they reported that there were no other follow-up methods other than coming to the hospital. More than 60% stated that emergency services were available during the lockdown.

As shown in Tables 2 and 3, there was no statistically significant difference between attending for follow-up during the lockdown and sociodemographic characteristics of the patients and their caregivers and reasons for follow-up in this hospital (p-value > 0.05). Patients' caregiver satisfaction with hospital services during the COVID-19 pandemic is shown in Table 4. The caregivers were asked about their satisfaction level with hospital services, and over 60% were satisfied between 60-80%. Medical clinics during lockdown showed other ways for follow-up other than coming to the hospital and private clinics with a statistically significant difference from surgical clinics (p-value < 0.001). Caregivers of the patients were statistically more satisfied in clinics of medical subspecialties than in surgical ones (p-value = 0.002). figure 1

The differences in the number of follow-up patients in all clinics over the past 3 years (2019, 2020, until July 2021) and changes are listed in Figure 2. The number of patients in outpatient clinics decreased by more than 90% from 2020 & to July 2021 compared to 2019.

TABLE 1: ACCESSIBILITY TO THE HOSPITAL AND FOLLOW-UP VISITS BEFORE THE PANDEMIC

Variable	Value N (%)
Accessibility to the hospital	
Distance from home to hospital	
Near	158 (35.6)
Far	286 (64.4)
The number of transportations to reach the hospital	
One	36 (8.1)
Two	190 (43.0)
three or more	216 (48.9)
Time taken to come to the hospital	
less than 1 hour	81 (18.2)
from 1-2 hours	244 (54.8)
3 hours or more	120 (27.0)

Transportation payment to come to the hospital	
20-50 LE (1-2.5 $)	173 (39.0)
50-100 LE (2.5-5 $)	152 (34.2)
>100 LE (>5 $)	119 (26.8)
Follow-up visits	
Frequency of visits per year before the pandemic	
1-2	173 (39.1)
3-5	147 (33.3)
>5	122 (27.6)
Reasons for follow-up in the hospital	
Higher cost of follow-up in other places	28 (6.3)
I trust the doctors here	279 (62.8)
Here they give me the treatment	37 (8.3)
The service is not available next to me	100 (22.5)

TABLE 2 RELATION BETWEEN ATTENDANCE FOR FOLLOW-UP IN THE HOSPITAL DURING THE COVID-19 LOCKDOWN AND THE SOCIO-DEMOGRAPHICS OF THE PATIENTS

	Attending follow-up during the COVID-19 lockdown period n (%)		
	Yes	**No**	**P-value**
Gender of the child			
Male	144 (52.7)	129 (47.3)	0.99
Female	87 (52.7)	78 (47.3)	
Age of the patient			
<10 years	167 (50.2)	166 (49.8)	0.06
>10 years	67 (60.4)	44 (39.6)	
Maternal Education			
Uneducated	90 (53.6)	78 (46.4)	0.85
Educated	141 (52.6)	127 (47.4)	
Paternal Education			
Uneducated	78 (53.8)	67 (46.2)	0.66
Educated	137 (51.5)	129 (48.5)	
Maternal occupation			
Not working	209 (53.9)	179 (46.1)	0.41
Not a continuous work	5 (62.5)	3 (37.5)	
Working	17 (43.6)	22 (56.4)	
Paternal occupation			
Not working	25 (48.1)	27 (51.9)	0.76
Not a continuous work	99 (53.5)	86 (46.5)	
Working	90 (52.0)	83 (48.0)	
Monthly household income per month			
<1000 LE (<54 $)	39 (59.1)	27 (40.9)	0.37
1000-2000 LE (54- 108 $)	146 (52.9)	130 (47.1)	
>2000 LE (>108 $)	49 (48.0)	53 (52.0)	
Place of living			
Urban	89 (52.0)	82 (48.0)	0.82
Rural	144 (53.1)	127 (46.9)	

Distance from home to hospital			
Nearby	87 (55.1)	71 (44.9)	0.46
Far	147 (51.4)	139 (48.6)	
The number of transportations to reach the hospital			
One	19 (52.8)	17 (47.2)	0.99
Two	101 (53.2)	89 (46.8)	
Three or more	113 (52.3)	103 (47.7)	

TABLE 3 RELATION BETWEEN ATTENDING THE HOSPITAL FOR FOLLOW-UP DURING THE COVID-19 LOCKDOWN AND REASONS FOR COMING FOR FOLLOW-UP IN THE HOSPITAL

Reason for follow-up in the hospital	Attending for follow-up during the period of COVID lockdown n (%)	
	Yes	No.
Higher cost of follow-up in other places	11 (39.3)	17 (60.7)
I trust the doctors here	154 (55.2)	125 (44.8)
Here they give me the treatment	24 (64.9)	13 (35.1)
The service is not available next to me	45 (45.0)	55 (55.0)
p-value	**0.067**	

TABLE 4 PATIENTS' SATISFACTION RESPONSES TOWARD THE QUALITY OF HEALTH CARE IN THE HOSPITAL

Items of patients´ satisfaction	Agree on n (%)	Neutral n (%)	Disagree n (%)
Ease of access to the service in non-pandemic situations	298 (67.1)	120 (27.0)	26 (5.9)
There were fixed follow-up appointments	164 (36.9)	58 (13.1)	222 (50.0)
I knew the follow-up appointments	192 (43.2)	55 (12.4)	197 (44.4)
Someone was calling to remind me of the clinic's appointment	59 (13.3)	50 (11.3)	335 (75.5)
The clinics were open to provide patients with treatment.	167 (37.8)	188 (42.5)	87 (19.7)
The waiting areas were acceptable to me	258 (58.1)	72 (16.2)	114 (25.7)
It was easy to move between the hospital services (laboratory, pharmacy, x-ray ...)	279 (62.8)	95 (21.4)	70 (15.8)
The number of nurses was sufficient to receive the service	309 (69.6)	129 (29.1)	6 (1.4)
Did you find enough help from the nurses to make follow-up appointments?	302 (68.2)	127 (28.7)	14 (3.2)
The number of doctors in the service	303 (68.2)	126 (28.4)	15 (3.4)
All the required services were available in the hospital (pharmacy, laboratory, x-rays)	181 (40.9)	85 (19.2)	177 (40.0)
The pharmacy was opened to give me the treatment	174 (39.3)	222 (50.1)	47 (10.6)
The pharmacy was working to provide treatment	281 (63.3)	112 (25.2)	51 (11.5)
X-rays were convenient for me	280 (63.1)	112 (25.2)	52 (11.7)
I can afford to do labs outside of the hospital during the pandemic	76 (17.1)	157 (35.4)	211 (47.5)
I can afford the ticket price	402 (90.5)	30 (6.8)	12 (2.7)
I can afford labs costs at the hospital	290 (65.3)	22 (5.0)	132 (29.7)

The cost of transportation to the hospital is acceptable to me	385 (86.7)	8 (1.8)	51 (11.5)

FIGURE 1 THE RELATION BETWEEN THE PRESENCE OF ANOTHER WAY OF FOLLOW-UP DURING THE COVID-19 LOCKDOWN AND THE TYPE OF FOLLOW-UP CLINICS

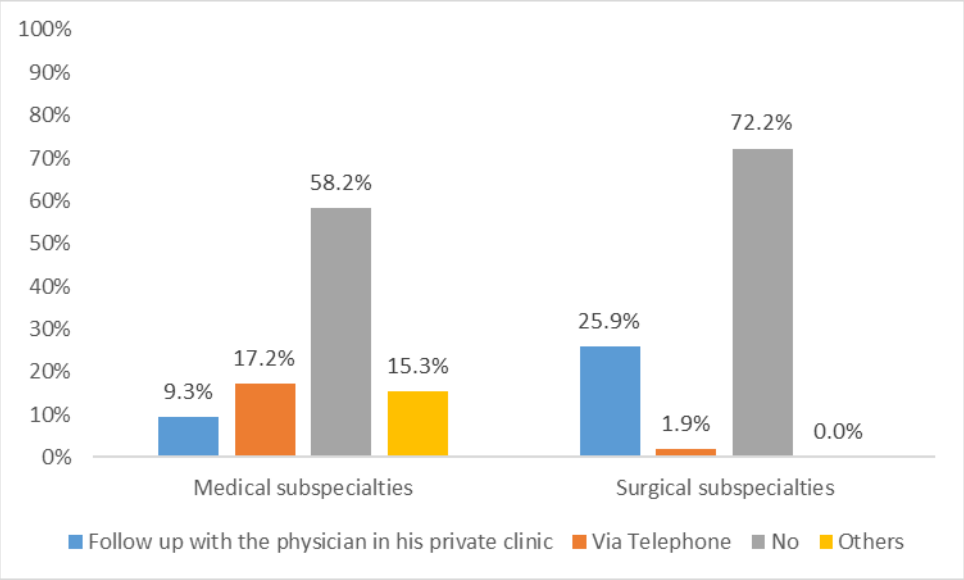
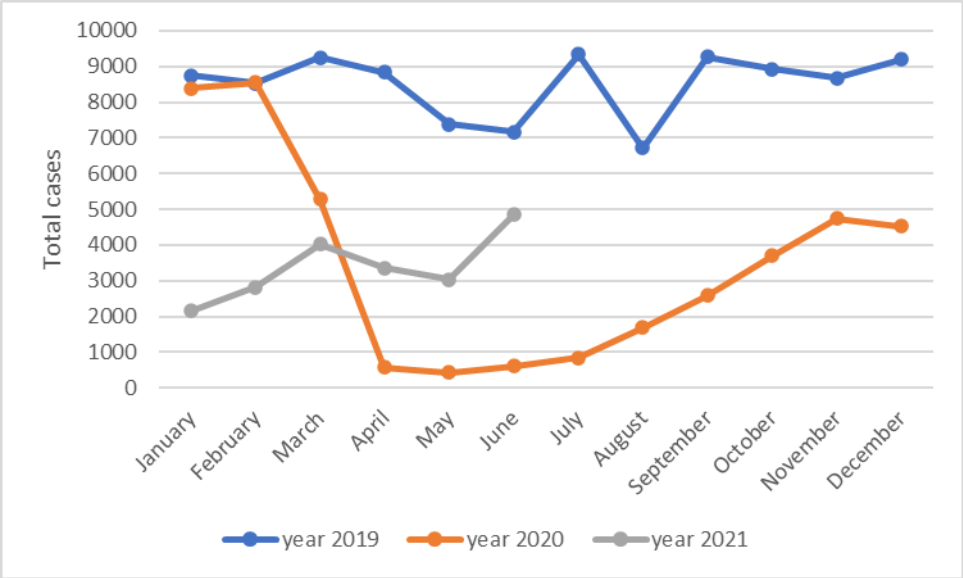


FIGURE 2: THE TREND LINE OF TOTAL FOLLOW-UP CASES IN THE FOLLOW-UP CLINICS OVER 3 CONSECUTIVE YEARS



DISCUSSION

The COVID-19 pandemic's impact on important health services has a great concern [12]. Loss of vital health services probably negatively impacts public health, especially for the most vulnerable population segments, including children, the elderly, and those with disabilities or chronic illnesses [13]. In the current study, 62.7% of caregivers were 60-80% satisfied with the health services during the pandemic, and 13.1% were < 60% satisfied. The study was carried out in North Shoa to validate patient satisfaction with health services throughout the COVID-19 pandemic and showed that overall satisfaction was 44.6% [10]. In the current study, more than half of the caregivers said that follow-up was not affected by the suppression of the COVID-19 pandemic. This disagrees with another study by Zhang et al., who found that 75.5% of parents of chronic patients told them that the COVID-19 outbreak had a significant influence on the regular medical medication of

their children [14]. Furthermore, in a study of chronic rheumatology patients in 15 Arab countries carried out by Ziadé et al.,, the COVID-19 pandemic had a significant negative effect on visits to rheumatology, access to hydroxychloroquine, and persistence of chronic medications [15].

In this study, it was found that there was no statistically significant difference between coming to follow-up during the COVID-19 pandemic and the patients´ sociodemographic background. The low-income individuals were stricter to come for follow-ups, which may be explained by their inability to go to private hospitals or clinics, and transportation was not a problem for them. In a study by Aklilu et al., patients noted that their clinic appointments were frequently missed due to transportation problems and concern about contracting COVID-19 in the hospital [16].

In this study, medical subspecialties continued follow-up with patients during the lockdown in ways other than coming to the hospital or private clinics, such as via Telephone calls, WhatsApp, and Zoom meetings. According to Ashton et al., phone and webcam reviews increased rapidly in 2020, allowing for ongoing care for nearly all patients with inflammatory bowel disease [17]. Another study by Deriba et al. showed that traveling long distances to far health facilities to receive top-notch medical care could put the patient at risk for COVID-19. Telemedicine may address this issue in low- and middle-income nations to save time and resources and manage and prevent the COVID-19 pandemic [10]. Furthermore, it was discovered that fewer patients were coming in for surgical and medical follow-ups for chronic diseases, and the surgical outpatient department saw the largest decline. Significantly fewer people visited the emergency room, especially for urgent surgeries. These results were similar to those found in a study by Abdela et al., in which patient flow was reduced in all elements of basic healthcare service [18].

We found that the outpatient clinic trend line decreased by more than 90% in 2020 and 2021 compared to 2019. This agrees with what was found in a study by Abdela et al. (2020), who reported that the number of surgical and medical visits was reduced (by more than 50%).

STRENGTHS OF THE STUDY:

this study measured the patient satisfaction of a variety of chronic pediatric patients attending one of the largest highly specialized tertiary pediatric hospitals in Egypt and the middle east during the COVID-19 lockdown.

LIMITATIONS OF THE STUDY:

due to the time constraints, it was better to explore more about the other ways that were done to communicate with the patients during the pandemic lockdown.

Meaning of the study and ideas for future research: Health care services, especially emergency and follow-up services, need to be protected from collapses by innovative, new ideas as many people will be affected whenever those services are affected. This study found that some efforts were performed during the pandemic to help patients who were used to follow-up in the specialized clinics before the pandemic. One of these efforts was using telemedicine for follow-up and organizing their follow-up.

CONCLUSION

During the COVID-19 pandemic, healthcare service provision was negatively affected. Follow-up of chronic patients and continued medical care were challenging points. Our results showed that 62.7% were 60-80% satisfied with the service. During this period, patients who were following up in medical subspecialties were more satisfied than surgical ones. Sociodemographic data and transportation did not hinder patients from seeking medical care.

The COVID-19 pandemic lockdown affected chronic patients' visits to outpatient clinics with a reduction in the number of follow-up patients in 2020 and 2021 compared to 2019. Many outpatient clinics, mainly medical ones, took certain measures to facilitate the follow-up of their patients, like using WhatsApp or phone calls. The technical and logistic arrangement of alternative ways to remotely follow up on chronic patients is an important issue that each hospital should highlight.

ETHICAL CONSIDERATION:

Informed oral consent was obtained from the caregivers of the patient. All the included participants were treated according to the Helsinki Declaration of biomedical ethics This study's protocol was accepted by the scientific and ethical committee of the Faculty of Medicine, Cairo University, Egypt. The ethics committee approval number is (REC NO: MS-121-2021).

CONFLICT OF INTEREST:

No conflict of interest

SOURCE OF FUNDING:

Self-funded

References:

1. World Health Organization. Coronavirus (COVID-19) events as they happen. WHO. 2022. available: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen (accessed 12/05/22).
2. World Health Organization. Coronavirus disease (COVID-19). WHO. 2022. available. https://www.who.int/emergencies/diseases/novel-coronavirus-2019?adgroupsurvey=%7Badgroupsurvey%7D&gclid=Cj0KCQjw4PKTBhD8ARIsAHChzRJrIBIkYC5NYEt6JPUj0IINRUqRNu8d3oR7uJxy1yqf-ISg-QRpAGsaAlYMEALw_wcB (accessed 12/05/22).
3. Yoosefi Lebni J, Abbas J, Moradi F, Salahshoor MR, Chaboksavar F, Irandoost SF, et al. How the COVID-19 pandemic effected economic, social, political, and cultural factors: A lesson from Iran. Int J Soc Psychiatry 2021;67:298–300. https://doi.org/10.1177/0020764020939984.
4. Haileamlak A. The impact of COVID-19 on health and health systems. Ethiop J Health Sci 2021;31:1073–4. https://doi.org/10.4314/ejhs.v31i6.1.
5. Zhou J, Otter JA, Price JR, Cimpeanu C, Meno Garcia D, Kinross J, et al. Investigating Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Surface and Air Contamination in an Acute Healthcare Setting During the Peak of the Coronavirus Disease 2019 (COVID-19) Pandemic in London. Clin Infect Dis 2021;73:e1870–7. https://doi.org/10.1093/CID/CIAA905.
6. Ferguson NM, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, Bhatia S, Boonyasiri A, Cucunubá Z, Cuomo-Dannenburg G, Dighe A. Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. available https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-9-impact-of-npis-on-covid-19/ (accessed 15/01/23).
7. Damiani G, Gironi LC, Kridin K, Pacifico A, Buja A, Bragazzi NL, et al. Mask-induced Koebner phenomenon and its clinical phenotypes: A multicenter, real-life study focusing on 873 dermatological consultations during COVID-19 pandemics. Dermatol Ther 2021;34. https://doi.org/10.1111/DTH.14823.
8. Gironi LC, Boggio P, Giorgione R, Damiani G, Savoia P. The impact of COVID-19 pandemics on dermatologic surgery: real-life data from the Italian Red-Zone. J Dermatolog Treat 2022;33:1–7. https://doi.org/10.1080/09546634.2020.1789044.
9. OpenEpi - Toolkit Shell for Developing New Applications n.d. available https://www.openepi.com/SampleSize/SSPropor.htm (accessed 9/06/22).
10. Deriba BS, Geleta TA, Beyane RS, Mohammed A, Tesema M, Jemal K. Patient Satisfaction and Associated Factors During COVID-19 Pandemic in North Shoa Health Care Facilities. Patient Prefer Adherence 2020;14:1923. https://doi.org/10.2147/PPA.S276254.
11. Fatah SAMA El, Khairy WA, Salem MR. Key determinants of client satisfaction with primary healthcare services. Int J Behav Healthc Res 2018; 6:237. https://doi.org/10.1504/ijbhr.2018.101574.
12. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. N Engl J Med 2020;382:1199–207. https://doi.org/10.1056/NEJMOA2001316/SUPPL_FILE/NEJMOA2001316_DISCLOSURES.PDF.
13. Kieny MP, Evans DB, Schmets G, Kadandale S. Health-system resilience: reflections on the Ebola crisis in western Africa. Bull World Health Organ 2014;92:850. https://doi.org/10.2471/BLT.14.149278.
14. Zhang G, Yang H, Zhang A, Shen Q, Wang L, Li Z, et al. The Impact of the COVID-19 Outbreak on the Medical Treatment of Chinese Children with Chronic Kidney Disease (CKD) : A Multicenter Cross-section Study in the Context of a Public Health Emergency of International Concern 2020. https://doi.org/10.1101/2020.02.28.20029199.https://DOI: 10.1101/2020.02.28.20029199 .
15. Ziadé N, el Kibbi L, Hmamouchi I, Abdulateef N, Halabi H, Hamdi W, et al. Impact of the COVID-19 pandemic on patients with chronic rheumatic diseases: A study in 15 Arab countries. Int J Rheum Dis 2020;23:1550–7. https://doi.org/10.1111/1756-185X.13960.
16. Aklilu TM, Abebe W, Worku A, Tadele H, Haile T, Shimelis D, et al. The Impact of COVID-19 on Care Seeking

Behavior of Patients at Tertiary Care Follow-up Clinics: A Cross-Sectional Telephone Survey. Addis Ababa, Ethiopia. MedRxiv 2020:2020.11.25.20236224. https://doi.org/10.1101/2020.11.25.20236224.

17. Ashton JJ, Kammermeier J, Spray C, Russell RK, Hansen R, Howarth LJ, et al. Impact of COVID-19 on diagnosis and management of paediatric inflammatory bowel disease during lockdown: a UK nationwide study. Arch Dis Child 2020;105:1186–91. https://doi.org/10.1136/ARCHDISCHILD-2020-319751.

18. Abdela SG, Berhanu AB, Ferede LM, van Griensven J. Essential Healthcare Services in the Face of COVID-19 Prevention: Experiences from a Referral Hospital in Ethiopia. Am J Trop Med Hyg 2020;103:1198. https://doi.org/10.4269/AJTMH.20-0464.

ACHSM Asia-Pacific Journal of Health Management shape

RESEARCH ARTICLE

GRADUATE EMPLOYMENT OUTCOMES OF HEALTH SERVICE MANAGEMENT WORK INTEGRATED LEARNING PLACEMENTS

Sheree Lloyd[*1], Minalli Vasandani[2], Jose Oscar III Salvacion[2]*

1. University of Tasmania, Australia
2. Griffith University, Queensland, Australia

Correspondence: Sheree.lloyd@utas.edu.au

ABSTRACT

INTRODUCTION

Australian universities are increasingly focused on graduate employability outcomes. Industry and government are also seeking job-ready graduates. Employment outcomes for degree programs are measured by national surveys. Understanding employment outcomes for health service management university programs however are not able to be determined by these surveys as the data are not sufficiently granular. Universities embed a range of employability activities into their degrees to promote and support job-ready graduates such as work-integrated learning placements.

STUDY DESIGN

This study employed a novel approach to measuring employability outcomes for graduates who had completed a health service management work integrated learning placement.

FINDINGS AND RESEARCH OUTCOMES

Our study shows that graduates of a health service management program who complete a work-integrated learning placement have good employability outcomes and are gaining employment in roles related to their degree. Further research is needed to understand the impact of the placement and other embedded approaches in health service management degree programs to determine the role of each and other possible contributing factors.

KEYWORDS

employment, work integrated learning, LinkedIn, industry placement, international students, health service management.

INTRODUCTION

One of the objectives of Australian higher education is to develop work-ready graduates [1,2] and enhance graduate employment outcomes [3,4]. Employers are seeking graduates with discipline-specific knowledge, and transferable skills, combined with "practical work experience" and academic abilities [5]. Work-integrated learning (WIL) plays an integral role in preparing graduates for employment by supporting students to acquire the necessary skills and to apply their theoretical knowledge in the professional work environment [6]. According to Palmer and colleagues [3] measuring graduate employment outcomes is essential to evaluate the efficacy, need for and to improve the WIL experience. Internationally, WIL is a recognised mechanism for building graduate skills, developing discipline-specific [7] knowledge and applying theory into practice.

In Australia, students in the field of health have the highest WIL participation rate (57.7%) with placement as the primary type of WIL activity [1]. This is due to the applied nature of many health disciplines and the competency requirements needed to meet registration and accreditation requirements in fields such as nursing, medicine, physiotherapy, and psychology. These competencies are usually acquired in a health care setting. Multiple studies have shown the benefits of WIL on graduate employability outcomes such as improving work readiness, developing a professional network and identifying transferable skills [8–10].

In Australia, employability is of interest to universities [1,2,11] and international and domestic students. For domestic students, a post graduate qualification can support a change of career direction or cement opportunities for growth and promotion. For international students, Post Study Work Rights (PSWR) are influential in study destination decision making and expectations related to employment and life goals and migration aspirations [10,12]. The Temporary Graduate (485) Visa is a drawcard for international students who study at an Australian University [10]. Tran and colleagues studied the impacts of the post-study works rights policy in Australia and found showed that 51% of the respondents who remained in Australia and were past and present holders of the Temporary Graduate (485) Visa 'were in full-time employment, with 36% and 15% working full time in and outside their field of study respectively; 16% of respondents worked part time; and another 15% worked as casuals' [10].

The employability outcomes of graduates are also of interest to university leaders and academics convening WIL courses. WIL courses have been offered to health service management students at the Australian public university we studied since 2009 (hereafter referred to as the University). During a WIL placement students acquire skills and knowledge and, on these placements, learn by completing projects of value for health industry partner organisations. The WIL placement, at the University, provides students with an opportunity to foster proficiency in discipline-related skills and develop themselves for employment through the learning that occurs on placement and the active engagement with industry [13]. Working with the health sector, students have completed placements in a broad range of settings and projects including workforce planning, strategy and policy development, consumer engagement, governance, electronic patient records, informatics, and health service accreditation [13].

The HSM WIL is completed at the end of the study program. International and domestic students can complete one or two substantial industry-based WIL placements of four (4) days a week for 13 weeks with attendance at a weekly academic workshop. Completion of a significant placement, at the end of their degree provides an opportunity for students to practice knowledge and skills learned and apply theory into practice. There are no GPA or other hurdles for international and domestic students seeking a WIL placement and all students can participate in at least one placement. For international students, this is particularly relevant and other studies have shown that access to WIL for this cohort is important [6,12,14]. A study cited by Ferns et al [7] found that only 17% of the international students in their study undertook an internship in Australia. In the health service management program under study, all international students are given the option of taking one or two WIL placements depending on the Program of study they enrol in.

LinkedIn is a professional networking site and developing a personal profile can assist graduates by highlighting an individual's professional story, and documenting their experience, skills, and education [15]. LinkedIn was launched in 2003 and in 2016 had 430 million members [16]. Students as they transition out of university are encouraged to complete a LinkedIn profile to represent themselves professionally and because online social networks, such as LinkedIn are an emerging tool for identifying, attracting, and screening recruits [17,18]. LinkedIn can also be used by employers of health service managers to verify information in resumes and to advertise roles suitable for graduates. It is also recognised that companies such as LinkedIn 'profit from and contribute to the promotion of the employability discourse as well as a focus on skills' [11]. Social media and professional networking sites such as LinkedIn collect vast amounts of personal and professional data. Companies, such as LinkedIn can mine this data and benefit from user provided data. The LinkedIn platform is not immune, and users of these platforms should be aware of the risks and potential dangers of social media sites such as privacy, fraud, and phishing [19].

There is limited literature on the roles and destinations of health service management graduates. Few studies could be found on the use of LinkedIn as a tracking tool for graduate employment destinations. A study conducted by

Heydenrych and colleagues [20] used LinkedIn to track employment outcomes for engineers in South Africa and found that LinkedIn allowed for a straightforward capture of data.

This study explored the employment outcomes of and Australian University health service management (HSM) graduates after a Work Integrated Learning (WIL) placement. We applied a novel method of tracking outcomes based on LinkedIn data and examined graduates who had completed a WIL placement in HSM from cohorts in 2018-2020.

RESEARCH QUESTIONS

What are the employment outcomes for health service management graduates who take a work-integrated learning course?

What are the sectors where graduates are now employed? How many graduates are working in roles for which they studied i.e., HSM?

RESEARCH DESIGN AND METHODOLOGY

We used a pragmatic lens in conducting this research. This approach is widely used in the health industry whereby knowledge of the world can be obtained through observation, experience and experimentation and making decisions on what will work best [21–23] Consequently, we used routinely available data to answer the research questions posed in this inquiry. Using class lists we identified the students who had completed a health service management WIL between 2018 – 2020. Students on placement, as part of the employment related tasks, were encouraged by the Work Integrated Learning Convenor and The University Careers and Employability Group to create a LinkedIn profile. We determined graduate outcomes by checking each graduate with a current LinkedIn profile and their employment status in October 2021 and recorded this on a spreadsheet. It was noted if they were employed, employed as a health service manager and the sector of employment.

PARTICIPANT SELECTION AND SAMPLING

To select participants, for the period studied, a total of ninety-two placements occurred, eight (8) students completed two placements (Figure 1). We removed duplicate names for students who completed two placements resulting in eighty-four potential participants. Exclusion criteria for the study were those students that did not have a LinkedIn profile (n=12) or had not updated their profile to record their current employment status (n=18). From the cohorts 72/84 (86%) had a LinkedIn profile with 54/72 (75%) having an updated profile which included their current employment status. Figure 2 shows the participant selection process for inclusion in the study.

FIGURE 1 TOTAL HEALTH SERVICE MANAGEMENT PLACEMENTS BY YEAR AND TRIMESTER

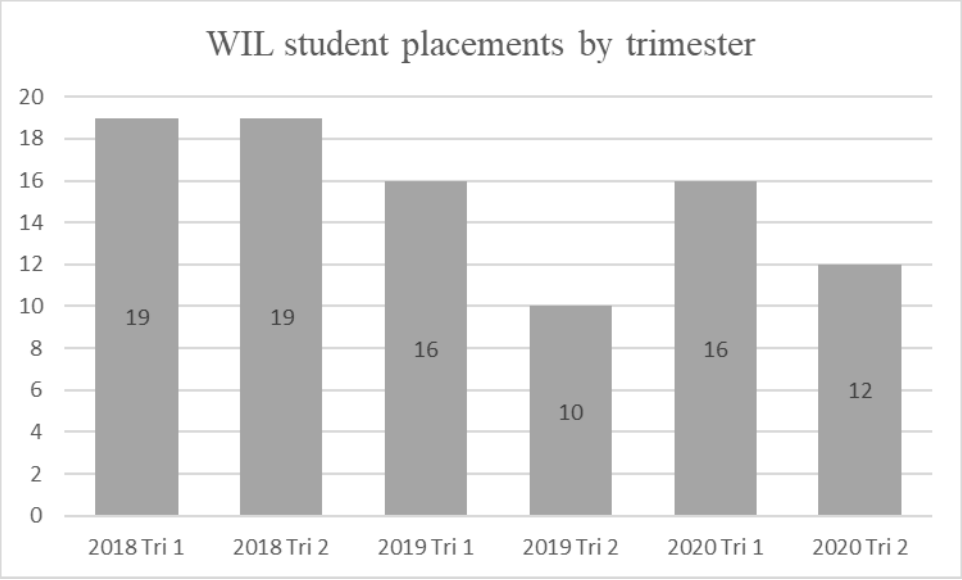
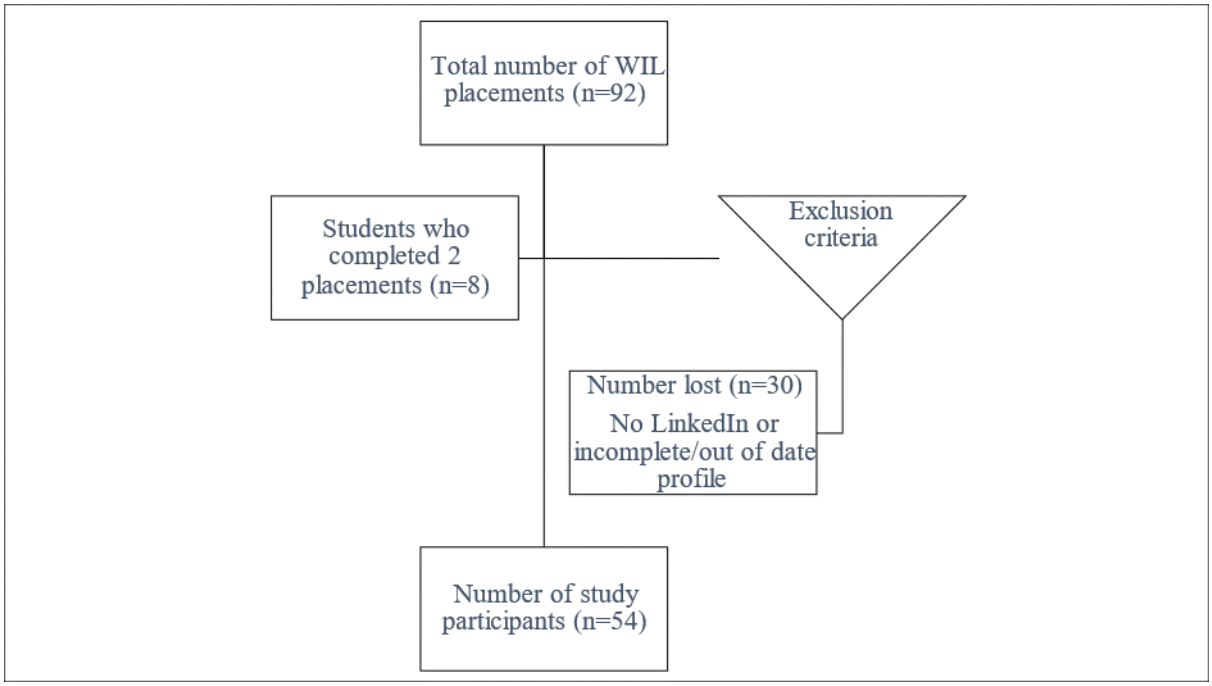


FIGURE 2 PARTICIPANT SELECTION



The following data for each participant was collected, using a spreadsheet.

1. Trimester of placement
2. Last name and first name
3. International student at time of placement (Y/N)
4. Employed (Y/N)
5. Role title for the position that the graduate is employed.
6. Working in a role requiring a health service manager (either in Australia or overseas) (Y/N)
7. Sector where graduates are employed (Private, public, Not for Profit)
8. LinkedIn Address

While data on students who had completed a placement in 2021 was available these cohorts were not included as it takes time to find employment particularly during a time of disruption, such as that experienced in Australia with the COVID 19 pandemic.

DATA ANALYSIS

To make sense of the data [21], we used Excel to summarise the data and quantify employability outcomes. Pivot tables were used to create tables to measure patterns and trends [21]. The small size of the participant sample prevented further statistical analysis.

ETHICAL APPROVALS

This study was considered low and negligible risk and the following ethical approval was obtained from Griffith University Human Research Ethics Committee (GU Ref No 2021/860).

The Ethics Committee recommended the opt-out approach to participation as part of ethical approvals, and this was included as part of the study design. The chief investigator sent a message to all potential participants via LinkedIn and informed them of the research and their ability to opt-out by request. Graduates were invited to ask further questions and to opt-out within a 14-day period. Questions received from graduates were addressed with no graduates opting out of the study.

RESULTS

Results are divided into three sections 1. characteristics of participants 2. overall employment outcomes and sectors employing HSM graduates, 3. graduates working as health service managers.

CHARACTERISTICS OF PARTICIPANTS

The only identifying information collected in this study was the residency status of the student at time of placement with forty-five having a residency status as international and nine as domestic.

Students completed their placements in a broad range of public, private, non-government and not for profit health care organisations. Non-government and not for profit

organisations operate independently of government to address social and other issues [24]

EMPLOYMENT OUTCOMES AND SECTORS

What are the employment outcomes for health service management graduates who take a work integrated learning course?

What are the sectors where graduates are now employed? Table 1 shows the sectors where graduates in the sample found employment and student residency status when they completed a WIL placement. Overall, the private sector was the largest employment destination for health service management graduates who had completed a WIL (n=29, 54%).

Some student's LinkedIn profiles showed employment in overseas locations, the majority were employed in organisations located in Australia, demonstrating student uptake of their post study work rights. For international graduates the majority were employed in companies in the private sector.

TABLE 1 TOTAL DISTRIBUTION BY STUDENT RESIDENCY STATUS AT TIME OF WIL PLACEMENT AND EMPLOYER TYPE

	Residency status at time of WIL placement		Total N (% of respondents)
Employer Sector	**Domestic Student**	**International Student**	
Private	2	27	29 (54)
Public	7	9	16 (30)
Non-Profit	0	9	9 (17)
Total	9	45	54 (100)

TABLE 2 GRADUATES WORKING AS HEALTH SERVICE MANAGERS

Graduates Working as Health Service Managers N (% of graduates)	
Working as a Health Service Manager	**Total**
Yes	40 (74)
No	14 (26)
Grand Total	**54 (100)**

TABLE 3 RESIDENCY STATUS AT TIME OF PLACEMENT

	Residency status at time of WIL placement N (% of graduates)		
Graduates working as a Health Service Manager	**Domestic**	**International**	**Total**
Yes	9 (22.5)	31 (77.5)	40 (100)
No	0 (0)	14 (100)	14 (100)
Grand Total	**9 (17)**	**45 (83)**	**54 (100)**

TABLE 4 GRADUATES WORKING AS HEALTH SERVICE MANAGERS BY EMPLOYER TYPE

Employer Type	Graduates employed as health service managers N (% of graduates)		Total N (% of graduates)
	Domestic Student	**International Student**	
Private	2 (22)	20 (64)	22 (55)
Public	7 (78)	7 (23)	14 (35)
Not for Profit	0 (0)	4 (13)	4 (10)
Total	**9 (100)**	**31 (100)**	**40 (100)**

GRADUATES WORKING AS HEALTH SERVICE MANAGERS

Seventy-four percent (74%) (40) of graduates in our study were employed in roles identified as related to their studies in health service management. Twelve graduates were working in the health sector but not in position titles related to HSM (clinical roles). See Table 2.

For international students, LinkedIn profiles reflected that most were working in their chosen fields as health service managers (n=31, 69%). All domestic students in the sample (n=9, 100%) were employed as health service managers. See Table 3.

SECTORS OF EMPLOYMENT – WHO IS EMPLOYING OUR HSMS WHO COMPLETED A PLACEMENT

More than half of the graduates employed as health service managers, (n=22,55%) were working in roles within the private sector, with 14 (35%) in the public sector and 4 (10%) working for not-for-profit organisations. Table 4 shows the breakdown of graduate employment outcomes, working in degree-related occupations, by residency status at time of placement.

For international students who completed a WIL placement the private sector was the largest employer of graduates followed by public and not for profit sectors (Figure 3). This contrasts with domestic students although our data set is too small to draw conclusions.

FIGURE 3 INTERNATIONAL STUDENTS WORKING AS HSM PERCENT DISTRIBUTION BY EMPLOYER TYPE

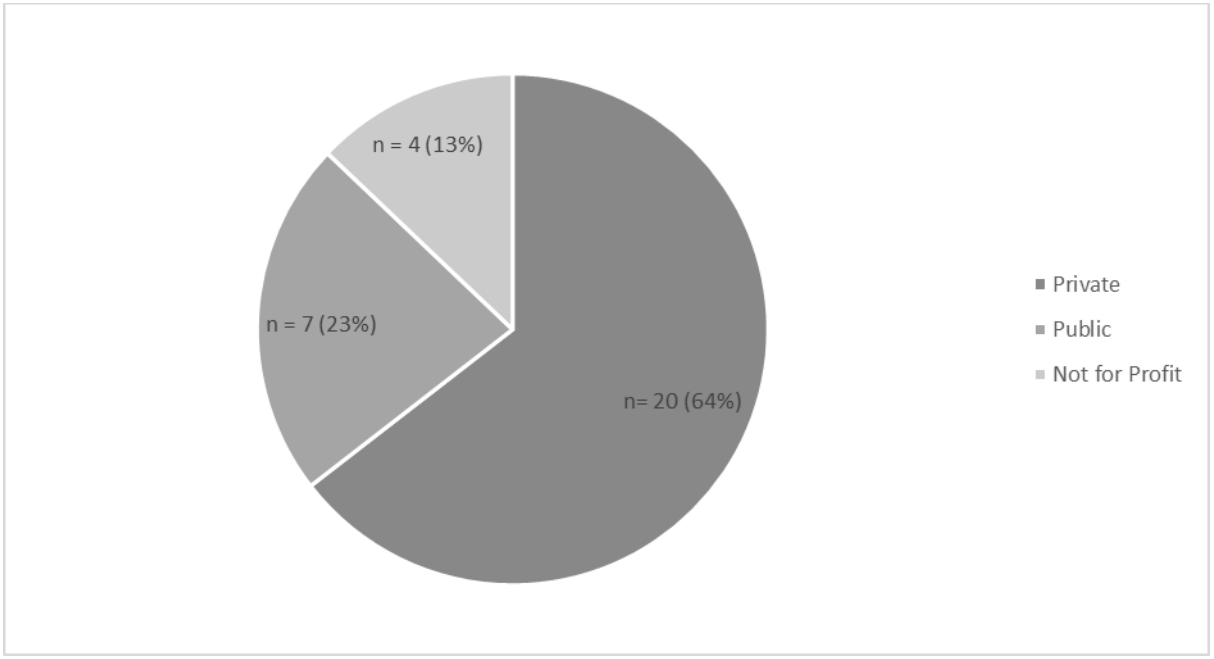


TABLE 5 BROAD ROLE OF HSM DESCRIBED ON LINKEDIN

Broad role and role described on LinkedIn	Percentage of total	Total
Health service manager	**25%**	10
Assistant Manager		1
Business Co-ordinator		1
Business Development Officer		1
Health Manager		2
Healthcare manager		1
HR Manager/Business Support Manager		1
Operations Manager		1
Program Manager		1
Senior supervisor		1
Primary care manager	**22.5%**	**9**
Clinic manager		2
Lead medical administrator		1
Medical Administrator		1
Practice Manager		5
Technical manager/officer	**15%**	**6**
Clinical specialist in medical technologies		1
Environmental Services Officer		1
Health and safety specialist		1
Medical Billings Officer		1
Senior Technical Advisor		1
Technical Advisor		1
Project management/officer	**12.5%**	**5**
Project Coordinator		1
Project Manager		1
Project Officer		1
Senior Project Officer		2
Planning manager	**10%**	**4**
Executive Strategy and Planning		1
Health planner		1
Planning Manager		1
Strategy and Business Development		1
Information manager/officer	**10%**	**4**
Clinical documentation specialist		1
Digital Health Expert		1
Information Manager		1
Information Technology Officer		1
Consultant	**2.5%**	**1**
Consultant		1
Insufficient detail to code	**2.5%**	**1**
Insufficient detail available		1
Grand Total	**100%**	**40**

ROLES HSM GRADUATES ARE EMPLOYED IN?

Graduates were employed in a variety of roles relevant to their qualifications in health service management that were coded to broad functional job titles as shown in Table 5. Twenty-five percent (n=10) were in roles that were described as health service managers, twenty-two percent (n=9) primary care manager. Other broad roles were information managers, technical managers or planning managers.

DISCUSSION

This study applied a novel approach to understand the employment outcomes for health service management graduates who complete a work integrated learning placement, the sectors where they are employed and the number of graduates that are working in roles for which they studied, in this instance health services management.

Graduate employment outcomes for the students completing a work-integrated learning placement between 2018 and 2020 confirm the finding from other studies that demonstrated similar employment rates [25]. We note that all the domestic students were already working or had recently worked in the Australian context, in other disciplines or as clinicians at the time of their WIL placement. This cohort sought an industry placement to develop new skills, apply theory into practice and use this to transition to management roles.

Our graduates working as health service managers have found employment in a variety of private, public, and non-governmental agency settings including pharmaceutical companies, general practices, large tertiary referral hospitals and State health departments. The private sector and not-for-profit predominately employed the majority of students working as health service managers however this probably reflects the characteristics of the cohort of students (i.e., international students). The roles are appropriate for new graduate health service managers and will position them to utilise their undergraduate, postgraduate, experience skills and knowledge to further progress their professional careers.

Other studies have observed [1,26] that international students have multiple barriers to overcome when looking for postgraduate employment such as a lack of, or small social and professional networks, perceived notions or issues on communication skills, technical ability and cultural differences. This is further complicated by advertised roles in the public sector, requiring a permanent residency/visa status and prior work experience in Australia effectively locking out international students. Job roles in areas of need or remote and regional Australia can be difficult without a driver's licence and transport.

That the private sector was the largest employer of international health service management graduates reflects that in Australia, employers may be more willing to risk investing in international students who can fill temporary or contract roles that are suited to the graduate visa requirements.

Of course, we would like to see a greater proportion of our graduates work in their chosen field of health service management and Universities strive to ensure that the curricula incorporate evidence-based approaches to support graduates to achieve desirable employment outcomes. But we are encouraged by the results and the strength of our employment outcomes may be attributed to the development of the student cohort, program design, industry support for our program and characteristics of the WIL course. We believe the success of employment outcomes lies in the characteristics of our HSM Programs as shown below in Figure 4, however this is anecdotal and validation through further research is needed.

Relevant discipline and professionally relevant knowledge and skills is embedded into courses throughout the University's health service management program curriculum. Courses utilise authentic assessment to build these skills and students will complete a variety of tasks such as conducting research and projects, oral presentations, reflections, authoring reports, preparing executive briefing notes, analysing data, preparing plans, and creating poster presentations. The program studied provides an opportunity for a WIL placement to all domestic and international students. All students who have completed the required courses and compliance requirements irrespective of their overall GPA can complete a WIL placement. This provides equity in access to WIL and holds our course apart from others that may have GPA, interview, and other hurdles. Student learning in the WIL is underpinned by a strengths-based approach, strong scaffolding of learning to match industry expectations and valuing diversity and prior experience.

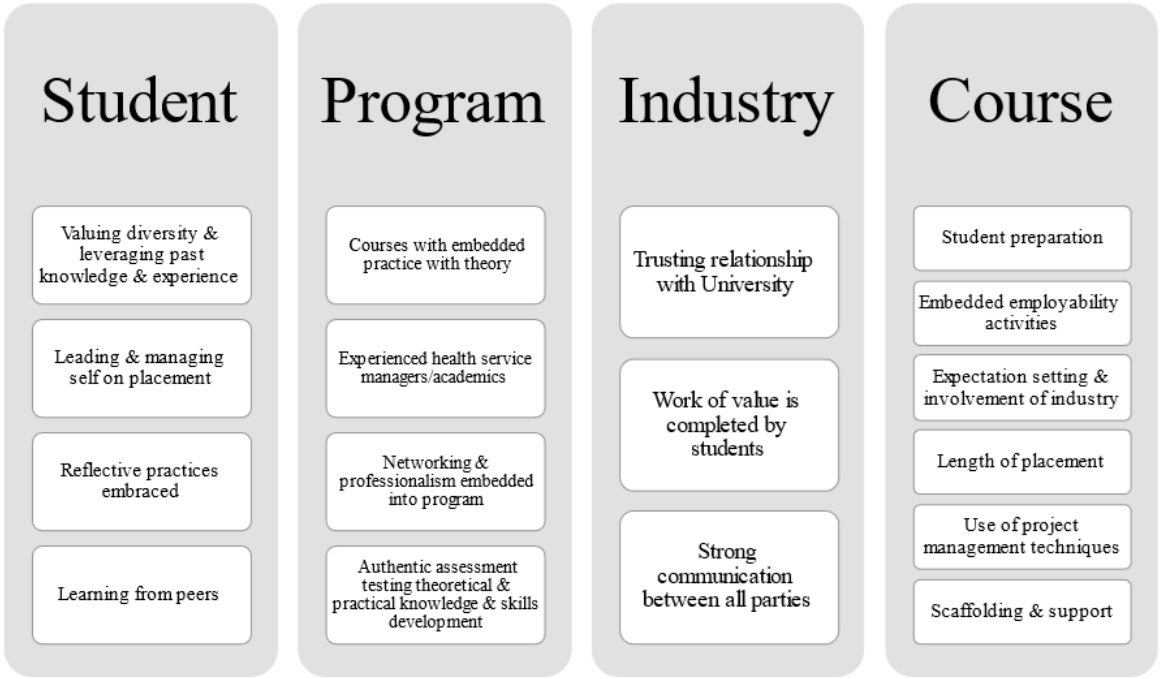
CONCLUSIONS

Universities are focussed on employability as government and employers demand work ready graduates [12,27,28]. Consequently, empirical data on graduate outcomes and destinations. is needed by HSM academics, program leaders and WIL academics to understand employment outcomes and the factors related to success.

We used a novel approach utilising LinkedIn rather than surveying graduates to determine graduate employment outcomes. The approach enabled us to measure graduate employability outcomes and obtain data that is more granular than can be extracted from surveys such as the Quality Indicators for Learning in Teaching (QILT) student experience studies that are not sufficiently detailed to measure discipline specific outcomes [29].

This exploratory study has revealed that the LinkedIn platform can be used to track graduate outcomes with several provisos, described in the limitations section and that international graduates can achieve strong employment outcomes in health services management. Graduates have been appointed a diverse number of position titles including project officer, senior project officer, practice manager, operations or service managers, business co-ordinator or business development officer, clinical documentation specialist or information technology officer.

FIGURE 1 CHARACTERISTICS OF HSM PROGRAM RELATED TO EMPLOYABILITY OUTCOMES



LIMITATIONS

Self-reporting by graduates is limited by the engagement with, the accuracy of, and completeness of participant LinkedIn profiles. Researchers were not able to determine that graduates accurately maintained their LinkedIn profiles and/or updated them when they left employment or changed roles. Further, the data provides a broad picture and was not sufficiently granular to understand what the roles entailed, the location of employment or the time taken to secure a role. Further, this sample may be biased as students who have a LinkedIn profile were motivated towards attaining employment. There was a high loss rate of potential participants as 30 of the 92 graduates did not have a LinkedIn profile that contained sufficient information to determine employability outcome.

A further limitation is that every graduate in this study had participated in a WIL and as such we were not able to make comparisons to the employment outcomes of those that had not completed a placement. This study also did not consider pre-graduate employment experience, age, prior qualifications, and their effects on postgraduate

employment outcomes. Palmer and colleagues note that 'the research literature suggests that the relationship between WIL and graduate outcomes is likely to be complex and context dependent' [3]. The empirical evidence on the magnitude of the contribution of WIL to the success of employability outcomes is still emerging and further research needed [30,31].

FURTHER RESEARCH

Further research to understand the factors that influence graduate employment outcomes is needed. Data to determine if placement sector (public/private), time taken for graduates to secure employment, extra-curricular activities students involve themselves with, the level of health service management positions graduates are attaining and the components of the degree that contribute to employment would enable further understanding of health service management graduate employability.

AUTHORS CONTRIBUTION

SL was the Chief Investigator for the study. SL designed the study. Literature searches were conducted by SL, MV and JS. Analysis was conducted by JS, MV and SL. JS, SL and MV completed the first draft, edited by all. All authors contributed to the intellectual input and edited emerging drafts. All authors agree on the final version of the article.

ACKNOWLEDGMENTS

HSM academic colleagues who mentor, support, and guide students prior to commencing the WIL courses in our degrees. Students for their efforts in learning during placement and grad

References

1. Universities Australia. Work Integrated Learning in Universities: Final Report. 2019.
2. Griffith University. The Griffith Employability and Career Success Framework. 2022.
3. Palmer S, Young K, Campbell M. Developing an institutional evaluation of the impact of work-integrated learning on employability and employment. International Journal of Work-Integrated Learning 2018;19:371–83.
4. Jackson D. Employability skill development in work-integrated learning: Barriers and best practice. Studies in Higher Education 2015;40:350–67. https://doi.org/10.1080/03075079.2013.842221.
5. Bates L, Sampford K. Building a bridge between university and employment: Work-integrated learning Queensland Parliamentary Library Research Publications and Resources Section 2005.
6. Universities Australia, Australian Chamber of Commerce and Industry, Business Council of Australia, Australian Collaborative Education. National strategy on work integrated learning in university education 2015.
7. Ferns SJ, Rowe AD, Zegwaard KE. Advances in research, theory, and practice in work-integrated learning: Enhancing employability for a sustainable future. Taylor & Francis Group; 2021.
8. Chowdhury F. Work integrated learning at tertiary level to enhance graduate employability in Bangladesh. International Journal of Higher Education 2020;9:61–8. https://doi.org/10.5430/ijhe.v9n4p61.
9. Ferns S, Lilly L. Driving institutional engagement in WIL: Enhancing graduate employability. Journal of Teaching and Learning for Graduate Employability 2016;6:116–33. https://doi.org/10.21153/jtlge2015vol6no1art577.
10. Tran L, Rahimi M, Tan G. Temporary Graduatification: Impacts of Post-Study Work Rights Policy in Australia. Research for Educational Impact 2019:1–52.
11. Komljenovic J. Linkedin, platforming labour, and the new employability mandate for universities. Globalisation, Societies and Education 2019;17:28–43. https://doi.org/10.1080/14767724.2018.1500275.
12. Matthews D, Radloff A, Doyle J, Clarke L. International Graduate Outcomes Survey - 2018. Final Report. Higher Education Research 2019.
13. McConnell D, Linwood R, Day G, Avery M. A Descriptive Analysis of a Health Management Work Integrated Learning Course: moving from Health Services Management learning to employment readiness. Asia-Pacific Journal of Health Management 2019;14:56–67. https://doi.org/10.24083/apjhm.v14i2.269.
14. Gribble C, Blackmore J, Rahimi M. Higher Education, Skills and Work-Based Learning Article information : Higher Education, Skills and Work-Based Learning 2015;5:401–16.
15. LinkedIn. What is LinkedIn and how can I use it? 2020. https://www.linkedin.com/help/linkedin/answer/111663/what-is-linkedin-and-how-can-i-use-it-?lang=en (accessed January 1, 2022).
16. World Economic Forum. The Human Capital Report (Insight Report). 2015.

17. Zide J, Elman B, Shahani-Denning C. Linkedin and recruitment: How profiles differ across occupations. Employee Relations 2014;36:583–604. https://doi.org/10.1108/ER-07-2013-0086.
18. Garg R, Telang R. To be or not to be linked: Online social networks and job search by unemployed workforce. Manage Sci 2018;64:3926–41. https://doi.org/10.1287/mnsc.2017.2784.
19. Davydoff D. Don't Overlook Linkedin as a Corporate Security Risk. Security Magazine 2019. https://www.securitymagazine.com/articles/90263-dont-overlook-linkedin-as-a-corporate-security-risk (accessed January 4, 2022).
20. Heydenrych H, Case JM. Researching graduate destinations using LinkedIn: an exploratory analysis of South African chemical engineering graduates. European Journal of Engineering Education 2018;43:693–705. https://doi.org/10.1080/03043797.2017.1402865.
21. Liamputtong P. Research methods in health: foundations for evidence-based practice. 2nd ed. South Melbourne, Vic: Oxford University Press; 2013.
22. University of Nottingham. Understanding pragmatic research n.d. https://www.nottingham.ac.uk/helmopen/rlos/research-evidence-based-practice/designing-research/types-of-study/understanding-pragmatic-research/section03.html#:~:text=Pragmatism%20involves%20research%20designs%20that,find%20solutions%20to%20research%20problems. (accessed March 21, 2023).
23. Long KM, McDermott F, Meadows GN. Being pragmatic about healthcare complexity: Our experiences applying complexity theory and pragmatism to health services research. BMC Med 2018;16. https://doi.org/10.1186/s12916-018-1087-6.
24. Oxford English Dictionary. Oxford English Dictionary Online. Oxford English Dictionary 2015;2010:http://dictionary.oed.com/. http://dictionary.oed.com.
25. Quality Indicators for Learning and Teaching. 2021 Graduate Outcomes Survey – Longitudinal. 2021.
26. Kay J, Ferns S, Russell L, Winchester-Seeto T. The emerging future : Innovative models of work-integrated learning. International Journal of Work Integrated Learning 2019;20:401–13.
27. Ferns S, Russell L. Enhancing industry engagement with work-integrated learning : Capacity building for industry partners. Asia-Pacific Journal of Cooperative Education, Special Issue 2016;17:349–75.
28. Sotiriadou P, Logan D, Daly A, Guest R, Sotiriadou P, Logan D, et al. Studies in Higher Education The role of authentic assessment to preserve academic integrity and promote skill development and employability 2020. https://doi.org/10.1080/03075079.2019.1582015.
29. ACEN. Australian Collaborative Education Network - 2021 Summary Report for Graduate Outcomes Survey items 2021.
30. Jackson D, Collings D. The influence of Work-Integrated Learning and paid work during studies on graduate employment and underemployment. High Educ (Dordr) 2018; 76:403–25. https://doi.org/10.1007/s10734-017-0216-z .
31. Wilton N. The impact of work placements on skills development and career outcomes for business and management graduates. Studies in Higher Education 2012;37:603–20. https://doi.org/10.1080/03075079.2010.532548

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

THE RATIO AND PREDICTOR FACTORS OF THE INAPPROPRIATE AND UNNECESSARY USE OF EMERGENCY DEPARTMENT SERVICES

Mohamad Hosseini Kasnavieh[1], Mahsa Mahmoudinejad[1], Mohamad Veisi[2], Shadi Mousavi[1], Ali Tahmasebi[3]*

1. Department of Emergency Medicine, School of Medicine, Iran University of Medical Sciences, Tehran, Iran.
2. Health management and Economics department, School of Public Health, Tehran University of medical sciences, Tehran, Iran.
3. Health Management and Economics Research Center, Health Management Research Institute, Iran University of Medical Sciences, Tehran, Iran.

Correspondence: ali66tahmasebi@gmail.com

ABSTRACT

INTRODUCTION:

Provision of unnecessary medical services is one of the problems that have driven up health care budgets. The crowding of emergency departments (ED) and sometimes patients 'unreasonable expectations, may lead to ED staff burnout and increase the provision of unnecessary services.

METHODS:

In this study, the Hospital Urgencies Appropriateness Protocol (HUAP) was used to assess the appropriateness of services provided in the ED. The sample size of this study consisted of 445 patients who were selected among the patients admitted in Rasoul Akram and Firouzgar hospitals in Iran by stratified sampling. Chi-square and logistic regression tests were used to analyze the data.

RESULTS:

The rate of inappropriate admissions in the ED of the studied hospitals was measured at about 13%. Patients admitted to the Firouzgar ED showed a higher probability of inappropriate admission. Among the considered factors, gender and the interval between the onset of symptoms and ED admission are factors affecting inappropriate admission.

CONCLUSION:

The rate of inappropriate admission is seen as high in this study. Gender and the interval between the onset of symptoms and an ED admission can be considered as predictors of the provision of unnecessary services. Outcomes from this study are that it is significant to provide operational and evidence-based solutions regarding the issues related to the provision of identified unnecessary services in the ED.

KEYWORDS

Inappropriate treatment, HUAP, emergency department.

INTRODUCTION

One of the problems that has driven up health care costs is the provision of unnecessary medical services. [1-4] Unnecessary medical services are defined as the services that in regard to a patient's conditions are not necessary to be provided. These services do not bring about any positive changes in the patient's life longevity and quality and the patients would not choose them if they had enough information about them. [5] An Emergency Department (ED) is one ward in the hospital that is seen as the entrance to the hospital due to its special conditions in comparison with other wards. The special services and functions of ED have developed this service as the entrance gate of the hospital. The need for immediate responses, which may require more resources than what is currently available in the ED, the emergency conditions, limited time for decision-making, and sometimes patients 'unreasonable expectations may lead to ED staff burnout and increase the provision of unnecessary services in ED. [6-8] In a survey conducted in 2015, over 85% of emergency physicians (EP) believed that too many diagnostic tests were ordered in their own EDs, and 97% said at least 22% of the advanced imaging they ordered were medically unnecessary. [9]. Unnecessary emergency services also raise medical costs. Out of 100 million physician's visits that are made in the United States every year, two-thirds of the 27 million visits of insured patients are unnecessary and can be delivered in primary care centers at a much lower cost ($US1,800 less per patient). [6]

ED generally provides urgent care services and do not include non-urgent cases; however, many patients consider it necessary to receive regular services in this ward as well. [7, 10,11] The patients' high expectations and demands can be one reason for the provision of unnecessary service in the ED and it can affect the quality of services and the patients' and staff's dissatisfaction in the ED [6]. Financial motivations, fear of missing cases in diagnoses, fear of complaints, risk aversion, impatience in cases with uncertainty, high risk of making decisions in limited time and the need for an urgent decision, lack of continuous relationship between doctor and patient, inadequate access to the patient's record at the time of making a decision, incomplete and sometimes inconsistent access to the patient's records, unreasonable expectations of patients or their companions and families, local care standards, overcrowding of the ED and congestion of services, are some reasons which may lead to the provision of unnecessary services in the ED. [9] The risk of harm to patients, additional costs which are not rationally cost-justified, wrong care in the wrong place and at the wrong time and worries about limiting the capacity of the ED for people who need emergency services are the consequences of unnecessary services which reduce ED service quality. [12, 13] Although various studies on unnecessary and inappropriate services have been conducted in Iran and there have sought solutions to reduce these problems [8, 14, 15] it should be noted that there is insufficient information in the research literature about the provision of unnecessary services in the ED. [16] Therefore, this study was conducted to determine the conditions and predictor for inappropriate and unnecessary use of the ED services in Iran University of Medical Sciences based on the HUAP protocol. [17]

METHOD

A cross-sectional and retrospective study design was employed. The study was completed in May to August 2022 (a three-month period was used given the large number of patient presentations that occur at these facilities). In this study, the Hospital Urgencies Appropriateness Protocol was used to assess the appropriateness of services provided in the ED which is a previously developed standardized and validated set of assessment criteria [17].

Patient histories were reviewed through medical records by an emergency medicine specialist who had no professional dependence on the investigated hospitals. This assessment determined whether the patient's admission was appropriate or not. If patient conditions were in accordance with at least one of the standards of HUAP, the patient's admission was considered to be appropriate. The sample size of this study consisted of 445 patients (based of Cochran formula (Cochran, 1977)) [40] from an estimated 60,000 population size who were selected among the patients admitted in Rasoul Akram and Firouzgar hospitals (which are general and teaching hospitals affiliated to the Iran University of Medical Sciences) by a stratified sampling method. Inclusion criteria were patients discharged with less than 6 hours in the ED and the patients discharged with more than 6 hours in the ED were excluded from the study. Patient background information such as gender, insurance status, marital status, address (city of residence), previous admission record, age, and type of the admission day (workday or weekend/holiday), education, age, and admission shift were collected and registered. In addition, some

demographic information was incomplete in some of the medical records. Incomplete demographic information caused missing data in our study, although we tried to survey medical records, which were generally fully completed. Chi-square and logistic regression tests were analyzed in the data to identify affecting variables that affects inappropriate use of services.

This study was not a trial clinical study; therefore, it is not necessary to get informed consent. However, confidentiality of the information was considered. This study was also approved by Ethical Committee of the Iran University of Medical Sciences. This study received an ethics code with IR. IUMS.REC1396.31194 number from the Iran University of Medical Sciences.

RESULTS

According to the data analysis of the obtained results, 41.1% of the patients were female and 58.9% of them were male. Also, 54.6% of patients were married and 45.4% were single. The mean age of the patients in this study was about 41 years with a standard deviation of 20. [Table 1] Other demographic information of the patients is included in Table 1.

TABLE1. FREQUENCY DISTRIBUTION OF DEMOGRAPHIC INFORMATION OF PATIENTS

Variable	Subcategory	Frequency	Frequency percentage
Gender	Male	262	58.9%
	Female	183	41.1%
Marital status	Single	202	45.4%
	Married	243	54.6%
The interval between the onset of symptoms and ED admission	Less than one day	382	85.8%
	More than one day	63	14.2%
Previous admission record	Yes	132	42.2%
	No	181	57.8%
Insurance status	Insured	327	74%
	Not insured	115	26%
Place of residence	Tehran	414	93%
	Other cities	31	7%
Admission day	Weekdays	69	15.5%
	Days off	375	84.5%
Education	High school degree or lower	226	72.9%
	College degree and BA	74	23.9%
	Master degree and higher	10	3.2%
Age	18 years≤	42	9.4%
	18-36 years	184	41.3%
	37-55 years	111	24.9%
	56-74 years	81	18.2%
	≥ 75 years	27	6.1%
Admission shift	Night	71	16%
	Morning	135	30.5%
	Evening	237	53.5%

TABLE2. FREQUENCY DISTRIBUTION OF INAPPROPRIATE ADMISSION IN HOSPITAL EDS

Hospital	Status	Frequency	Frequency percentage
Rasoul Akram	Appropriate	247	91.1%
	Inappropriate	24	8.9%
Firouzgar	Appropriate	141	81%
	Inappropriate	33	19%
Total	Appropriate	388	87.2%
	Inappropriate	57	12.8%

A total of 445 patients admitted to the ED were studied. However, about 57 patients did not meet the conditions of admission in the ED and were highlighted as inappropriate admissions in the ED. Therefore, the rate of inappropriate admission in the ED of the study hospitals was measured at about 13%. The rate of inappropriate admission in the ED of Firouzgar Hospital was higher than the rate in Rasoul Akram Hospital.

To investigate and determine the predictor factors inappropriate admission, variables such as gender, marital status, insurance status, the studied hospital, place of residence, admission time, day of the week, admission status in terms of being a weekday or a day off, patient age, admission record in the ED, the patient's education and the interval between the onset of symptoms and ED admission were included as predictor variables. Lemeshow statistics showed a good fit of the model [Chi-square = 6.1, P-value = 0.639]. Also, the Nagelkerke R Square was obtained at 0.3, which represents a good level of prediction of the regression model.

Considering the P-value of the variables in Table 2, it was revealed that among the 12 variables included in the regression equation, 3 variables have a significant effect in predicting the amount of inappropriate admission. (Table 3)

In regard to the result obtained, patients admitted to the Firouzgar ED showed a higher probability for inappropriate admission. Thus, the risk of inappropriate admission in patients referred to Firouzgar ED was about 5 times higher than that in Rasoul Akram ED patients. [OR: 4.92; 95% CI: 2.11–11.51, p≤0.001] Also, female patients showed more inappropriate admissions in the ED than male patients. Female patients revealed 3 times more risk of inappropriate admission in the ED. (OR: 3.38; 95% CI: 1.47–7.76, p = 0.004) Another predictor factor on the rate of inappropriate admission in the ED of the studied hospitals was the "Interval between the onset of symptoms and ED admission". Accordingly, patients who for one day after the onset of symptoms referred to the ED showed a higher risk than patients who before one day referred to the ED. According to our results, the amount of this risk is about 12 times. In other words, the patients who after one day from the onset of their first illness symptoms referred to the ED showed a 12 times higher risk of non-appropriate admission rather than other patients (OR: 12.47; 95% CI: 4.66–33.4, p≤0.001) Table 3 shows the statistics of the other variables and it is taken into account in the next section.

TABLE3. RESULTS OF LOGISTIC REGRESSION TEST TO DETERMINE VARIABLES AFFECTING NON-APPROPRIATE ADMISSION IN ED

Category	Group	SE	Wald	P-value	OR†	OR Confidence interval	
						low	high
Hospital	Rasool Akram *						
	Firouzgar	0.43	13.55	0.001≥	4.92	2.11	11.51
Gender	Man*						
	Female	0.42	8.2	0.004	3.38	1.47	7.76

Insurance status	Insured *						
	Not insured	0.49	0.52	0.473	0.7	0.27	1.84
Marital status	Single*						
	Married	0.5	0	0.974	0.98	0.37	263
Place of residence	Tehran*						
	Other cities	0.71	0	0.989	1.09	0.25	4.04
Previous admission record	Yes*						
	No	0.48	0.76	0.387	1.51	0.59	3.85
Admission time	Night *		0.49	0.782			
	Morning	0.61	0.16	0.687	0.78	0.24	2.58
	Evening	0.58	0.48	0.49	0.67	0.22	2.08
Education	High school degree or lower*		0.28	0.87			
	College degree and BA	0.5	0.02	0.895	1.07	0.4	2.82
	Master degree and higher	1.07	0.28	0.597	1.76	0.22	14.33
The interval between the onset of symptoms and ED admission	Less than one day*						
	More than one day	0.5	25.19	0.001≥	12.47	466	33.4
Day of the week	Day off*						
	Weekdays	1.04	0.28	0.596	0.58	0.08	4.39
Age	*18 years≥		4.78	0.31			
	18-36 years	0.78	0.12	0.727	1.31	0.29	5.99
	37-55 years	0.93	0.04	0.848	1.2	0.19	7.43
	56-74 years	0.97	1.26	0.261	0.33	0.05	2.26
	≥75 years	1.2	0.27	0.601	0.53	0.05	5.6

*, reference † Odds ratio.

DISCUSSION

The present study aimed to determine the extent and reasons of inappropriate admissions in the ED. For this purpose, the HUAP was used. This protocol is a valid tool to assess the appropriateness of hospital admissions and hospitalization in the ED. [18, 19] Today, unnecessary and inappropriate services beyond those needed from a medical centre have turned into a major problem in health systems all around the world, and the medical centers in developed countries have been seriously suffering from this problem as well. [2-4, 20-23] The overcrowding and complexity of providing ED services have made this department a place where prescription and the provision of unnecessary and inappropriate services are possible. [6-9] Unnecessary and inappropriate services in the ED are services that, in addition to not being needed and a waste of resources, may harm the patients and reduce the quality of ED services. [12, 13] Therefore, it seems necessary to determine its extent and reasons.

Based on this study's evaluation criteria, about 13% of the ED admissions have been determined inappropriate which were identified as about 9% for one hospital and 19% for the other. There is a relatively large difference in unnecessary use of ED services in one hospital compared to another, indicating poor management in that hospital. Although in Singapore the rate of inappropriate hospitalization was obtained at generally 9.6% [24] and close to the results of the present study, the results of a study conducted in Greek public hospitals by using the HUAP tool, the rate was reported more than 38% [25]. In two other

studies conducted in prior years using HUAP, the percentages of inappropriate services in the ED were obtained at 29.6% and 24.2% .[10, 26] Although the obtained results are fairly consistent (about 8%), the percentage of unnecessary and inappropriate services in the ED in various studies is not highly consistent .[27, 28] Perhaps the reason for this difference can be related to the different places, times, tools, and evaluation methods that have been used. It was reported that in a military training hospital in Iran, more than 64% of patients who received ED services had unnecessary conditions.[15] However, in a similar study in Iran, this rate was estimated at 20% .[29] Meanwhile, in a systematic review and meta-analysis conducted in Iran, the number of provided services that did not meet the appropriateness criteria was on average 12.3% for admission and about 12% for hospitalization. These percentages were close to the total percentage of ED inappropriate services estimated in the present study. [14]

Patients' gender is one factor that can affect the inappropriate use of ED services. [10] The study of the effect of patients' gender on the rate of inappropriate admissions showed that females were admitted to the ED and received inappropriate admissions 3 times more than males. This significant difference could be due to the weaker physical condition of females and their sensitivity to health. In the same study, gender was considered as an important factor, so the rate of inappropriate use of services was higher in females [10] This result has been confirmed in the results of other studies.[12, 29] In another study in Singapore, the results showed that gender was effective in using inappropriate services in the ED, but males were more at risk of using ED inappropriate services than females .[24] However, there is also evidence of no effect of gender on the use of ED inappropriate services. [30] Therefore, the difference of more than 3 times shows that the gender factor has affected the rate of inappropriate admissions in the ED.

According to the obtained results, one of the effective factors in the rate of ED inappropriate admissions was the interval between the onset of symptoms and ED admission. Reasons for providing unnecessary services in the ED include almost similar factors such as distance to the hospital, delay in treatment, use of personal transport, and referral from other hospitals. [26, 28, 31] Similarly, longer stays in the waiting room, longer distances, and the interval between the onset of symptoms and ED admission have been associated with the ED's inappropriate services. [10] Based on the results, the interval between the onset of symptoms and admission to the ED had a significant effect on inappropriate admission. In other words, more than one day from the time of the first symptoms to the patient's arrival in the ED has increased the risk of inappropriate admission by 12 times.

Although in several studies a relationship was found between insurance status and the use of inappropriate services. [12, 32, 33] there is evidence that these two issues are not correlated.[34] Despite the numerical difference, the effect of insurance status on inappropriate use of ED services was not statistically significant. Perhaps if the effect of the type of insurance on the use of inappropriate services were also examined, the results would be different. [28, 35] However, no significant difference was found between people who had health insurance and people who did not in the amount of use of ED inappropriate services. Also based on regression analysis of demographic variables such as age, education, place of residence, marital status, time and day of admission, if the day of admission was off or not and previous admission record in the ED, although no numerical difference was found in the use of ED inappropriate services, it was not statistically significant. However, some studies have shown that age, education, time, and day of admission and if the day of admission was off or not [10, 28, 35-37] have affected the rate of ED inappropriate admission. However, the results of some studies in the case of the insignificance of the effect of some of the mentioned variables on the rate of ED inappropriate admissions were consistent with the results of the present study. [12, 38, 39] The reason for the lack of significant effect of age, education, place of residence, etc. can be found in the very low elasticity of the ED services. In other words, when the patients feel an urgent need for hospital services, regardless of their conditions, they refer to the ED to receive services that might be inappropriate.

CONCLUSION

A significant percentage of all ED admissions with conditions that vary in both complexity and cost, depending on the criteria used, are inappropriate. It shows that hospital services as the most expensive part of the modern health care system, especially in the ED, are still evolving and in need of special attention. Based on the results of regression analysis, gender and the time interval between the onset of symptoms and admission to the ED

were the factors that significantly affected the use of ED inappropriate services. This difference revealed that it was not random and the two variables can be considered as predictors of the provision of unnecessary services. Since inappropriate and unnecessary services are a waste of resources and reduce the quality of services and decline the capacity to provide services to those who need them, it may also lead to overcrowding of the ED and even harm the patients. Therefore, to alleviate the problems of ED, it is significant to provide operational and evidence-based solutions regarding the issues related to the provision of unnecessary services in the ED.

LIMITITION OF THE STUDY:

This study was done in general and educational hospitals and the condition in non-general and non-educational and even private hospitals maybe different.

ABREVIATION:

ED Emergency Department

HUAP Hospital Urgencies Appropriateness Protocol

FINANCIAL SUPPORT:

This study was supported by the Iran University of Medical Sciences.

ACKNOWLEDGMENT:

The authors warmly appreciate the Iran University of Medical Sciences for supporting this study.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

References

1. McGinnis JM, Stuckhardt L, Saunders R, Smith M. Best care at lower cost: the path to continuously learning health care in America. 2013.
2. Carroll AE. The high costs of unnecessary care. Jama. 2017;318[18]:1748-9.
3. Limb M. A fifth of healthcare spending is wasted, says OECD report. British Medical Journal Publishing Group; 2017.
4. Gautam A. Tackling wasteful spending on health: OECD; 2017.
5. Morgan DJ, Leppin A, Smith CD, Korenstein D. A practical framework for understanding and reducing medical overuse: conceptualizing overuse through the patient-clinician interaction. Journal of hospital medicine. 2017;12[5]:346.
6. Braverman A. Unnecessary ED visits-The crossroads of Behavioral Patterns and Legislation.
7. Moskop JC, Geiderman JM, Marshall KD, McGreevy J, Derse AR, Bookman K, et al. Another look at the persistent moral problem of emergency department crowding. Annals of emergency medicine. 2019;74[3]:357-64.
8. Newton EH. Addressing overuse in emergency medicine: evidence of a role for greater patient engagement. Clinical and experimental emergency medicine. 2017;4[4]:189.
9. Kanzaria HK, Hoffman JR, Probst MA, Caloyeras JP, Berry SH, Brook RH. Emergency physician perceptions of medically unnecessary advanced diagnostic imaging. Academic Emergency Medicine. 2015;22[4]:390-8.
10. Carret ML, Fassa AG, Kawachi I. Demand for emergency health service: factors associated with inappropriate use. BMC health services research. 2007;7[1]:1-9.
11. Faulkner D, Law J. The 'unnecessary'use of emergency departments by older people: findings from hospital data, hospital staff and older people. Australian Health Review. 2015;39[5]:544-51.
12. Oktay C, Cete Y, Eray O, Pekdemir M, Gunerli A. Appropriateness of emergency department visits in a Turkish university hospital. Croatian medical journal. 2003;44[5]:585-91.
13. Institute NEH. A matter of urgency: reducing emergency department overuse. 2010.
14. Arab-Zozani M, Pezeshki MZ, Khodayari-Zarnaq R, Janati A. Inappropriate rate of admission and hospitalization in the iranian hospitals: a systematic review and meta-analysis. Value in health regional issues. 2020;21:105-12.
15. Bahadori M, Mousavi SM, Teymourzadeh E, Ravangard R. Emergency department visits for non-urgent conditions in Iran: a cross-sectional study. BMJ open. 2019;9[10]:e030927.
16. Arab-Zozani M, Pezeshki MZ, Khodayari-Zarnaq R, Janati A. Medical overuse in the Iranian healthcare system: a systematic review protocol. BMJ open. 2018;8[4]:e020355.
17. Carret ML, Fassa AG, Kawachi I. Demand for emergency health service: factors associated with inappropriate use. BMC health services research. 2007;7(1):1-9

18. O'Brien GM, Shapiro MJ, Woolard RW, O'Sullivan PS, Stein MD. "Inappropriate" emergency department use: a comparison of three methodologies for identification. Academic emergency medicine. 1996;3[3]:252-7.

19. Mantas J, Hasman A, Gallos P. Health Informatics Vision: From Data via Information to Knowledge: IOS Press; 2019.

20. Bouck Z, Pendrith C, Chen X-K, Frood J, Reason B, Khan T, et al. Measuring the frequency and variation of unnecessary care across Canada. BMC health services research. 2019;19[1]:1-11.

21. Pathirana T, Yu MW, Martiny F, Rupasinghe M, Kottahachchi D, Wijewickrama A, et al. 8 Drivers and potential solutions for overdiagnosis: perspectives from the low and middle income countries. Royal Society of Medicine; 2019.

22. Moynihan R, Doust J, Henry D. Preventing overdiagnosis: how to stop harming the healthy. Preventing Overdiagnosis. 2015;344:47.

23. Brownlee S, Chalkidou K, Doust J, Elshaug AG, Glasziou P, Heath I, et al. Evidence for overuse of medical services around the world. The Lancet. 2017;390[10090]:156-68.

24. Oh HC, Chow WL, Gao Y, Tiah L, Goh SH, Mohan T. Factors associated with inappropriate attendances at the emergency department of a tertiary hospital in Singapore. Singapore medical journal. 2020;61[2]:75.

25. Mantas J. Inappropriate use of public hospitals emergency departments in Greece: magnitude and associated factors. Health Informatics Vision: From Data via Information to Knowledge. 2019;262:224.

26. Sempere-Selva T, Peiró S, Sendra-Pina P, Martínez-Espín C, López-Aguilera I. Inappropriate use of an accident and emergency department: magnitude, associated factors, and reasons—an approach with explicit criteria. Annals of emergency medicine. 2001;37[6]:568-79.

27. Kang EJ, Kim SH. Risk factors related to unnecessary emergency medical services transport for pediatric patients. Journal of International Medical Research. 2019;47[1]:335-44.

28. Naouri D, Ranchon G, Vuagnat A, Schmidt J, El Khoury C, Yordanov Y. Factors associated with inappropriate use of emergency departments: findings from a cross-sectional national study in France. BMJ quality & safety. 2020;29[6]:449-64.

29. Jalili M, Shirani F, Hosseininejad M, Asl-e-Soleimani H. Emergency department nonurgent visits in Iran: prevalence and associated factors. The American journal of managed care. 2013;19[1]:e1-8.

30. Miyazawa A, Maeno T, Shaku F, Tsutsumi M, Kurihara H, Takayashiki A, et al. Inappropriate use of the emergency department for nonurgent conditions: patient characteristics and associated factors at a Japanese hospital. Journal of general and family medicine. 2019;20[4]:146-53.

31. Soltani S, Hoseini Kasnavieh M, Shaker H, Abbasian A, Amanollahi A, Tahmasebi A. Evaluation of Inappropriate Admission and Hospitalization According to Appropriateness Evaluation Protocol and Estimation of Direct Financial Burden. Shiraz E-Medical Journal. 2019;20[12].

32. Meidani Z, Farzandipour M, Gilasi H, Shekrachi M, Nazemibidgoli Z. Investigation of appropriateness of patient hospitalization based on appropriateness evaluation protocol [AEP]. Journal of Payavard Salamat. 2016;10[4]:360-9.

33. Esmaili A, Ravaghi H, Seyedin H, Delgoshaei B, Salehi M. Developing of the appropriateness evaluation protocol for public hospitals in Iran. Iranian Red Crescent Medical Journal. 2015;17[3].

34. Masoompour SM, Askarian M, Najibi M, Hatam N. The financial burden of inappropriate admissions to intensive care units of Shahid Faghihi and Nemazee Hospitals of Shiraz, Iran, 2014. Shiraz E-Medical Journal. 2016;17[11].

35. Carret MLV, Fassa ACG, Domingues MR. Inappropriate use of emergency services: a systematic review of prevalence and associated factors. Cadernos de saude publica. 2009;25:7-28.

36. Calicchio M, Valitutti F, Della Vecchia A, De Anseris AGE, Nazzaro L, Bertrando S, et al. Use and Misuse of Emergency Room for Children: Features of Walk-In Consultations and Parental Motivations in a Hospital in Southern Italy. Frontiers in Pediatrics. 2021;9.

37. Selasawati H, Naing L, WA WA, Winn T, Rusli B. Inappropriate utilization of emergency department services in Universiti Sains Malaysia hospital. The Medical journal of Malaysia. 2004;59[1]:26-33.

38. Hwang JS, Kim SH, Van Dillen C. Unnecessary emergency medical services transports of geriatric patients in a tertiary hospital in South Korea. International Journal of Gerontology. 2018;12[3]:222-6.

39. Kang EJ, Kim SH. Risk factors related to unnecessary emergency medical services transport for pediatric patients. J Int Med Res. 2019;47[1]:335-44.

40. Cochran WG. Sampling techniques. 3rd ed. ed. New York: Wiley; 1977.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

AN ANALYSIS OF THE COST BENEFITS OF ESTABLISHING A REGIONAL MAINTENANCE CENTER FOR HEALTH SERVICES

Ririn Widyowati Supangat, Dr. Ratna Dwi Wulandari*

Departement Administration and Public Health Policy, Airlangga University, Indonisia

Correspondence: ririn.widyowati.supangat-2021@fkm.unair.ac.id

ABSTRACT

OBJECTIVE:

The limitations of the District Health Office in managing medical equipment management programs are compared to the management of medical equipment in hospitals, as are the efficiency of the resources needed by the Regional Maintenance Center in assisting the Health Office to carry out the program. An analysis is needed to see what the resultant costs and benefits are.

METHOD:

The research is accompanied by observations and observations of documents related to medical device maintenance and calibration analysis of equipment using cost-benefit analysis. The study was carried out in 2021 at the Pasuruan District Health Office in East Java Province, Indonesia.

RESULTS:

It was found that in respect to financial aspects, when viewed from the NPV, the IRR value is found to be 2.34%, the BCR is greater than one, which is 6.95%, and the PI is 8.5. The Regional Maintenance Center at the district health office is feasible to establish and develop in terms of both financial and effectiveness.

CONCLUSION:

It is believed that the Regional Maintenance Center can run well if all parties support it, starting from the regional leadership, then support from human resources, financial resources, staff competence, infrastructure and management information systems. so that health services can be provided both in quantity and quality. It is hoped that the Ministry of Health can support it with various regulations for these matters.

KEYWORDS

Maintenance, medical devices, cost-benefit analysis, medical equipment, health service

INTRODUCTION

During the COVID-19 pandemic the demand for health services and facilities was very high. Asset management, risk management, and maintenance are three types of management that are closely related to each other all over the world. It is possible to ensure the safety and security of patients.

Maintenance management has developed as a science over time, but in decision-making for strategic purposes, it

is still not an important concern for stakeholders. According to research from the WHO, up to 50% of existing medical equipment in developing countries cannot be used, among other things, due to improper planning, poor maintenance, and a lack of resources [2].

Equipment maintenance management in each country uses a different model with a view that exists in that country. In Jordan, designing a simulation model based on the failure data to be represented maintenance policies with the aim of maximizing utilization and reducing downtime thereby providing maximum utilization value [4], and in India, using the maintenance management model *Failure Mode and Analysis Effect* [5].

In Indonesia, the policy for maintaining medical devices determined by the ministry of health requires health facilities to meet service standards, quality requirements, safety and usability requirements. Equipment maintenance must be documented and carried out periodically, as is the case with experiments [6, 7, 8, 9, 10].

The limitations of the district health office in carrying out the requirements of the ministry of health to carry out maintenance are thought to be more difficult than carrying out replacements in the event of a malfunction, which is one of the reasons for not paying attention to maintenance at public health centers.

Community health centres, under the control of the district Health Office, are the first level of the Indonesian care system, providing a wide range of health services of which promotive, preventive, curative, rehabilitative, midwifery and support services are components of overall health. service coverage for people living in rural, suburban, and hard-to-reach areas. The Health Office and the Puskesmas do not yet have a section that specifically manages the alkes management program.

Resource efficiency was the rationale for setting up a regional maintenance center to manage medical equipment under the district Health Office. researchers found that most of the maintenance units were in hospitals. so that public health centers have to repair their medical devices in private maintenance units.

According to Prof. Tohisiro OKA, cost analysis is a method that uses models, theories, and data to examine goods, shopping, and businesses that have targets and solutions that are in accordance with the organization's vision and mission [11]. Cost-benefit analysis is a theory for recommending policies with total costs in the form of money. In the cost-benefit analysis, there are two components, namely: (1) costs starting from preparation, investment, operation, and maintenance; and (2) benefits that are either direct, indirect, or related.

The purpose of this study is to analyze the cost benefits in optimizing equipment maintenance management with the existence of a regional maintenance center and as a basis for decision making by the Health Service. A regional maintenance center is said to be feasible if the CBA number is more than one (26). With this research, it is hoped that medical equipment management, including medical device maintenance and calibration, will not only be recognized as important when it comes to health center accreditation, but will also be carried out in a planned and sustainable manner to support the governance of medical devices in community health centers and their networks.

METHOD

DESIGN

Descriptive research with quantitative methods is the type of research used in this study. in an observational study conducted in 2021 at the Pasuruan district health office. The results of the cost-benefit analysis were evaluated by examining the records of costs incurred for establishing a regional maintenance center. The costs and benefits of the regional maintenance center from a maintenance point of view in one year are calculated.

PROCESS

The first stage in this research is to analyze the cost components of the establishment of the regional maintenance center, which can be seen in Table 1.

TABLE 1. NOMINAL COMPONENTS OF COSTS AND BENEFITS

No	Cost component
1	**Cost Investment**
a	Cost capital
b	Cost equipment
c	Cost Support
	1) Air conditioning
	2) Exhaust
	3) Generator
2	**Cost Operational permanent**
a	Cost Human Resources
	1) Bachelor degree

	2) Senior high school
b	Cost office stationery
c	Cost General
	1) Electricity
	2) Air
	3) Phone / internet
	4) Ingredients burn generator
d	Cost Building Maintenance
e	Cost Maintenance tool

No	Component Benefits
1	Well-maintained tools

Source: Data from the Pasuruan District Health Office, 2021

From the results of this analysis, it can be determined how much money has been set aside or is planned to be set aside by the Pasuruan District Health Office to correct an imbalance in the form of reducing maintenance costs and improving public health services.

The second stage determines the costs and benefits of the program that will be carried out and continues to the third stage, namely analysis based on two aspects, namely determining the determination of regional development and beginning with financial calculations such as net present value (NPV), return on investment (IRR), and benefit cost ratio (BCR), move on to benefits. from the aspect of benefits, by looking at how effective the establishment of a regional maintenance center with the Profitability Index method is with financial calculations of net present value (NPV), return on investment (IRR), and benefit cost ratio (BCR), Then, from the aspect of benefits, we can look at how effective the establishment of a regional maintenance center using the Profitability Index method is.

Ethical considerations

This article followed all ethical standards for research and has permission from the dictrict health office. This study was not conducted on human research subjects or human participants.

RESULTS

DETERMINE THE COMPONENTS OF COSTS AND BENEFITS.

From the observations of several sections of expenditure and income from the establishment of a health facility maintenance unit, as detailed in Table 2,

TABLE 2. NOMINAL COMPONENTS OF COSTS AND BENEFITS

No	Cost component	unit	Price ($US)	Cost ($US)
1	Cost Investment	1	104,248	104,248
a	Cost capital	1	19,635	19,635
b	Cost equipment			
c	Cost Support	7	280.14	1961
	1) Air conditioning	3	70.04	210.11
	2) Exhaust	1	10.505	10.505
	3) Generator	1	104,248	104,248
2	Cost Operational permanent			
a	Cost Human Resources			
	1) Bachelor degree	4	140.07	560.29
	2) Senior high school	3	105.05	315,16
b	Cost office stationery	1	350,18	350,18
c	Cost General			-
	1) Electricity	12	105.05	1,260.64
	2) Air	12	21.01	252.13
	3) Phone / internet	12	42.02	504.26
	4) Ingredients burn generator	12	10.51	126.06
d	Cost Building Maintenance	1	14.007	14.007
e	Cost Maintenance tool	1	700,36	700,36

No	Component Benefits	
1	Well-maintained tools	28.014

Source: Data from the Pasuruan District Health Office, 2021

Data from year 0 will be reviewed for four years. component costs increased by 4% of component benefits per twelve months.

ANALYZING THE FINANCIAL ASPECT

In the analysis of the financial aspect, the net present value is calculated first. The Regional Maintenance Center uses a 4% discount factor (DF). Net present value (NPV) is the price of the current product of cash inflows less the current price of cash outflows for that period. The NPV value of the Regional Maintenance Center establishment produces positive results, and the 4%-5% Discount Factor results in a positive NPV, which is $US 146,078.12. This program is considered to have a high level of investment. This can be seen in Tables 3 and 4.

TABLE 3. NET PRESENT VALUE REGIONAL MAINTENANCE CENTER.

year	Cash flow ($US)	DF	PV ($US)
0	(18,076.76)	1	(18,076.76)
1	18,076,76	0.961538	17,381.49
2	18,076,76	1.886095	34,094.48
3	18,076,76	2.775091	50,164.65
4	18,076,76	3.629895	65,616.74
	Net present value		**149,180,62**

Source: : Data from the Pasuruan District Health Office, 2021

TABLE 4 NET PRESENT VALUE WITH DF 4%-5%

year	cash flow	DF 4%	PV ($US)	DF 5%	PV ($US)
0	(18,076.76)	1	(18,076.76)	1	(18,076.76)
1	18,076,76	0.961538	17,381.49	0.952381 _	17,215.96
2	18,076,76	1.886095	34,094.48	1.859410	33,612.11
3	18,076,76	2.775091	50,164.65	2.723248	49,227.5
4	18,076,76	3.629895	65,616.74	3.545951	64,099.31
Net present value			**149,180,62**		**146,078,12**

Source: : Data from the Pasuruan District Health Office, 2021

The next step was to calculate the IRR number, which is used to determine the risk of an investment. The establishment of a Regional Maintenance Center:

$IRR = 4\% + \frac{149.180,62}{149.180,62-146.078,12}$ 5% -4%

IRR = 2.34%

From the calculation using the IRR method, the formation of a health facility maintenance unit is shorter than the interest rate.

The next step was to calculate the Benefit Cost Ratio (BCR) obtained from the net present value assessment for the expenditure section and the benefit section for establishing a health facility maintenance unit, calculating the Net Present Value from the use of a 4% Discount Factor. Then the BCR can be assessed as follows:

BCR= (Current Value of Benefits/ Present Value of Costs)
=(28,015.12(P/A,4%,4) +28,015,12(P/F,4%,4)/18.076.76
= 6.95

Based on the BCR calculation, it was found that the establishment of a Regional Maintenance Center is greater than 1.

ANALYZING FROM THE BENEFIT ASPECT

The development of the Regional Maintenance Center in providing effectiveness can be known by calculating the value of future cash flows compared to the values that came out at the beginning of the investment period, so that a Profitability Index calculation was obtained as follows:

$PI = \frac{149.180,62}{18.076,76} = 8.25$

The Profitability Index value in the program is 8.25.

From this research it can be concluded that regional maintenance center development provides more benefits and worth implementing. it is based on B/C considerations the regional maintenance center construction has a value > 1 and the NPV value for regional maintenance center

construction shows positive results. Development of a regional maintenance center in 10 years PV value obtained benefit of $US 149,180 with PV cost for $US 146,078. The B/C ratio for the construction of a regional maintenance center is 6.35.

DISCUSSION AND CONCLUSION

Referring to research from the WHO that in developing countries, 50% of medical equipment cannot be used due to a lack of precise planning, lack of maintenance, and unavailable human resources (2), the Ministry of Health of the Republic of Indonesia developed Regional Maintenance Centers. The goal is to achieve optimal health service conditions by maintaining medical devices used in services [12, 13].

In achieving this target, the Ministry of Health of the Republic of Indonesia has carried out advocacy and outreach to the leaders of the health offices in the provinces and regions regarding the importance of maintaining medical devices in health care facilities in 2020. To find out the importance of this, this research was made with the research location at the Department of Health. Pasuruan District Health.

Based on the results of the research, from the financial aspect, the investment in the regional maintenance center is feasible to establish by looking at the NPV, which shows a positive number of $US146,078.12, the IRR is shorter than the interest rate, and the BCR is greater than one. According to the benefit aspect, the probability index value of 8.25 indicates that the regional maintenance center is feasible to develop because the benefits generated are very large for improving the maintenance management of medical devices.

Referring to research from the WHO sets out that in developing countries 50% of medical devices cannot be used due to improper planning, inadequate maintenance, and unavailable human resources [2], the Ministry of Health of the Republic of Indonesia developed a Regional Maintenance Center. The goal is to achieve optimal health service conditions by maintaining the medical devices used in the service. In addition to paying attention to the costs and benefits of establishing Regional Maintenance Centers, researchers also conducted a more in-depth analysis of resource fulfillment by looking at the work plan documents for establishing the Regional Maintenance Center in 2018 and the Regional Maintenance Center Team in 2018, 2019, 2020 and 2021.However, it may not be realized until the end of 2020 because the regional leader is skeptical of that unit.So it is hoped that this research can be used as a study for regional leadership advocacy materials to establish and develop a regional maintenance center [14].

However, this research needs to be complemented by an academic study on equipment management. Regional leaders often think that maintaining medical devices is considered a burden for health providers. Hao Yu Lia developed a data-driven Markov decision process (MDP based on the discrete time Markov chain (DTMC) model) to optimize decisions and replace equipment. Medical decision-making about whether to repair or replace medical equipment is essential to managing health facility costs. [15]

Post-market management of medical equipment must be reached and properly implemented. Starting from planning, in this case, technology assessment and evaluation of existing medical equipment [16, 17],

Further research is needed on how the maintenance management system can support the operation of regional maintenance centers and how to provide adequate financial, facility, and human resources. Medical equipment maintenance programs must be carried out and managed so that health services are improved and safety is guaranteed. The development of a website-based management information system is also very important to produce data about the need for the management of available medical equipment quickly and accurately [21]. Human resource support, costs, infrastructure, and operational procedures for maintaining medical devices that conform to accreditation standards are factors that have a strong influence on the management of medical equipment [19, 20, 23, 24, 15, 26].

The cost of spare parts that are accurate and adapted to medical device technology will have an effect on overcoming financial problems in operating expenses at the regional maintenance center or clinical engineering service unit [26]. With the Regional Maintenance Center, it is expected to improve the performance of the Medical Devices and Household Health Supplies section. Lack of manpower is the reason for the less than optimal management of medical equipment in Pasuruan Regency. However, the formation of this unit also requires adequate

preparation and requires support from stakeholders and regional leaders so that the investment made in this unit can run smoothly with no obstacles.

This research can be used in other places, but the cost of building construction can adjust to local conditions.

CONCLUSION

Various regulations were issued by the Ministry of Health to develop regional maintenance centers. It is believed that the Regional Maintenance Center can run well if all parties support it, starting from the regional leadership, then human resources, financial resources, staff competency, infrastructure and management information systems. so that health services can be provided both in quantity and quality.

COMPETING INTEREST

The authors state that they have no competing interests.

Reference

1. Kumar MS, Raut DRD, Narwane DVS, Narkhede DBE. Applications of industry 4.0 to overcome the COVID-19 operational challenges. Diabetes Metab Syndr Clin Res Rev. 2020 Sep 1;14(5):1283–9.
2. Barriers to innovation in the field of medical devices [Internet]. [Accessed 2022 Jan 22]. Available from: https://scholar.googleusercontent.com/scholar?q=cache:vcEWs3JWmO4J:scholar.google.com/&hl=id&as_sdt=0,5&scioq=1.%09World+Health+Organization.+(2010).+Barriers+to+innovation+in+the+field+of+medical+devices:+Background+paper+6,+August+2010+(No.+WHO/HSS/EHT/DIM/10.6).+World+Health+Organization
3. Galán MH, Adan Martínez Gómez E, Herrera Galán M. A Review of Maintenance Management Models: Application For The Clinic And Hospital Environment. 2018; Available from: www.theijes.com
4. Mahasneh R, Assaf S. Suhad Assaf Identifying the Optimal preventive maintenance interval for three of major medical equipment using discrete event simulation. Vol. 11, International Journal of Research and Reviews in Pharmacy and Applied sciences IJRRPAS. 2021.
5. Shirish Gandhare M, Darmora DP, Madankar T. Maintenance Of Medical Equipment Using Failure Modes And Effect Analysis: A Review.
6. Indonesia PR. Law of the Republic of Indonesia number 36 of 2009 concerning health. Jakarta: Author. 2009; Retrivied February 14, 2023, From https://peraturan.bpk.go.id/Home/Details/38778/uu-no-36-tahun-2009
7. Fitriana Y, Pratiwi K. Implementation of Patient Safety in Regional General Hospitals and Private Public Hospitals in Bantul Based on the Provisions of Law Number 44 of 2009 concerning Hospitals. Midwifery journal. 2018;7(1):28–39.
8. Law of the Republic of Indonesia number 44 of 2009 concerning hospitals [JDIH BPK RI]. (n.d.). Retrieved January 22, 2022, from https://peraturan.bpk.go.id/Home/Details/38789/uu-no-44-tahun-2009
9. Regulation of the Minister of Health of the Republic of Indonesia Number 27 of 2019. 2019;Nomor 65(879):2004–6. Retrivied February 14, 2023, From https://peraturan.bpk.go.id/Home/Details/138620/permenkes-no-27-tahun-2019.
10. Novitasari M, Budiyanti RT, Sriatmi A. Pratama Clinic Readiness In Improving The Quality Of Health Services.LINK. 2022;18(1):1
11. Udyanto HM. Cost Benefit and Effectiveness of Investing in High-Tech Medical Devices in Radiology Installations. Management Journal. 2 Juni 2021;12(2):01.
12. Sutomo S, Arnawilis A, Hartono B, Lita L. Analysis of Facilities and Infrastructure Maintenance Management at the Rokan Hulu Regional General Hospital. community health journal. 2021;7(1):45–56.
13. Performance Report of the Directorate General of Pharmaceuticals and Medical Devices 2020 | Directorate General of Pharmaceuticals and Medical Devices [Internet]. [Retrivied June 14, 2022]. From https://farmalkes.kemkes.go.id/2021/02/laporan-kinerja-direktorat-jenderal-kefarmasian-dan-alat-kesehatan-tahun-2020/
14. Liao H yu, Cade W, Behdad S. Markov chain optimization of repair and replacement decisions of medical equipment. Resources, Conservation and Recycling. Agustus 2021;171:105609.
15. Johansson L, Lindahl B, Knutsson S, Ögren M, Persson Waye K, Ringdal M. Evaluation of a sound environment intervention in an ICU: A feasibility study. Australian Critical Care. Maret 2018;31(2):59–70.
16. Lari A, Komeili A, Hajinabi K, Riahi L. Designing A Model of Medical Equipment Purchase Management in Hospitals of Tehran University of Medical Sciences. APJHM. 27 Juni 2021;16(2):137–47.
17. Sabarguna BS, Wahyudi A. Analysis of Medical Device Maintenance Management at X Hospital. Community Health Journal. 2020;6(2):230–6.

18. Suprihatin EE. The Influence Of Budgeting, Calibration Procedures, And Human Resources Practices On Medical Device Calibration Compliance In Health Centers In Gunungkidul District. Management Research Journal. 26 Februari 2021;8(1):67–79.
19. Firdaus AJA, Pramono D, Purnomo W. WEB-Based Development of the UPT Calibration Information System for the Malang District Health Office. JUST-SI [Internet]. 31 Agustus 2020 [dikutip 14 Juni 2022];1(1). Tersedia pada: https://just-si.ub.ac.id/index.php/just-si/article/view/3
20. Rahmiyati AL, Kulsum DU, Hafidiani WL. Analysis Of Hospital Radiology Equipment Maintenance System. Medical scientific journal. 10 Desember 2019;18(3):93–7.
21. Pancaharjono W, Mogsa DF, Hasugian AR, Siswantoro H, Syarif AK, Harso AD, dkk. Factors Influencing Quality Assurance of Equipment in Puskesmas. Journal of Research and Development of Health Services. 19 Agustus 2020;44–52.
22. Ramadhan F. Logistics Management of Medical Devices at the Puskesmas. 2020;11.
23. Irawati N, Purwadi D, Mathori M. Efforts to Improve the Performance of the Implementation of the Maintenance and Calibration Program for Health Center Medical Devices at the Pacitan District Health Office. 2018. WHO
24. Fotovatfard A, Heravi G. Identifying key performance indicators for healthcare facilities maintenance. Journal of Building Engineering. 2021 Oct;42:102838.
25. Bektemur G, Muzoglu N, Arici MA, Karaaslan MK. Cost analysis of medical device spare parts. Pakistan Journal of Medical Sciences. 2018;34(2):472.
26. Schniederjans, M.J., Hamaker, J.L., Schniederjans, A.M. Information technology investment:Decision making methodology. World Scientific Publishing Company. 2010.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

DOES EMPLOYMENT STATUS ASSOCIATE WITH PHYSICAL AND MENTAL HEALTH STATUS? A CROSS-SECTIONAL STUDY ON WORKING-AGE POPULATION

Nishad Nasrin[1], Kaniz Fatema[1], Fariha Farjana[1], Nurun Naher Moni[1], Md. Karimul Islam[2], Kaniz Fatima Mohsin[1] and Md. Shakil Ahmed[2]*

1. Economics Discipline, Social Science School, Khulna University, Bangladesh
2. BRAC Institute of Governance and Development, BRAC University, Dhaka, Bangladesh

Correspondence: karimulislamku@gmail.com

ABSTRACT

AIM:

The study aims to investigate the implication of employment status on individuals' mental and physical health status in Bangladesh.

METHOD:

Administering a semi-structured interview schedule, data were collected from 320 participants applying the multi-stage random sampling technique from the metropolitan area of Khulna city. An unpaired t-test was executed to observe the comparative scenario of mental health and socio-demographic conditions of different health-bearing classes. Also, logistic regression and the OLS model were executed to assess the association between employment status and physical and mental health status. BMI and Depression Anxiety Stress Scales 21 (DASS-21) were applied to measure the physical and mental health status, respectively.

RESULTS:

Results revealed that employed individuals were more exposed to physical and mental health disorders compared to unemployed individuals. The employed individuals were at higher risk of being unhealthy, and suffering from back pain and sickness than the unemployed individuals. Results suggested that the employed individuals were expected to get involved more in mental health risk behavior (0.766, $p < 0.01$); however, they possessed a lower extent of anxiety (-0.532, $p < 0.05$).

RECOMMENDATIONS:

Insurance coverage, motivational programs, change in lifestyle and workplace environment development can be initiated from both employer and government levels for better health outcomes.

KEYWORDS

employment, physical health, mental health, health risk behavior, Bangladesh

INTRODUCTION

Employment, within the context of its socio-economic dimension, is correlated with health as a cause and consequence of perceived health status. World Health Organization (WHO) recognizes and fixes employment as a socio-economic determinant of health, signifying that decent employment leads to upholding good physical and mental health status. Conversely, a less optimal job can also lead to poorer mental and physical health status [48,19].

Because of the recognized significance and pragmatism, a large body of literature has already evolved to explore the relationship between employment status and the state of health of workers. Available evidence shows that the health of the labor force is mediated through a host of factors related to employment status, for instance, type of employment, the physical environment of the workplace, quality of work, and employer-employee relationship [9 8]. Occupational stress as a risk factor for certain types of disease exposure is well documented by contemporary literature. This argument supports the view that the nature of employment determines the status of health [31, 30, 33, 51, 24]. Similarly, activity-limiting and accomplishment-limiting physical and mental health affect employment status [35]. There is another line of argument concentrating that people bearing sound physical and mental health are more capable of finding and retaining their jobs successfully [22].

Numerous studies explored the connection between employment status and perceived health status. The unemployed labor force is found to have a higher risk of experiencing degraded mental health compared to the employed labor force [39]. Besides, temporary employees had a higher risk of both non-optimal self-rated health and psychological distress as they suffered from job insecurity, low cash margin, and high job strain [55]. In contrast, employed individuals could secure a sound mental state through a wide range of refreshments, for instance, spending leisure time in physical activity. In this context, psychological contentment contributed much to being free of stress. The threatening concern of psychological work stress originated from occupational risk factors, which lead to numerous diseases and worsen health conditions [31]. It is concluded by literature [30, 33, 51] showing a similar physical health risk due to distress in work and occupational inconveniences. Diabetes, blood pressure, lipid fractions, smoking, alcohol consumption, physical inactivity, and cardiovascular disease risk factors were found to be more intensive among various occupations [30]. The common reasons for physical health distress among employees are a terrible workplace environment [50, 44], and occupational hazards [50, 28]. Irrespective of these reasons, employed people also suffered from particular diseases, like fibromyalgia [46], chronic obstructive pulmonary disease (COPD) [25], and vector disease transmission, like COVID-19 [5]. It is also argued that employment status can improve mental and physical health conditions. For example, employment and reemployment were strongly associated with better mental health status, whereas unemployment and joblessness were closely connected to poorer physical and mental health status [20]. In the UK, unemployed people suffered from mental disorders, and vocational schemes were recommended to overcome health problems [7].

To sum up, the available research substantiates that workers' physical and psychological wellbeing are largely determined by employment status. The observed association has many dimensions in different countries and contexts. However, the association of employment status with physical and mental health from the Bangladesh perspective is seldom studied. Considering this issue, the current study aims to investigate the hypothesis that employment does matter for the health status of individuals. Aligned with the research objective, the present study attempts to explore the research question of whether the employment status of an individual exerts any beneficial or detrimental effects on physical health status specifically in the context of Bangladesh Secondly, this research aims to explore the extent to which the employment status matters for one's mental health state.

METHODOLOGY

PARTICIPANTS AND SAMPLING

For the study, Khulna city (the third largest city) in Bangladesh [4] is purposely chosen because of the convenience of data collection. According to the census, the total population of Khulna City Corporation (KCC) was 975,000 in 2018 [23]. Also, the total number of working proprietorships was 1,55,550, where the male share is around 90 percent [15, District Report: Khulna). Data were collected from individuals with certain specifications: (i) must be a Bangladeshi citizen; (ii) living in KCC areas for more than two years; and (iii) must not be younger than 19

years of age. The participants were selected using a multi-stage random sampling technique. Firstly, four wards from the KCC were selected randomly; secondly, an inventory of employed and unemployed individuals was developed based on the information provided by the respective Ward Council Office; and finally, 40 individuals, each from employed and unemployed groups, were selected randomly. Therefore, the l sample size drawn from all four selected wards stood at 320. It is essential to consider that for a population of 100,000, the required sample size, at a 7% precision level with 95% confidence interval, is 204 [11]. However, this current study was unable to cover the representative data to generalize the findings, which is one of the limitations of this study.

DATA COLLECTION PROCEDURE

After a rigorous review of the existing literature, and specification of objectives and research questions, a semi-structured interview schedule (SSIS) in English was developed. The SSIS was pre-tested and finalized with minor editing. The SSIS was divided into four separate but integral parts; the first section contained questions about the socio-demographic background, i.e., age, gender, education, marital status, and family size; the second section accumulated data on anthropometric measures as well as information on the presence or absence of blood pressure, back pain, and other illnesses; the third section zoomed the lens in on employment status; and the final section considered the state of mental health of the participants. To evaluate the incidence of work-related stress on the mental health of the participants, the authors considered depression, anxiety, and stress as outcome variables. One member from each of the households was chosen for retrieving data on physical and mental health related indicators . The data were collected at the end of 2018. Depression Anxiety Stress Scales 21 (DASS-21) is instrumented for the assessment of mental health conditions. A face-to-face interview method was administered to collect data from the subjects.

DATA ANALYSIS

1. Descriptive statistics

The statistical data analysis covers descriptive statistics, including mean and standard deviation. The demographic and mental health-related variables are differentiated by physical health conditions, such as body mass index (BMI), blood pressure, and diabetes. Each health condition was grouped into two separate categories, i.e., healthy and unhealthy states. Precisely, the healthy or unhealthy state of households was determined by BMI [57]. Blood pressure was also recognized as one of the predictors of physical health in which one group has normal, and the other has abnormal blood pressure. Similarly, a class of households might suffer from diabetes, and the other class might have no prevalence of diabetes. This factor variable is also considered one of the prominent components of the health conditions of an individual. The study also presented the t-test results to evaluate the pattern of prevailing deviations between the two groups.

2. Econometric model specification

Multicollinearity and heteroscedasticity in the data were checked before conducting the econometric analysis to obtain robust results. After testing the prospective anomalies associated with data analysis, logistic and OLS regressions were executed to identify the pattern of incidence of the employment status on the participants' state of physical and mental health. STATA 14 was used to analyze the data.

In this study, BMI was classified using WHO-recommended categories of normal weight (18.5–24.9), overweight (25.0–29.9), obesity (≥30), and underweight (<18.5). The BMI scores were further categorized as healthy weight and unhealthy weight. Subjects with normal BMI scores were considered as healthy weight and subjects with extremely low BMI score (underweight) and extremely high BMI scores (i.e., Obese and overweight) were recognized as unhealthy weight. In the logistic regression, healthy weight took the value 1, and unhealthy weight contained the value 0. Conversely, the rest of the variables, i.e., blood pressure and back pain, take values equal to 1 if an individual suffers from the mentioned discomforts and 0 if otherwise. Moreover, sickness, another determining factor of health condition, took the value 1 if the subject experiences any illness that lasts for more than two days in the last three months and 0 if otherwise. Hence, in equation (i), Y_i is a dichotomous outcome variable (BMI), and the probability model can be specified as:

$$E(Y\_i)=(\llbracket \beta\_0+\Upsilon\_i\ D\_i+\Sigma\beta \rrbracket \_i\ x\_i+\varepsilon\_i) \qquad \text{(i)}$$

In equation (i), β_0 = Intercept or constant term, β_i = vector of the regression coefficient, x_i = vector of the explanatory variables which covers age, gender, educational status, monthly income, marital status, etc. Besides, Υ_i is the coefficient for the current employment status dummy of i^th individual, D is the vector of employment status (dummy), and ε_i = error term. For the rest of the dichotomous dependent variables, for instance, blood

pressure, back pain, and sickness, the set of explanatory variables remains the same and a logit model is executed to determine the probabilities.

To address the second research question, this paper evaluated the pattern of differences in health risk behavior. The health risk behavior was assessed covering multiple aspects, including smoking habit, involvement in physical exercise, sleep duration, and so on. In addition, the mental health status was also assessed carefully. Anxiety, depression, and stress were three outcome variables to evaluate the mental health status of employed and unemployed individuals. The data on health risk behavior and mental health related aspects were accumulated using the Likert scale. Here, under the broad heading of health risk, anxiety, depression, and stress, there are multitudinous questions. For instance, to determine the pattern of an individual's health risk, different aspects, i.e., smoking practice, screen use, and sleep inadequacy, were included. The answers for each of the sub-questions were also accumulated by using the idea of the Likert scale. Finally, unit-free standardized z scores were calculated. After that, this score was further used in the OLS regression model as an outcome variable. In contrast, the DASS-21, a clinical assessment for measuring mental health via depression, anxiety, and stress, was the short form of DASS-42 arrayed for mental health-related data collection. The entire SSIS consisted of three reliable 7-items scales, which were further rated on a 4-point Likert scale (0 = did not apply to me at all; 3 = applied to me most of the time). Finally, z scores were retrieved from those. These scores were finally used in the OLS models as outcome variables.

$$Z_i=\beta_0 〖+\alpha〗_i D_i+ 〖\Sigma\beta〗_i X_i+\omega_i \quad \text{..... (ii)}$$

Here, Z_i = z scores on the physical health risk behavior of the subjects. Here, β is the intercept term, X_i is the vector of explanatory variables and ω_i is the error term. In addition, D_i is the employment status of the subject (dummy). For the rest of the continuous z scores on mental health, the set of explanatory variables remained the same, and therefore, an OLS model was applied to determine the slope coefficients.

TABLE 1: LIST OF VARIABLES

Variable Name		Measurement Unit
Physical health	BMI	1 = Healthy weight, 0 = Unhealthy weight
	Blood pressure	1 = if the subject suffering from blood pressure and 0 = otherwise
	Back pain	1 = If subject has back pain and 0 = No back pain issues
	Frequency of sickness	1 = If respondent experience sickness for more than 2 days in last 3 months and 0 = otherwise
Mental health	Depression	Z score retrieve from DASS-21 scale
	Anxiety	Z score retrieve from DASS
	Stress	Z score retrieve from DASS
Health risk behavior	Smoking	Four-point Likert Scale further converted to Z score
	Screen use	Four-point Likert Scale further converted to Z score
	Sedentary behavior	Four-point Likert Scale further converted to Z score
	Unwillingness to do exercise	Four-point Likert Scale further converted to Z score
Socio-economic variables	Age	Years
	Gender	1 = male and 0 = Female
	Educational status	1 = up to SSC, 0 = Otherwise1 1 = Up to HSC, 0 = Otherwise 1 = Up to Undergraduate, 0 = Otherwise 1 = Masters and above, 0 = Otherwise
	Employment status	1 = Employed, 0 = Unemployed
	Marital status	1 = Married, 0 = Otherwise

	Family t ype	1 = Joint, 0 = Nuclear Family
	No. of children	Number of children
	Religion	1 = Muslim and 0 = Otherwise

Note: 1. Reference category

RESULTS

SOCIO-DEMOGRAPHIC, PHYSICAL AND MENTAL HEALTH VARIABLES

Table 2 shows that the socio-demographic characteristics, like age, were different for healthy and unhealthy; normal and abnormal blood pressure; and diabetic or non-diabetic strata. For instance, the healthy class has a lower age than the unhealthy group (4.947, $p < 0.05$). In the same way, the comparatively younger age class was devoid of blood pressure and diabetes. To illustrate, the mean age of the persons with diabetes was 46 years, around 12 years more than that of non-diabetic strata (-12.09, $p < 0.01$). Household income also varied, however, in different ways. The monthly income of the healthy (BDT 19,739) and non-diabetic (BDT 30,978) classes are less than that of the unhealthy (BDT 36,459) and diabetic groups (BDT 44,875). These differences are statistically significant ($p < 0.01$). Also, as a crucial composite of mental health, the health risk index revealed a significant difference between healthy and unhealthy (-3.379, $p < 0.01$) as well as diabetic and non-diabetic (1.690, $p < 0.01$) strata. The mean difference indicates that physical health status was often determined by mental health conditions. The depression index, a common symptomatic intensifier of mental health, establishes this relationship further by revealing a significant difference in average depression rate between the normal and hyper blood pressure classes. Usually, a lower degree of depression ensures normal blood pressure, and a higher degree results in the opposite—the mean difference in the depression index (-0.602, $p < 0.01$) satisfies this theorem.

RELATIONSHIP BETWEEN PHYSICAL HEALTH STATUS AND EMPLOYMENT

Table 3 presents the results of the association between physical health conditions and employment status as well as other socio-economic determinants. Physical health condition was classified into six binary variables (Table 3). To investigate the association, employment status, and other socio-demographic factors were assessed against each dependent variable, employing logistic regression. Results show that a negative association prevailed between healthy weight and employment ($p < 0.01$). The employed individuals were at a higher risk of being unhealthy compared to the unemployed. They also tend to suffer from back pain and sickness more than the jobless group ($p < 0.01$). This direct relationship indicates the physical inconveniences subject to being employed. Age may exacerbate physical health concerns in this context. Individuals lose control over their food, exercise, and body-fitness activities as they get older. Furthermore, it increases the risk of comorbidity in the aged population. Thus, higher age intensifies the suffering of high blood pressure ($p < 0.01$). On the other hand, higher age contributes to lessening the extent of back pain ($p < 0.01$) and headache ($p < 0.01$). The increased age was also predicted to improve the health status of individuals in terms of gaining a healthy weight ($p < 0.05$).

Males, compared to females, were found to be exposed more to having diabetes, however, males had less frequency of sickness ($p < 0.10$). Compared to the unmarried, the married were directly exposed to the risk of suffering from diabetes, back pain, and headache. Furthermore, these health risks were expected to reduce the probability of bearing a healthy weight ($p < 0.01$).

In the extended family, the participants were found to have higher blood pressure and serious headaches than those from the nuclear family. Therefore, if family size increases, the risk of intensive blood pressure is heightened, and the probability of having a healthy weight shrinks. However, an indirect association was also found significant between the family size and the frequency of sickness. In addition to the family size, the number of children was negatively associated with the healthy weight ($p < 0.05$). The higher the number of children, the greater the risk of suffering from abnormal blood pressure ($p < 0.05$) and diabetes ($p < 0.01$).

TABLE 2: STATISTICS OF DEMOGRAPHIC AND MENTAL HEALTH VARIABLES STRATIFIED BY PHYSICAL HEALTH

	Physical health condition										
	BMI				**Blood Pressure**				**Diabetes**		
Variables	Healthy (20.31%)	Unhealthy (79.69%)	MD		Normal (47.81%)	Abnormal (52.19%)	MD		Non-diabetic (85%)	Some diabetic (15%)	MD
Demographic characteristics	*Mean*	*Mean*	*H_0:0*		*Mean*	*Mean*	*H_0:0*		*Mean*	*Mean*	*H_0:0*
Age	33.523	36.184	4.947**		31.673	39.281	-7.608***		33.831	45.917	-12.09***
Family size	4.938	4.800	-0.079		4.549	5.084	-0.535		4.805	4.958	-0.153
Schooling year	15.384	15.623	-0.238		16.035	15.072	0.964***		15.257	17.375	-2.118***
Monthly income	19739	36459	25583***		34686	31574	3111		30978	44875	-13897***
Mental health-related variables											
Health risk[a]	3.391	-0.864	-3.379***		-0.310	0.284	-0.595		0.254	-1.44	1.690***
Anxiety index[a]	0.649	-0.165	-0.814		-0.088	0.081	-0.168		-0.044	0.250	-0.294
Depress index[a]	0.125	-0.032	-.0157		-0.314	0.288	-0.602**		-0.020	0.113	-0.133
Stress index[a]	-0.025	0.006	0.0317		-.0095	0.087	-0.184		-0.102	0.578	-0.680

Note: ***. p < 0.01; **. p < 0.05; *. p < 0.10***

Standardized value; MD. Mean difference

TABLE 3: ASSOCIATION BETWEEN PHYSICAL HEALTH AND EMPLOYMENT STATUS INCLUDING SOCIO-DEMOGRAPHIC DETERMINANTS

Variables	Physical health status					
	BMI Base: unhealthy	Blood pressure Base: normal	Diabetes Base: Non-diabetic	Backpain Base: low-never	Headache Base: low-never	Sickness Frequency Base: low-never
Current employment status (1= employed, 0 otherwise)	-4.725***	-0.839	--	4.281***	0.909	1.147*
	(0.984)	(0.536)	--	(1.078)	(0.620)	(0.645)
Age (years)	0.111**	0.104***	-0.0648	-0.202***	-0.113***	-0.0366
	(0.0555)	(0.0365)	(0.0609)	(0.0620)	(0.0431)	(0.0416)
Gender (1= male, 0 otherwise)	-0.321	0.237	1.198*	-0.580	0.122	-0.654*
	(0.446)	(0.355)	(0.663)	(0.525)	(0.369)	(0.397)
Religion (1= Muslim, 0 otherwise)	0.987***	1.557***	-0.252	-0.169	-0.829**	0.335
	(0.382)	(0.306)	(0.620)	(0.402)	(0.333)	(0.334)
Marital status (1= married, 0 otherwise)	-1.731***	-0.799**	1.668***	0.935**	1.428***	0.848**
	(0.384)	(0.339)	(0.608)	(0.407)	(0.334)	(0.343)
Family type (1= extended, 0 otherwise)	0.285	1.329***	-0.900	0.607	1.059***	-0.184
	(0.421)	(0.357)	(0.726)	(0.484)	(0.396)	(0.393)
Family size (number)	0.497**	0.438**	-0.496	-0.210	0.103	-0.577***
	(0.230)	(0.193)	(0.410)	(0.251)	(0.208)	(0.207)
No of children (number)	-0.914**	0.839**	2.204***	0.264	0.234	0.671
	(0.454)	(0.375)	(0.595)	(0.469)	(0.383)	(0.414)
Years of schooling =12	2.031**	1.510**	--	-1.153	-1.176	-1.973**
	(0.999)	(0.735)	--	(1.186)	(0.828)	(0.942)
Years of schooling =16	0.677	1.234**	-1.774**	-0.746	-0.0521	-1.489*
	(0.917)	(0.582)	(0.845)	(1.117)	(0.715)	(0.842)
Years of schooling=18	2.004*	0.639	--	-0.850	0.113	-1.759*
	(1.062)	(0.791)	--	(1.239)	(0.917)	(1.029)
Constant	-6.129***	-7.562***	3.792	8.957***	3.451**	6.301***
	(2.058)	(1.458)	(3.547)	(2.319)	(1.541)	(1.630)
Observations	320	320	134	320	320	320

Note: Standard errors are in parentheses ***. p < 0.01, **. p < 0.05, *. p < 0.1

Years of schooling affect physical health conditions both positively and negatively. For instance, individuals with 12 years of education, compared to the individuals with a secondary level of education (maximum ten years), positively relate to healthy weight ($p < 0.05$) and high blood pressure ($p < 0.05$). Similarly, individuals with 16 or more years of schooling enhanced the likelihood of gaining healthy weight ($p < 0.10$) and reduced the possibility of sickness ($p < 0.10$).

RELATIONSHIP BETWEEN MENTAL HEALTH STATUS AND EMPLOYMENT

Apart from physical health, mental health conditions were also investigated to see whether employment status and other demographic factors influence them. Table 4 displays the OLS result of this association. Mental health was divided into four classes, i.e., health risk, anxiety, depression, and stress, against the outcome variables.

TABLE 4: EMPLOYMENT AND SOCIO-DEMOGRAPHIC DETERMINANTS OF MENTAL HEALTH

Variables	Mental Health Status			
	Health risk	Anxiety	Depression	Stress
Current employment status (1= employed, 0 otherwise)	0.766***	-0.532**	0.0264	0.280
	(0.201)	(0.226)	(0.231)	(0.222)
Age (years)	-0.0266*	0.0169	-0.00850	0.00974
	(0.0135)	(0.0153)	(0.0156)	(0.0150)
Gender (1= male, 0 otherwise)	0.462***	0.183	0.0122	-0.0455
	(0.119)	(0.135)	(0.137)	(0.132)
Religion (1= Muslim, 0 otherwise)	-0.242**	-0.0342	0.0516	-0.0338
	(0.115)	(0.130)	(0.132)	(0.127)
Marital status (1= married, 0 otherwise)	0.792***	-0.0832	-0.0469	-0.100
	(0.121)	(0.136)	(0.139)	(0.133)
Family type (1= extended, 0 otherwise)	0.202	0.307**	0.296**	0.208
	(0.130)	(0.147)	(0.150)	(0.144)
Family size (number)	-0.269***	0.0173	-0.0294	0.0257
	(0.0703)	(0.0792)	(0.0808)	(0.0777)
No. of children (number)	-0.114	-0.300**	0.0378	0.0614
	(0.132)	(0.148)	(0.151)	(0.146)
Years of schooling =12	0.151	0.259	0.514	-0.0752
	(0.271)	(0.306)	(0.312)	(0.300)
Years of schooling =16	0.596***	0.342	0.360	-0.240
	(0.208)	(0.234)	(0.239)	(0.229)
Years of schooling=18	0.280	0.551*	0.318	-0.204
	(0.287)	(0.323)	(0.330)	(0.317)
Constant	0.610	-0.917*	-0.0669	-0.418
	(0.493)	(0.555)	(0.566)	(0.544)
Observations	320	320	320	320
R-squared	0.262	0.064	0.024	0.099

Note: Standard errors in parentheses

***. $p < 0.01$; **. $p < 0.05$; *. $p < 0.1$

The results show that employed people were 0.76 points more vulnerable to mental health risks than unemployed people ($p < 0.01$). They were, nevertheless, 0.53 points less anxious than the unemployed ($p < 0.05$). It is worth noting that the study found no evidence of a link between employment status and depression or stress. The increase in age was negatively associated with mental health risk behavior by 0.03 ($p < 0.10$) points. Similarly, the Muslim people were less exposed to health risks than other religious communities (-0.242, $p < 0.05$). This may happen because Muslim people usually refrain from health risk behaviors

such as smoking, drinking alcohol and so on due to religious bindings, which is evident in the literature [58]. However, male participants have more health risks than females (0.462, $p < 0.01$). Likewise, this risk was also higher for a married person than for an unmarried one (0.792, $p < 0.01$). The study also found that family size was negatively linked with health risk behavior (-0.269, $p < 0.01$). However, the extended family has a positive linkage with anxiety (0.307, $p < 0.05$) and depression (0.296, $p < 0.05$). On the other hand, the participants who had completed 16 years of formal education were (0.60 points) more prone to mental health risk behavior than the people with less than ten years of schooling ($p < 0.01$).

DISCUSSION

From the descriptive statistics, it is found that healthy weight was prevalent more among the younger age group. Also, lower-aged individuals experienced minimum cases of blood pressure and diabetes. It indicates the predominance of different sorts of diseases among aged adults in the context of Bangladesh. The prevalence of mental health risk was higher among individuals with diabetes. The current study successfully connects physical health status with mental health, which may be reciprocally related to each other. This finding is supported by the literature [38]. Consistent with the literature, the present study, for instance, observed an apparent relationship between depression rate (mental health component) and blood pressure (physical health component).

PHYSICAL HEALTH STATUS

Literature suggests that better health is the combination of better physical and mental health conditions of individuals [38], such as healthy weight, less stress, no depression, no anxiety, and less incidence of sickness. This study found a statistically significant negative association between health status (BMI) and employment status. Specifically, employed people were at higher risk of having unhealthy weight than unemployed people. However, the finding contradicts [14] and complies with the literature [35]. In addition, back pain was also positively interlinked with employment status, which complies with the findings of the literature [34]. As an employed person needs to stay at the office for a longer time compared to an unemployed person; hence, they are most likely to suffer from back pain. Moreover, if employed persons perform a desk job, they usually need to spend a long time on a chair. It may negatively affect their physical health, for instance, back pain, migraine, stress and so on. This finding is coherent with the literature [40]. In addition, the frequency of sickness was also higher for employed people, which indicates that if the persons are employed, then they can get less scope of physical mobility, for example, participation in physical exercise and taking sufficient rest for maintaining a healthy lifestyle. The findings are backed by literature [12]. It is prescribed that exercise is a medicine to fight against 26 different types of diseases [37].

The current study found the frequency of sickness is higher for employed individuals. Because, in the context of Bangladesh, due to heavy workload, the employed people often take food from restaurants (in most cases where hygiene is not usually practiced), and they get a limited scope of participation in physical exercise and entertainment. However, these findings contradict the literature [29]. Moreover, higher age levels intensify the risk of comorbidity as they lose physical strength to combat different diseases, including high blood pressure, diabetes, and so on [3, 40].

The male-headed households were more exposed to diabetes than the female-headed households, but surprisingly the case is reversed for the experience of frequency of sickness. According to the social structure of Bangladesh, males are breadwinners, and they are supposed to work outside their homes, therefore, they get less scope for physical exercise and refreshments. This may lead to an intensification in the probability of suffering from diabetes. However, in the study area, the male experiences less sickness than the female, which is contradictory to the findings of the literature [16]. It may happen due to the contextual differences between males and females. Also, the married person was more exposed to diabetes, back pain, headache, and frequency of sickness, which were also expected because, after marriage, responsibility surges along with a greater workload, which can be detrimental to an individual's health. This finding complies [27] however contradicts [56] the existing literature.

Similarly, the extended family (where with spouse and children, other members belong jointly) experienced higher blood pressure and headache compared to nuclear families (where usually husband, wife, and their children belong to). Having large family size involves in availing of less opportunity to feed all the members with nutritious food, which is common in the lower economic strata of the population in Bangladesh [13]. However, the

extended family size was negatively associated with the frequency of sickness. The probable reasons for such association might evolve from the scope of more entertainment, sharing, and caring with the extended family members. This opportunity may increase the mental and physical wellbeing of the family members to prevent diseases. The higher number of children increases the probability of gaining weight. One of the reasons may be that children generally insist on fast food intake [42]. Due to more availability and convenience, parents and family members often entertain their children with fast food. Similarly, this incidence heightens abnormal blood pressure and diabetes, and the finding also complies with the literature [26].

Moreover, education is a determining factor that contributes positively to upholding a healthy weight. Compared to individuals with a secondary level of education, individuals with 12 years of schooling possess healthier weight, at the same time, suffer from blood pressure, which is contradictory to the literature [27]. Besides, individuals having 16 or more years of schooling have a higher probability of gaining healthy weight and reduce the likelihood of frequency of sickness. It is expected that highly educated people can take care of their health and care for eating behavior which is supported by the literature [53].

MENTAL HEALTH STATUS

This study found interesting findings while linking current employment status with mental health risk behavior and anxiety. Employed individuals were more vulnerable to a higher mental health risk behavior than unemployed persons. Though, this finding contradicts the literature [14]. Conversely, employed individuals were less anxious than unemployed people. A parallel conclusion is drawn by another study [2]. In this respect, maintaining a healthy lifestyle is recommended to attain better mental health status [12]. In addition, employed people, compared to unemployed, generally become more aggressive at their work which is also evident [47]. The employed person usually depends on on-screen sources for entertainment and also their official tasks. They are more likely to smoke cigarettes, as observed in the literature [18]. Employment reduces the scope of physical exercises [52]. More surprisingly, the employed persons rarely visit a doctor for consultation when they feel sick; however, this finding contradicts the literature [1]. One of the reasons for getting such a finding can be time management, i.e., after an official workload, people may not be interested in investing more time to consult with a doctor.

In contrast, after getting a job, individuals often feel mentally relieved from searching for a livelihood option, which usually reduces anxiety. Individuals who are not yet employed become more anxious about getting a job and securing their future life because they may feel pressure from their social expectations, a predominant issue in the social settings of Bangladesh. It is observed that unemployed or job seekers often feel pressure from their social settings in Bangladesh [43]. However, the study does not find any form of association between employment status and depression.

Males get more involved in health risk behavior than females because, in the social context of Bangladesh, males are treated as breadwinners. Due to livelihood purposes, they usually leave the family back home and often smoke to relieve mental pressure, watch TV, or browse the internet. This may lead to performing/engaging in more aggressive behavior among employed individuals than among unemployed persons, which is consistent with the literature [59, 17]. Moreover, married individuals are more likely to be involved in health risk behavior which is also coherent with the findings of the literature [45]. Usually, married persons are more responsible for their families than unmarried individuals who can also contribute to an increasing burden on the former, thereby increasing health risk behaviors.

The study also found that family size was negatively linked with health risk behavior, i.e., an increased number of family members may contribute to a reduction in mental health-related ailments because of sharing among and caring for each other. However, surprisingly, the extended family has a positive association with anxiety and depression. In Bangladesh, an extended family usually faces more complex power dilemmas compared to a nuclear family, and that may trigger a higher prevalence of anxiety and depression. In addition, individuals with 16 years of formal education were more prone to mental health risk behavior than people with less than ten years of schooling. It may occur because after having a bachelor's degree, generally, people engage in income-generating activities which foster the probability of health risk behavior.

STRENGTHS AND LIMITATIONS

This current study explored the relationship between employment status and an individual's physical and

mental health status, which has rely been explored in the context of Bangladesh, more precisely, from the southwestern part of Bangladesh. In doing so, 320 respondents covering a small territorial area were selected; however, for generalization of the study findings, this number of observations may not be representative which is a limitation of this study. Also, the pattern of occupation may have a different impact on health status, which is not covered in this study. Moreover, for triangulation purposes, this study needs to be supplemented by a qualitative one that is absent here.

In contrast, this study followed a random sampling technique which is a strong part of this research. Moreover, based on the study findings, this study prescribes some policy options which can be undertaken by the individual, institutional, and government levels, which is another strength of this study. Apart from the small sample size, the study findings provided some reflection of the nexus between employment-mental-physical health status of the individuals, which can assist future research on this issue.

CONCLUSION AND POLICY RECOMMENDATIONS

The study aims to explore the pattern of associations between individuals' employment status with their mental and physical health. Both the mental and physical health status of employed and unemployed individuals should be prioritized since both outcome variables define individual well-being. Since the data revealed that employed individuals were more risk prone to physical and mental health issues compared to unemployed individuals. Besides, the employed individuals were more struggling with multitudinous negative health outcomes (unhealthy BMI, back pain, and sickness) than the unemployed individuals. Therefore, a call for cluster-specific policy is crucial. For instance, the employer should cover a reasonable health insurance premium to support the medical cost of their employee. In addition, improvement of the office environment, arrangement of good quality easily adjustable back supporting chairs, and secured job contracts can help reduce the vulnerability to physical and mental health disorders. On the other hand, national-level policy reform focusing on physical and mental wellbeing for all people irrespective of employment status should be prioritized. Based on the age structure, provision of free or partially free yearly routine checkups in public hospitals should be instrumentalized by the government. The data also claims that an additional schooling year increases anxiety which affects mental health. This issue requires further empirical analysis considering cross-country panel data collection. If the findings resemble our findings, then the government should think about how to reduce the academic stress of the students. The arrangement of motivational programs on television and other social networking sites can also be helpful. It will motivate people to understand the significance of a healthy lifestyle, dietary patterns, and physical activity. An intensive investigation of the impact of job strain on physical and mental health is suggested to assist the policy interventions in the context of Bangladesh. Finally, further research on this issue can be carried out using a larger sample size from a wider range of territorial coverage and applying both quantitative and qualitative methods of research, which will provide more robust results.

CONFLICTS OF INTEREST/COMPETING INTERESTS

The authors have no conflicts of interest to declare.

ETHICAL APPROVAL

Ethical issues are considered carefully throughout the study, and the ethical clearance committee of the Khulna University of Bangladesh approved this study through certificate (Ref. No. – KUECC–2021/05/19). Prior to data collection, participants' consent was taken, and they were well informed about the study objective, confidentiality, and other issues.

References

1. Åhs A, Burell G, Westerling R. Care or not care—that is the question: predictors of healthcare utilisation in relation to employment status. International journal of behavioral medicine. 2012 Mar;19(1):29-38.
2. Al Yassin A, Ouyang B, Temes R. Depression and anxiety following aneurysmal subarachnoid hemorrhage are associated with higher six-month unemployment rates. The Journal of neuropsychiatry and clinical neurosciences. 2017 Jan;29(1):67-9.
3. American Diabetes Association. Standards of medical care in diabetes—2016 abridged for primary care providers. Clinical diabetes: a publication of the American Diabetes Association. 2016 Jan;34(1):3.
4. Bari QH, Hassan KM, Haque R. Scenario of solid waste reuse in Khulna city of Bangladesh. Waste management. 2012 Dec 1;32(12):2526-34.
5. Becker AD, Grantz KH, Hegde ST, Bérubé S, Cummings DA, Wesolowski A. Development and dissemination of

infectious disease dynamic transmission models during the COVID-19 pandemic: what can we learn from other pathogens and how can we move forward? The Lancet Digital Health. 2020 Dec 7.

6. Berniell MI. The effects of working hours on health status and health behaviors. 15th IZA European Summer School in Labor Economics. 2012 Mar.
7. Boardman J. Work, employment and psychiatric disability. Advances in Psychiatric Treatment. 2003 Sep;9(5):327-34.
8. Boden LI, Spieler EA, Wagner GR. The changing structure of work: implications for workplace health and safety in the US. InFuture of Work Symposium, US Department of Labor 2016 Mar 7.
9. Burgard SA, Lin KY. Bad jobs, bad health? How work and working conditions contribute to health disparities. American Behavioral Scientist. 2013 Aug;57(8):1105-27.
10. Cai L, Kalb G. Health status and labour force participation: evidence from the HILDA data. Melbourne Institute of Applied Economic and Social Research; 2004 Mar.
11. Cochran WG. Sampling techniques, new york, 1953. Statistical Surveys E. Grebenik and CA Moser. 1963.
12. Cole JA, Tully MA, Cupples ME. "They should stay at their desk until the work's done": a qualitative study examining perceptions of sedentary behaviour in a desk-based occupational setting. BMC research notes. 2015 Dec;8(1):1-9.
13. D'Souza A, Tandon S. Intrahousehold nutritional inequities in rural Bangladesh. Economic Development and Cultural Change. 2019 Apr 1;67(3):625-57.
14. Drydakis N. The effect of unemployment on self-reported health and mental health in Greece from 2008 to 2013: a longitudinal study before and during the financial crisis. Social science & medicine. 2015 Mar 1;128:43-51.
15. Economic Census. District report 2013, Khulna. Available: http://203.112.218.65:8008/WebTestApplication/userfiles/Image/EcoCen13/DistReport/Khulna.pdf (Accessed on 19/07/2021)
16. Evans J, Frank B, Oliffe JL, Gregory D. Health, illness, men and masculinities (HIMM): a theoretical framework for understanding men and their health. Journal of Men's Health. 2011 Mar;8(1):7-15.
17. Ford K, Butler N, Hughes K, Quigg Z, Bellis MA, Barker P. Adverse childhood experiences (ACEs) in Hertfordshire, Luton and Northamptonshire. Liverpool: Liverpool John Moores University. 2016 May.
18. Golden SD, Perreira KM. Losing jobs and lighting up: Employment experiences and smoking in the Great Recession. Social Science & Medicine. 2015 Aug 1;138:110-8.
19. Grzywacz JG, Dooley D. "Good jobs" to "bad jobs": replicated evidence of an employment continuum from two large surveys. Social science & medicine. 2003 Apr 1;56(8):1749-60.
20. Hergenrather KC, Emmanuel D, McGuire-Kuletz M, Rhodes SD. Employment as a social determinant of health: Exploring the relationship between neurocognitive function and employment status. Rehabilitation Research, Policy, and Education. 2018 Jun 1;32(2):101-22.
21. Hicks GE, Simonsick EM, Harris TB, Newman AB, Weiner DK, Nevitt MA, Tylavsky FA. Cross-sectional associations between trunk muscle composition, back pain, and physical function in the health, aging and body composition study. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences. 2005 Jul 1;60(7):882-7.
22. Kalisch R, Baker DG, Basten U, Boks MP, Bonanno GA, Brummelman E, Chmitorz A, Fernàndez G, Fiebach CJ, Galatzer-Levy I, Geuze E. The resilience framework as a strategy to combat stress-related disorders. Nature human behaviour. 2017 Nov;1(11):784-90.
23. Khulna City Corporation. Khulna, Bangladesh Metro Area Population 1950-2021, 2018. Available: https://www.macrotrends.net/cities/20124/khulna/population (Accessed 19/07/2021).
24. Landsbergis PA, Dobson M, Koutsouras G, Schnall P. Job strain and ambulatory blood pressure: a meta-analysis and systematic review. American journal of public health. 2013 Mar;103(3):e61-71.
25. Lee AL, Harrison SL, Goldstein RS, Brooks D. An exploration of pain experiences and their meaning in people with chronic obstructive pulmonary disease. Physiotherapy theory and practice. 2018 Oct 3;34(10):765-72.
26. Lee H, Wildeman C, Wang EA, Matusko N, Jackson JS. A heavy burden: the cardiovascular health consequences of having a family member incarcerated. American journal of public health. 2014 Mar;104(3):421-7.
27. Liu SY, Buka SL, Linkletter CD, Kawachi I, Kubzansky L, Loucks EB. The association between blood pressure and years of schooling versus educational credentials: test of the sheepskin effect. Annals of Epidemiology. 2011 Feb 1;21(2):128-38.

28. Mette J, Garrido MV, Harth V, Preisser AM, Mache S. Healthy offshore workforce? A qualitative study on offshore wind employees' occupational strain, health, and coping. BMC Public Health. 2018 Dec;18(1):1-4.
29. Mewes R, Rief W, Brähler E, Martin A, Glaesmer H. Lower decision threshold for doctor visits as a predictor of health care use in somatoform disorders and in the general population. General hospital psychiatry. 2008 Jul 1;30(4):349-55.
30. Mohsen A, Hakim S. Workplace stress and its relation to cardiovascular disease risk factors among bus drivers in Egypt. Eastern Mediterranean Health Journal. 2019;25(12):878-86.
31. Mirmohammadi SJ, Taheri M, Mehrparvar AH, Heydari M, Kanafi AS, Mostaghaci M. Occupational stress and cardiovascular risk factors in high-ranking government officials and office workers. Iranian Red Crescent Medical Journal. 2014 Aug;16(8).
32. Niedzwiedz CL, Knifton L, Robb KA, Katikireddi SV, Smith DJ. Depression and anxiety among people living with and beyond cancer: a growing clinical and research priority. BMC cancer. 2019 Dec;19(1):1-8.
33. Nyberg ST, Fransson EI, Heikkilä K, Alfredsson L, Casini A, Clays E, De Bacquer D, Dragano N, Erbel R, Ferrie JE, Hamer M. Job strain and cardiovascular disease risk factors: meta-analysis of individual-participant data from 47,000 men and women. PloS one. 2013 Jun 20;8(6):e67323.
34. Oberlinner C, Yong M, Nasterlack M, Pluto RP, Lang S. Combined effect of back pain and stress on work ability. Occupational Medicine. 2015 Mar 1;65(2):147-53.
35. Pacheco G, Page D, Webber DJ. Mental and physical health: re-assessing the relationship with employment propensity. Work, employment and society. 2014 Jun;28(3):407-29.
36. Patel V, Chisholm D, Parikh R, Charlson FJ, Degenhardt L, Dua T, Ferrari AJ, Hyman S, Laxminarayan R, Levin C, Lund C. Addressing the burden of mental, neurological, and substance use disorders: key messages from Disease Control Priorities. The Lancet. 2016 Apr 16;387(10028):1672-85.
37. Pedersen BK, Saltin B. Evidence for prescribing exercise as therapy in chronic disease. Scandinavian journal of medicine & science in sports. 2006 Feb;16(S1):3-63.
38. Penedo FJ, Dahn JR. Exercise and wellbeing: a review of mental and physical health benefits associated with physical activity. Current opinion in psychiatry. 2005 Mar 1;18(2):189-93.
39. Pharr JR, Moonie S, Bungum TJ. The impact of unemployment on mental and physical health, access to health care and health risk behaviors. International Scholarly Research Notices. 2012;2012.
40. Pradhan A, Shrestha N. Working hour and its impact on backache from gender perspective. Dhaulagiri Journal of Sociology and Anthropology. 2010;4:235-46.
41. Qaseem A, Wilt TJ, Rich R, Humphrey LL, Frost J, Forciea MA, Clinical Guidelines Committee of the American College of Physicians and the Commission on Health of the Public and Science of the American Academy of Family Physicians*. Pharmacologic treatment of hypertension in adults aged 60 years or older to higher versus lower blood pressure targets: a clinical practice guideline from the American College of Physicians and the American Academy of Family Physicians. Annals of internal medicine. 2017 Mar 21;166(6):430-7.
42. Quick VM, Byrd-Bredbenner C, Neumark-Sztainer D. Chronic illness and disordered eating: a discussion of the literature. Advances in Nutrition. 2013 May;4(3):277-86.
43. Rafi M, Mamun MA, Hsan K, Hossain M, Gozal D. Psychological implications of unemployment among Bangladesh Civil Service job seekers: a pilot study. Frontiers in psychiatry. 2019 Aug 12;10:578.
44. Ramli AH. Work environment, job satisfaction and employee performance in health services. Business and Entrepreneurial Review. 2019 Aug 24;19(1):29-42.
45. Reczek C, Pudrovska T, Carr D, Thomeer MB, Umberson D. Marital histories and heavy alcohol use among older adults. Journal of health and social behavior. 2016 Mar;57(1):77-96.
46. Reisine S, Fifield J, Walsh S, Forrest DD. Employment and health status changes among women with fibromyalgia: A five-year study. Arthritis Care & Research. 2008 Dec 15;59(12):1735-41.
47. Restubog SL, Zagenczyk TJ, Bordia P, Bordia S, Chapman GJ. If you wrong us, shall we not revenge? Moderating roles of self-control and perceived aggressive work culture in predicting responses to psychological contract breach. Journal of Management. 2015 May;41(4):1132-54.
48. Ross CE, Mirowsky J. Does employment affect health?. Journal of Health and social Behavior. 1995 Sep 1:230-43.
49. Ruhm CJ. Healthy living in hard times. Journal of health economics. 2005 Mar 1;24(2):341-63.
50. Rushton L. The global burden of occupational disease. Current environmental health reports. 2017 Sep;4(3):340-8.

51. Sara JD, Prasad M, Eleid MF, Zhang M, Widmer RJ, Lerman A. Association between Work-Related stress and coronary heart disease: a review of prospective studies through the job strain, Effort-Reward balance, and organizational justice models. Journal of the American Heart Association. 2018 Apr 27;7(9):e008073.
52. Thorp AA, Healy GN, Winkler E, Clark BK, Gardiner PA, Owen N, Dunstan DW. Prolonged sedentary time and physical activity in workplace and non-work contexts: a cross-sectional study of office, customer service and call centre employees. International journal of behavioral nutrition and physical activity. 2012 Dec;9(1):1-9.
53. Variyam JN, Blaylock JR, Smallwood DM, Basiotis PP. USDA's Healthy Eating Index and nutrition information. 1998.
54. Velten J, Lavallee KL, Scholten S, Meyer AH, Zhang XC, Schneider S, Margraf J. Lifestyle choices and mental health: a representative population survey. BMC psychology. 2014 Dec;2(1):1-1.
55. Waenerlund AK, Virtanen P, Hammarström A. Is temporary employment related to health status? Analysis of the Northern Swedish Cohort. Scandinavian journal of public health. 2011 Jul;39(5):533-9.
56. Williams L, Zhang R, Packard KC. Factors affecting the physical and mental health of older adults in China: the importance of marital status, child proximity, and gender. SSM-population health. 2017 Dec 1;3:20-36.
57. Little M, Humphries S, Patel K, Dewey C. Factors associated with BMI, underweight, overweight, and obesity among adults in a population of rural south India: a cross-sectional study. BMC obesity. 2016 February; 3:1-13.
58. Sinha JW, Cnaan RA, Gelles, RJ. Adolescent risk behaviors and religion: Findings from a national study. Journal of adolescence. 2007 April; 30(2):231-249.
59. Bowen P, Edwards P, Lingard H, Cattell K. Workplace stress, stress effects, and coping mechanisms in the construction industry. Journal of Construction Engineering and Management. 2014 Mar 1;140(3):04013059.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

QUALITY OF WORK LIFE AND MEDICAL TEACHERS' COMMITMENT: A MODERATED MEDIATION ANALYSIS OF FEAR OF COVID-19 AND JOB SATISFACTION

Gaurav Deep Rai, Saurabh Verma*

Department of Management Studies, National Institute of Technology, Silchar-788 010, Assam, India

Correspondence: gaurav_rs@mba.nits.ac.in

ABSTRACT

This study is principally the first to test a moderated mediation model of COVID-19 fear and job satisfaction in the Quality of Work Life (QWL)-commitment relationship of medical teachers during the pandemic. The conceptual model draws its theoretical tenet from spillover and conservation of resources theories.

Cluster sampling was incorporated from four metropolitan cities in India. A mixed-method research design was administered to 378 medical teachers amidst the pandemic. The partial least squares structural equation modeling (PLS-SEM) results indicate a significant positive association between the constructs. Path analyses have highlighted positive associations between QWL, job satisfaction, and affective commitment to medical institutions. Further, a partial mediation effect of job satisfaction in the QWL-commitment relationship is highlighted, adding a new dimension to past studies. Intriguingly, each of the positive associations between QWL, job satisfaction, and commitment was negated and significantly moderated by the fear of COVID-19 experienced by the medical teaching fraternity.

The findings offer practical implications to the stakeholders (Ministry of Health and Family Welfare, Department of Higher Education, Government of India, and State Governments) in enriching the QWL, job satisfaction, and medical teachers' commitment induced by psychological stress, anxiety, role conflict, post-traumatic stress disorder, and fear of COVID-19 in the global pandemic.

KEYWORDS

Fear of COVID-19; quality of work life; job satisfaction; medical teachers' commitment; moderated mediation model

INTRODUCTION

The outbreak of SARS CoV-2 or the Coronavirus (COVID-19) and its sub-variants have wreaked havoc across all spectrums of life, industry, and education. Given the virus's virulence, fatality, evolution, lack of proper vaccines, and uncertainty, the World Health Organization (WHO) declared COVID-19 a global pandemic on March 11, 2020. Consequently, nations were mandated to undergo complete lockdowns to abate the virus's rapid transmission, restructuring all possible medical resources to cater to the spiraling hospitalization load and address attention to other forms of medical care. Uncertainty impacted the education sector adversely as schools, colleges, and universities witnessed physical closure [1]. Notably, medical education, which relies on in-person teaching, was deeply impacted. Medical education is majorly patient-centric, interaction-based learning and assessment. Clinical teachings are best understood with in-person interactions

to unearth patients' clinical observations and develop patient interaction and counseling competencies [2]. The application of medical pedagogy transitioned from traditional/classroom teaching to remote learning or ICT-enabled technologies encountered teething problems in countries like India, which is limited by infrastructure and the voluminous demand for COVID-19 infection induced in the medical fraternity.

The literature has a plethora of articles highlighting the plight of the students and teachers in remote learning during the COVID-19 outbreak [3], but unfortunately, very few articles have precisely highlighted the challenges of remote medical pedagogy [2]. The global Delta wave induced overwhelming hospitalization, fatalities, and unprecedented challenges to healthcare professionals, and medical education were in a quandary. Nations like the US, UK, Australia, and Canada completely halted clinical rotations and summative examinations [4]. The unprecedented transition in the application of medical pedagogy via the virtual format in countries like India was not smooth [2,3]. Many Indian medical schools adopted ICT-enabled learning; the pre-clinical curriculum was transformed into remote learning through online lectures and group discussions via the virtual format. Past research has highlighted the limitations of online medical pedagogy: lack of personal interaction with the mentor, incomplete syllabus, incompetence to engage in ICT tools, rampant digital divide, and unpreparedness in curriculum delivery [5]. The psychological impact on students has been reported as demotivated, feeling of incompetence, especially concerning clinical skills, application of theoretical lessons in practice, low confidence in interaction, and counseling with a live (in-person) patient [6]. The literature has ignored the facets of work in remote medical teaching, its influence on job satisfaction, and overall well-being amidst the fear of COVID-19. The findings provide an impetus for implications for the management, medical fraternity, health care department, and government authorities. The need of the hour is to enrich the workplace (academic and professional), inducing job satisfaction and commitment, which are crucial for quality health care service.

LITERATURE REVIEW AND HYPOTHESES

QUALITY OF WORK LIFE AND AFFECTIVE COMMITMENT

The need-based theory of QWL [7,8,9,10] posits that every individual harbors basic needs to be satisfied when engaged at work. The degree of QWL experienced is exhibited through the extent these seven basic needs are satisfied by the job settings [9,10]. These are identified as i) health and safety needs (good healthiness and protection from harm at work); ii) economic and family needs (equitable compensation and attending domestic needs); (iii) social needs (collegiality at the workplace); (iv) esteem needs (recognition from within and outside work); (v) actualization needs (opportunity to achieve one's full potential; (vi) knowledge needs (training and development of competencies); (vii) aesthetic needs (personal creativity and independence at work) [7,8,9,10]. Affective commitment is perceived as an emotional drive to remain an institution member and assist in achieving its goals through intrinsic involvement and acceptance of organizational values [11,12]. Past studies have reported that as the employee needs (QWL) are satisfied, it instigates employee loyalty and commitment [7,8,9,10,11,12,13,14]. Based on this observation, the following hypothesis is proposed:

H1 – QWL is positively associated with medical teachers' affective commitment.

QWL AND JOB SATISFACTION

Job satisfaction reflects the employee's emotive and affective bond with their work, instigating happiness, positivity, and overall well-being [7,8,9,10,12]. Past research has categorically highlighted QWL is an antecedent to job satisfaction [8,9,10,12]. Hence, the literature has reported that a high degree of QWL induces positive attitudes, affective bonding, and job satisfaction [7,8,9,10,11,13,14]. Considering this past research, the following hypothesis is formed:

H2 – QWL positively predicts job satisfaction.

MEDIATING ROLE OF JOB SATISFACTION

Literature provides evidence that employees satisfied with their job leads to exhibit loyalty and commitment toward their institution [9,10,11,12,14]. Further, the spillover theory [15] posits that an individual harbors different domains of life (social, family, work life, etc.). The satisfaction from one domain influences the satisfaction in other domains of life. Hence, with the theoretical tenet of spillover theory, we propose that as the medical teachers' needs are satisfied through work (QWL), it spills over/instigates teachers' affective bond and job satisfaction, which percolates a feeling to remain a member of the institution through affective commitment and loyalty to work/ hospital

[8,9,10,11,12,13]. Thus, the following hypotheses are formed:

H3 – Job satisfaction positively predicts commitment.

H4 – Job satisfaction mediates the positive relationship between QWL and medical teachers' affective commitment in the COVID-19 outbreak.

MODERATING ROLE OF FEAR OF COVID-19

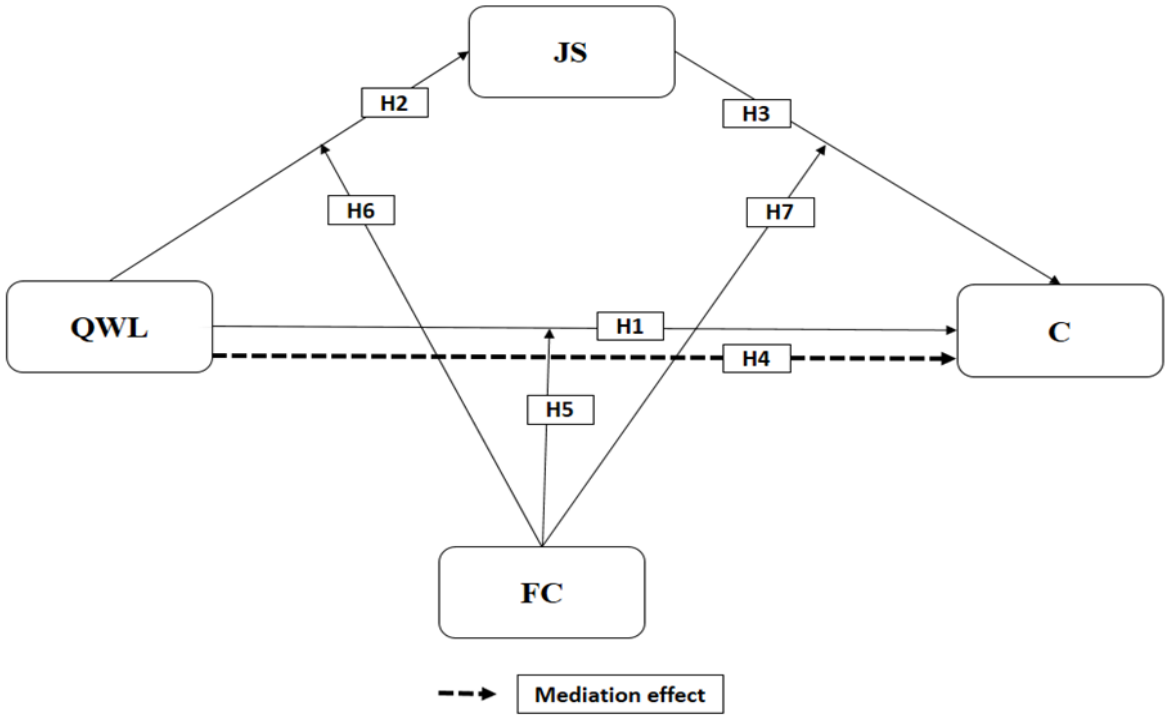
The COVID-19 pandemic has affected life through all spectrums. Prior studies have categorically highlighted the challenges [1,2,3,4,6] possible innovations in online medical education [2,7,16,17,18,19] and psychological repercussions on medical students [1,2,3,5,6,13,16,18], particularly concerning scepticism in clinical practices, patient interaction, and counseling [2,5,6,8,12,13,14,17]. Through extensive literature review, it has been observed that research highlighting the quality of work life of medical teachers in addressing the overwhelming demand of hospitalization, patient care, stigmatization, lack of adequate staff, and simultaneously managing the unprecedented challenge of ICT-enabled teaching and assessment have been ignored in the present literature [1,2,3,5,6,7,8,9,12,13,16,17,18,19,20]. However, there are virtually no articles published investigating the impact of fear of COVID-19 on work and work outcomes (job satisfaction and commitment) of the medical teaching fraternity. We further introduce the construct of fear of COVID-19 from the medical psychology literature [21] to provide an impetus for the psychological impact on facets of work and mental well-being. This research provides a psychosomatic perspective to unearth the moderating impact of fear of COVID-19 on the spillover effect of job satisfaction in the relationship between quality of work life (QWL) and commitment of the Indian medical teachers (Figure 1). We propose a moderated mediation conceptual model on the tenet of spillover theory [15] and conservation of resources theory [22]. We further postulate that as the personal resources of medical teachers (time, energy, reputation, and social relationships) are threatened/ challenged by the risk of contagion, stigmatization, and fear of infecting family members, the fear of COVID-19 moderates/ calibrates the mediation spillover effect of job satisfaction. The following hypotheses are proposed to test the moderated mediation framework:

H5 – The fear of COVID-19 moderates the predictive effect of QWL on commitment.

H6 – The fear of COVID-19 moderates the predictive effect of QWL on job satisfaction.

H7 – The fear of COVID-19 moderates the predictive effect of job satisfaction on commitment.

FIGURE 1: CONCEPTUAL FRAMEWORK



Note: QWL- Quality of Work Life; JS- Job Satisfaction; C- Commitment; FC- Fear of COVID-19

METHODS

SAMPLE

Initially, cluster sampling was administered to garner qualitative information from medical colleges of four prominent metropolitan cities (clusters) of India, i.e., Chennai, Delhi, Kolkata, and Mumbai. The study time frame was May 2021 to April 2022, coinciding with India's Delta and Omicron waves. Consequent to the havoc caused by the pandemic and strict COVID-19 appropriate norms issued by the Government of India, a cross-sectional approach with the circulation of e-questionnaires via email, Facebook, Instagram, and WhatsApp was deployed. The initial response rate was nominal, and snowballing techniques were adopted to increase the sample size. The optimum sample size was calculated as 119 through G*Power software (v3.1.9.4) with 'a priori' analysis, medium effect size (f2: 0.15), power: 0.95, and a: 0.05 (Figure 2).

Since the crux of this research is limited to garnering the perception of medical teachers towards the sundry facets of work life, a cover letter attached to the e-questionnaire categorically highlighted the nature of voluntary participation and confidentiality in the research. The ASA Code of Ethics (1999) mentions that confidentiality of information should be highlighted to the respondents at the beginning of a research relationship. Hence, complete anonymity of the responses was ensured to collate unbiased qualitative and quantitative perspectives towards the quality of work life, satisfaction, and commitment. The principals of the medical colleges were duly informed via email, and the link to the e-questionnaire was attached to ensure ethical approval for the voluntary participation of medical teachers in the online survey during the global COVID-19 pandemic.

Altogether, 378 complete responses were recorded on a five-point Likert scale (1: strongly disagree to 5: strongly agree) greater than the minimum sample size. The demographic profile of the respondents is elucidated in Table 1.

TABLE 1: DEMOGRAPHIC PROFILE

Demographic	Characteristics	Frequency	(%)
Designation	Professor	9	3.1
	Associate Professor	126	38.4
	Assistant Professor	243	58.5
Gender	Male	249	64.2
	Female	132	34
	Prefer not to say	7	1.8
Age	Below 30	127	32.7
	31-40	168	43.3
	41-50	78	20.1
	Above 50	15	3.9
Marital Status	Unmarried	187	48.2
	Married	172	44.3
	Widowed	16	4.1
	Separated	13	3.4
Teaching Experience	Below 10	215	55.4
	11-20	154	39.7
	21-30	12	3.1
	Above 30	7	1.8

FIGURE 2: G*POWER GRAPH

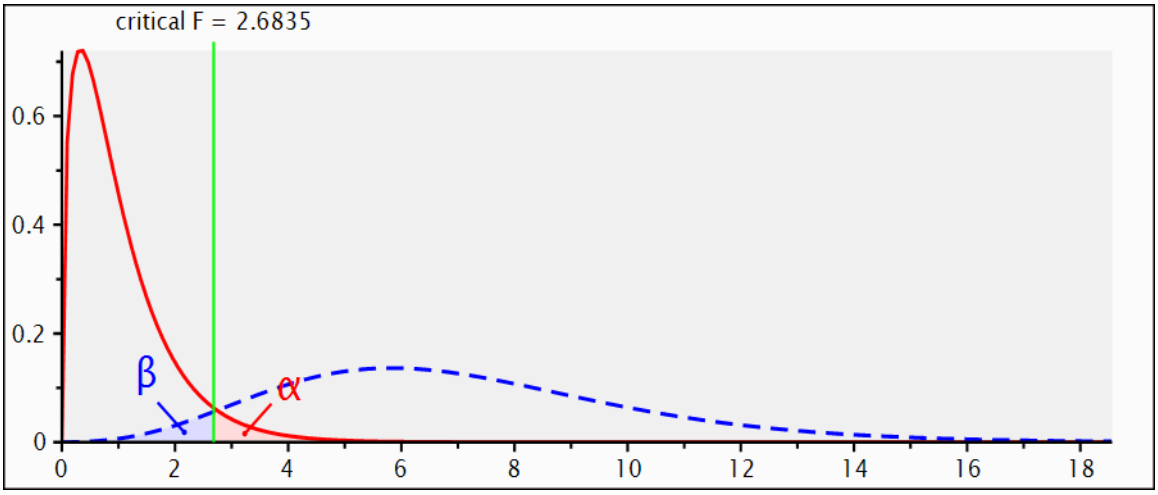


TABLE 2. MEASURES

Constructs	Reference	Items
Quality of Work Life Scale (QWLS)	[10]	16
Job satisfaction	[25]	3
Commitment	[26]	5
Fear of COVID-19 Scale (FCV-19S)	[21]	7

STATISTICAL TECHNIQUES

The hypothesized relationships were tested through partial least squares structural equation modeling (PLS-SEM) through SmartPLS (v. 3.3.9) [23], Statistical Package for the Social Sciences (SPSS) (v. 22), and PROCESS macro (v. 4.1) [18].

MEASURES

Measurement scales of constructs were adopted from prior studies, as exhibited in Table 2. Items were edited to suit the medical teaching fraternity.

RESULTS

MEASUREMENT MODEL

Prior to the testing of the structural relationship, the construct validity of the measurement model is tested. The internal consistency was verified through item-factor loadings, Cronbach's alpha (a), Rho, and composite reliability (CR), which all exceeded the standard of 0.7 [27,28,29] (Table 3). The average variance extracted (AVE) exceeded the threshold of 0.5, which supports the convergent validity criterion [27,28,29] (Table 3). The discriminant validity assessment was done through Fornell and Larcker criteria [28] and heterotrait-monotrait (HTMT) ratio [24]. The square root scores displayed diagonally were greater than their inter-correlations (Table 4), and the HTMT scores were less than 0.85 [25] (Table 5). This provides evidence of the constructs' high degree of discriminant validity [27,28,29,30]. Hence, with empirical evidence, the measurement model exhibits high construct validity and reliability [27,28,29,30]. Since our research was predominantly based on survey information, we addressed the multi-collinearity and common method bias issue through variance inflation factor (VIF) [29,30] and Harman's single factor test [31]. The VIFs were under the limit of 5, and the total variance extracted by all items loaded into one factor was 39.538% lower than the 50% mark. These statistics confirm that the measurement model is independent of multi-collinearity and common method biases [27,29,30,31]

TABLE 3. CONSTRUCT VALIDITY

Reflective Constructs	Indicators	Loadings/ Coefficients	t-value	VIF	a	Rho	CR	AVE
Quality of Work Life	HS	0.684	23.167	2.19	0.888	0.89	0.912	0.601
	E	0.801	36.177					
	A	0.791	34.672					
	EF	0.795	34.298					
	S	0.771	32.975					
	K	0.819	37.003					
	AS	0.74	28.06					
Job Satisfaction	JS1	0.854	48.357	1.69	0.804	0.806	0.884	0.718
	JS2	0.845	47.866					
	JS3	0.843	43.876					
Commitment	C1	0.876	71.551	2.22	0.868	0.871	0.919	0.791
	C2	0.894	63.118					
	C3	0.781	55.590					
	C4	0.879	60.048					
Fear of COVID-19	FC1	0.733	13.563	1.71	0.797	0.802	0.881	0.721
	FC2	0.867	49.719					
	FC4	0.816	25.246					
	FC5	0.846	32.628					

Note: HS- Health and safety needs, EF-Economic and family needs, S-Social needs, E-Esteem needs, A-Actualization needs. K-Knowledge needs, AS-Aesthetics needs, QWL- Quality of Work Life; JS-Job Satisfaction; C- Commitment, FC-Fear of COVID-19. All factor loadings are significant at 99% confidence levels.

TABLE 4. DISCRIMINANT VALIDITY (FORNELL-LARCKER CRITERION)

Constructs	1	2	3	4
1. Fear of COVID-19	***0.843***			
2. Job Satisfaction	0.421	***0.848***		
3. Commitment	0.373	0.431	***0.889***	
4. Quality of Work Life	0.507	0.707	0.385	***0.773***

TABLE 5. DISCRIMINANT VALIDITY (HTMT)

Constructs	1	2	3	4
1. Fear of COVID-19				
2. Job Satisfaction	0.521			
3. Commitment	0.446	0.515		
4. Quality of Work Life	0.604	0.812	0.43	

STRUCTURAL MODEL

The measurement model was empirically proven to be reliable and valid. The results of PLS-SEM are depicted in Table 6. The first hypothesis (H1) tested the direct relationship between QWL and the commitment of medical teachers in the COVID-19 pandemic. The path analysis results explicate that QWL significantly predicts commitment (β = 0.385; t-statistics = 7.874) levels. H2 also confirmed that the medical teachers' job satisfaction was significantly predicted by QWL (β = 0.707; t-statistics = 24.27). Job satisfaction also predicted hospital commitment during the pandemic (β = 0.317; t-statistics = 4.398), which supported H3. The mediation effect of job satisfaction in the relationship between QWL and commitment was tested as per Baron and Kenny's [27] and Preacher et al.'s [33] recommendations. The predictive effect (c') [27] of QWL on commitment in the presence of the mediator (job satisfaction) was positively significant (β = 0.161; t-statistics = 2.07). This implies that the predictive effect of QWL on hospital commitment during the pandemic was partially mediated through job satisfaction [32,33,34].

The moderated mediation model was tested as per the bootstrapping technique of 5000 subsamples [33,34] (Table 7). The results from Process Macro [35] (Model: 59) exhibited that the fear of COVID-19 had a significant negative moderating effect (β = -0.284; t-statistics = -2.569) on the relationship between QWL and commitment of the Indian medical teachers. Hence, H5 was confirmed. The interaction term (Fear of COVID-19 × QWL) significantly negatively affected the relationship between QWL and job satisfaction (β = -0.251; t-statistics = -6.059), which supported H6. The moderating effect of fear of COVID-19 on the predictive effect of job satisfaction on commitment was insignificant (β = 0.148; t-statistics = -0.272; p > 0.05). Hence, H7 was rejected.

TABLE 6. MEDIATION MODEL TESTING

Hypotheses	Paths	β	t-value	Support
H1	**QWL → C**	0.385	7.874**	Yes
H2	**QWL → JS**	0.707	24.27**	Yes
H3	**JS → C**	0.317	4.398**	Yes
H4	**QWL → JS → C**	0.161	2.07**	Yes

Note: QWL- Quality of Work Life; JS-Job Satisfaction; C- Commitment, FC-Fear of COVID-19.

TABLE 7. MODERATION OF MEDIATION RESULTS

Hypotheses	Paths	β	SE	t	LL	UL	Support
H5	**FC × QWL → C**	-0.284	0.111	-2.569**	-0.502	-0.067	Yes
H6	**FC × QWL → JS**	-0.251	0.041	-6.059**	-0.332	-0.169	Yes
H7	**FC × JS → C**	0.019	0.148	0.131^{NS}	-0.272	0.311	No

Note: QWL- Quality of Work Life; JS-Job Satisfaction; C- Commitment, FC-Fear of COVID-19.

** p<0.01; LL: Lower limit confidence interval; UL: Upper limit confidence interval; NS: Not significant.

DISCUSSION

An intensive literature review has highlighted the paucity of research on the impact of fear of COVID-19 on facets of work and work outcomes of medical college teachers. This research is primarily the first to contribute to the extant literature. The study is conceptualized to 1) unearth the mediating effect of job satisfaction in the QWL-commitment relationship of the medical college teachers in the pandemic. 2) the moderating effect of fear of COVID-19 in the mediation model. The PLS-SEM results have highlighted significant positive associations among QWL, job satisfaction, and commitment. Our findings indicate QWL positively predicted medical teachers' job satisfaction and affective commitment to their medical care institutions, which is commensurate with past studies [7,8,9,10,11,12,13,14,16,20,25,26,36,37]. Former studies have merely reported the mediating effect of job satisfaction in the QWL-organizational commitment relationship, but the nature of mediation i.e., complete or partial [27] have not been explored. This study adds a categorical perspective of a partial mediation effect of job satisfaction in the spillover of QWL on commitment in furtherance to previous studies [7,8,11,12,13,14,16,26,36,37]. There are no articles

published on the moderating effect of fear of COVID-19 in the facets of the work life of the medical teaching fraternity; we could not compare our results with prior studies. The novel contribution of this research is to provide empirical evidence of the fear of COVID-19 on the spillover of QWL on job satisfaction and affective commitment. The path analyses have revealed that fear of COVID-19 significantly reversed the positive effect (β: 0.385; H1) of QWL on commitment (H5). The COVID-19 fear also negatively moderated the positive effect (β: 0.707; H2) of QWL on job satisfaction (H6). Hence, we infer that fear of COVID-19 has inhibited/negated the affirmative predictive effect of QWL on job satisfaction and commitment levels of the medical teaching fraternity amidst the pandemic.

The mental well-being of the medical fraternity during the pandemic has been in jeopardy [1, 2, 3, 4, 5, 6, 9, 12, 13, 14, 17, 36]. A plethora of studies has indicated depression, loneliness, anxiety, death, emotional burnout, financial stressors, social stigma, and quarantine crippling the mental health of the medical sector [1, 2, 3, 9, 17, 18, 19, 20, 35, 37]. The healthcare providers struggled with isolation from social engagements, which exacerbated chronic mental health issues. The WHO report categorically addressed augmented mental health challenges from emotional anguish, exposure to COVID-19, death, personnel and personal protective equipment (PPE) shortages, and moral misery in patient care [2, 3, 16, 18, 19, 20, 35 ,36, 37, 38]. Unfortunately, the expression of emotions and stressors in medicine has been criticized as unprofessional [18,19], but the results have categorically elucidated the urgent need to address the fear of COVID-19 and its repercussions on different facets of work, satisfaction, and commitment. It has also been reported that public hospitals/ medical-educational institutions need a full-time human resource (HR) manager designated to address the humane aspects of healthcare workers and proper human capital management in Indian public health care. Furthermore, through personal interviews and telephonic conversations with the respondents, it has also come to the fore that appointment of full-time mental health counselors in hospitals/medical schools is the urgent need of the hour to address the cognitive, work-related, behavioral, emotional, and fear of COVID-19 issues of the medical health care employees, students, and trainees. This has also been addressed by the WHO [4,21,36,38]. The pandemic has witnessed a high degree of suicidal tendencies, depression, loneliness, societal stigma, and anxiety in the medical sector [2,4,6,12,1318,20,37]. Hence, the appointment of qualified HR executives and mental health counsellors could greatly enrich mental well-being, enhance QWL, job satisfaction, overall commitment, and reduce workplace ostracism (perception of being ignored/excluded by the management or colleagues).

The State Government, the Ministry of Health and Family Welfare, and the Government of India should categorically formulate policies on fair compensation, managerial support, adequate training facilities, workspace flexibility, and work-life balance to meet family and leisure needs. The urgent need is the transparent disbursement of adequate funds for optimum infrastructure to afford quality medical education, research, and health care. The Indian government has infused a budgeted estimate of 2.1 percent of gross domestic product (GDP) in the fiscal year of 2021-2022, well above 1.3 percent for the previous fiscal year (2020-2021). This ambitious endeavor is minuscule compared to the percentage of contribution to the GDP of developed nations like the US (19 percent), China (7.1 percent), and the UK (11.9 percent). The pandemic had a notable effect on clinical rotation training in India, adversely impacting hands-on learning and experience. The American College of Chest Physicians introduced virtual reality-enhanced classrooms and digital educational escape rooms for real-time clinical interaction [17,1835,36]. Such could be introduced by the Indian government for such unexpected pandemics or lethal variants of COVID-19 to provide seamless delivery of medical pedagogy in crisis. The medical teachers were adversely impacted by role conflict and ambiguity during the pandemic. The teachers had to attend the voluminous hospitalization and patient care while undertaking virtual/ in-person classes during the pandemic. Hence, the managerial authorities must emphasize adequate infrastructure, training, competencies enhancement, research and development, and a culture of mental health awareness and well-being. This study has been conducted with a cross-sectional research design due to the COVID-19 wave significantly impacting data collation. A longitudinal study incorporating the post-COVID-19 era could provide intriguing insights into HR policies. The coping mechanisms adopted by medical teachers during the pandemic may provide a novel perspective on the structural model. Some respondents have voiced a certain degree of workplace ostracism. The impact of ostracism, leadership practices, perceived organizational support, and culture in different facets of work life and well-being could explore new avenues in organizational behavior and medical psychology literature.

CONCLUSION

The medical fraternity was at the receiving end of the brunt of the COVID-19 in terms of the death toll, mental health issues, burnout, and post-traumatic stress disorder (PTSD). Literature has a plethora of articles on the generic impact of COVID-19 on life, education, and industry but ignores the impact of fear of COVID-19 on medical care providers. This article addresses the impact of psychological fear of COVID-19 in sundry facets of work life and the delivery of medical pedagogy in times of crisis and uncertainty. The pandemic has induced a negative spillover effect on the teachers' mental well-being, which needs critical attention from the management and health ministry. The study concludes with a positive spillover of job satisfaction in the association between QWL and commitment. The fear of COVID-19 had a negative inhibiting/ moderating effect on the positive influence of QWL on job satisfaction and commitment. Fair compensation policies, adequate training, infrastructure, understaffing, work flexibility, work-life balance, and appointment of HR managers and counselors are urgently needed. Critical care must be dedicated to increased staff participation in decision-making, competencies/ skill development programs, continuous knowledge development schemes, and reward and appraisal policies that could induce motivation, employee engagement, satisfaction, institutional commitment, and well-being in crises like the COVID-19 pandemic. Considering the fact that the Indian emergency medical system harbors a large number of staff, employee participation in decision-making could induce their aesthetic needs, creativity, independence, and innovation at work. These measures could enrich work-life experiences, commitment and reduce the fear of COVID-19 amidst difficult times.

References:

1. Joseph S. Cross Sectional Study on The Association of Daily Spiritual Experience on Mental Well Being During COVID-19 19 Among The African Students in India. Asia Pacific Journal of Health Management. 2021;16(4):196-204.
2. Sahi P, Mishra D, Singh T. Medical Education Amid the COVID-19 Pandemic. Indian Pediatrics. 2020;57(7):652-657.
3. Maatuk A, Elberkawi E, Aljawarneh S, Rashaideh H, Alharbi H. The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors. Journal of Computing in Higher Education. 2021;34(1):21-38.
4. Important Guidance for Medical Students on Clinical Rotations During the Coronavirus (COVID-19) Outbreak [Internet]. AAMC. 2022 [cited 4 August 2022]. Available from: https://www.aamc.org/news-insights/press-releases/important-guidance-medical-students-clinical-rotations-during-coronavirus-COVID-19-outbreak
5. Qamar K, Kiran F, Khan MA, Raza SN, Iram M, Rauf A. Challenges of e-learning faced by medical teachers and students during COVID-19 pandemic. PAFMJ. 2021;71(Suppl-1).
6. Syal A, Arya Y, Gupta M. Impact of COVID-19 on medical undergraduate students' academics and its ramifications. Indian Journal of Medical Sciences. 2021;73:26-29.
7. Rai GD. An Empirical Study of Bankers' Perception towards their Quality of Work Life. IOSR Journal of Humanities and Social Science. 2015;20(7):20-25.
8. Rai GD. Spillover of Quality of Work Life on Job Satisfaction: Evidence from College Teachers. The Management Accountant. 2018;53(3):64-72.
9. Rai GD, Verma S. Quality of work life, fear of COVID-19, job satisfaction, and commitment: A moderated mediation model. International Journal of Productivity and Performance Management. 2022.
10. Sirgy MJ, Efraty D, Siegel P, Lee DJ. A New Measure of Quality of Work Life (QWL) Based on Need Satisfaction and Spillover Theories. Social Indicators Research. 2001;55:241-302.
11. Eliyana A, Yusuf RM, Prabowo K. The influence of employees' job satisfaction factors on organizational commitment. Jurnal Manajemen Teori dan Terapan | Journal of Theory and Applied Management. 2012;5(2).
12. Diana, Eliyana A, Mukhtadi, Anwar A. Creating the path for quality of work life: A study on nurse performance. Heliyon. 2022;8(1):e08685.
13. Aminizadeh M, Saberinia A, Salahi S, Sarhadi M, Jangipour Afshar P, Sheikhbardsiri H. Quality of working life and organizational commitment of Iranian pre-hospital paramedic employees during the 2019 novel coronavirus outbreak. International Journal of Healthcare Management. 2021;15(1):36-44.
14. Hong KS, Tan KW, Bujang SJSH. Relationships between work life quality of teachers with work commitment, stress and satisfaction: a study in Kuching, Sarawak, Malaysia. Jurnal Teknologi. 2010;52(1):1–15.

15. Diener E. Subjective well-being. Psychological Bulletin. 1984;95(3):542-575.
16. Nimavat N, Singh S, Fichadiya N, Sharma P, Patel N, Kumar M et al. Online Medical Education in India – Different Challenges and Probable Solutions in the Age of COVID-19. Advances in Medical Education and Practice. 2021;12:237-243.
17. Papapanou M, Routsi E, Tsamakis K, Fotis L, Marinos G, Lidoriki I et al. Medical education challenges and innovations during COVID-19 pandemic. Postgraduate Medical Journal. 2021;98(1159):321-327.
18. Kaul V, Gallo de Moraes A, Khateeb D, Greenstein Y, Winter G, Chae JM, et al. Medical education during the COVID-19 pandemic. Chest. 2021;159(5):1949–60.
19. Kerasidou A, Horn R. Making space for empathy: Supporting doctors in the emotional labour of Clinical Care. BMC Medical Ethics. 2016;17(1).
20. Daud N. Quality of work life and organizational commitment amongst academic staff: Empirical evidence from Malaysia. 2010 International Conference on Education and Management Technology; 2010. IEEE.
21. Ahorsu D, Lin C, Imani V, Saffari M, Griffiths M, Pakpour A. The Fear of COVID-19 Scale: Development and Initial Validation. International Journal of Mental Health and Addiction. 2020;20(3):1537-1545.
22. Hobfoll S. Conservation of resources: A new attempt at conceptualizing stress. American Psychologist. 1989;44(3):513-524.
23. Ringle, Christian M., Wende, Sven, & Becker, Jan-Michael. (2015). SmartPLS 3. Bönningstedt: Smart PLS. Retrieved from https://www.smartpls.com.
24. Hayes A, Little T. Introduction to mediation, moderation, and conditional process analysis. New York: The Guilford Press; 2022.
25. Spector P. Measurement of human service staff satisfaction: Development of the Job Satisfaction Survey. American Journal of Community Psychology. 1985;13(6):693-713.
26. Meyer J, Allen N. A three-component conceptualization of organizational commitment. Human Resource Management Review. 1991;1(1):61-89.
27. Hair J, Ringle C, Sarstedt M. Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. Long Range Planning. 2013;46(1-2):1-12.
28. Fornell C, Larcker D. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research. 1981;18(1):39.
29. Henseler J, Ringle C, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science. 2014;43(1):115-135.
30. Kline R. Principles and practice of structural equation modeling. New York: The Guilford Press; 2016.
31. Podsakoff P, MacKenzie S, Lee J, Podsakoff N. Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology. 2003;88(5):879-903.
32. Baron R, Kenny D. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of Personality and Social Psychology. 1986;51(6):1173-1182.
33. Preacher K, Rucker D, Hayes A. Addressing Moderated Mediation Hypotheses: Theory, Methods, and Prescriptions. Multivariate Behavioral Research. 2007;42(1):185-227.
34. Muller D, Judd C, Yzerbyt V. When moderation is mediated and mediation is moderated. Journal of Personality and Social Psychology. 2005;89(6):852-863.
35. Bolin JH. Hayes, Andrew F. (2013). introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: The Guilford Press. Journal of Educational Measurement. 2014;51(3):335–7.
36. Acheampong A, Muhammed MA, Agyapong K. Perceived quality of work life and Work Performance Among University Academic Staff. International Journal of Current Research and Academic Review. 2016;4(4):1–13.
37. Aminizadeh M, Saberinia A, Salahi S, Sarhadi M, Jangipour Afshar P, Sheikhbardsiri H. Quality of working life and organizational commitment of Iranian pre-hospital paramedic employees during the 2019 novel Coronavirus Outbreak. International Journal of Healthcare Management. 2021;15(1):36–44.
38. Yağar F, Dökme S. The relationship between organizational commitment and demographic variables of physicians in public institutions. International Journal of Healthcare Management. 2017;12(1):81-86.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

CRM CAPABILITY AND SERVICE INNOVATION IN HEALTHCARE: EVIDENCE FROM INDIA

Payal Sanan

Amity Business School, Amity University, Mumbai, India

Correspondence: mehandiratta.payal@gmail.com

ABSTRACT

This study aims to investigate the constituents of customer relationship management (CRM) capability that allows to exhibit customer service flexibility (CSF) and affects innovation in healthcare. In doing so, it qualitatively develops and identify the dimensions of CRM capability through a case study in a public healthcare setting in India and provides a framework of CRM, CSF, and service innovation. The findings of the study suggest that CSF is a mediating mechanism between CRM capability and service innovation which is long ignored in the healthcare literature. The study contributes to theory and practice-oriented knowledge on how the CRM capabilities can improve the public healthcare and facilitates key strategies for flexible deliveries and innovative services.

KEYWORDS

CRM capability, customer service flexibility, service innovation, healthcare

INTRODUCTION

Recent research has extensively examined how healthcare in emerging markets has grown and become an important sector within the service economy [1,2]. Several reports indicate that within healthcare, the relationship with the patient needs a constant integration with recent technologies to capture accurate data. Another report by McKinsey reveals that relationship oriented strategies are crucial in the Indian healthcare sector in order to sustain relationships [3]. The present study argues that flexibility in service provisioning is required as an inbuilt mechanism to cope with uncertain demand in healthcare, providing innovative services and enhanced experience. For example, Fleerackers and Bilgeri [4] argue that CRM capabilities are the foundation of the adaptability of a service delivery system and develop the capabilities for understanding customer preferences and needs. In healthcare, CRM capabilities indicate the utilization of resources and capabilities to develop sustained relationships with patients for their healthier lives [5]. There is however, a scarcity of research investigating whether CRM capabilities help with developing flexible capabilities and with the challenges of resource constraints in conducting service innovation.

Furthermore, numerous studies have recognized that customer service flexibility (CSF) provides adaptation techniques to demand uncertainties and introduces new services rapidly [6]. Healthcare organizations operating in emerging markets must have flexibility and the ability to cope with dynamic customer requirements as well as providing innovative solutions to improve healthcare delivery mechanisms [7]. Despite this, there is limited research examining whether CRM capabilities strengthen CSF mechanisms to enhance service innovation.

Moreover, studies suggest that CRM capabilities are nested within an intricate organizational system of interrelated and

interdependent resources that are used to deliver customized services. The bundle of such resources would redesign and improve those services [8]. Prior research has recognized the benefits of developing customer relationships. For example, in healthcare, superior relationships with the patients as customers enable productivity and sustainability [9,10]. Several authors have emphasized the importance of CRM capability as an emerging paradigm in marketing and its performance outcomes [14]. Despite there is limited knowledge on the constituents of CRM capabilities in healthcare.

This study attempts to address the research gaps in the extant CRM and service innovation literature. First, this article explore how CRM capabilities are developed in healthcare. Second, it aims to tackle the conditions under which public healthcare in an emerging market develop the capabilities to cope with an uncertain environment and execute flexible operation of services. Accordingly, this study further investigate how CSF in an emerging healthcare market could affect service innovation.

THEORETICAL BACKGROUND

Many authors in the field of marketing and CRM contend that strong customer-related capabilities are one of the most important marketing capabilities that are selected and built to please customers and influence experiential value [15–17]. Organizations recognize the importance of resources for maintaining long-term relationships, prompter response to the diversified customer demand and providing a memorable experience [18]. CRM capabilities combine these valuable resources to cope with dynamic market conditions and customize services. Hence, CRM capabilities improve flexibility and facilitate the modification of services.

CRM CAPABILITY IN HEALTHCARE

The marketing literature has accumulated a broad body of knowledge on CRM capabilities [19], process of developing CRM [20], consequences of CRM [21], the content of CRM [22], and the mechanisms to implement CRM [23]. Over the last three decades, CRM has been recognized as an extensive strategy to obtain a competitive advantage, improve the relationship with customers and deliver effective services [11]. The primary focus of CRM was centered on relationship marketing [24], management of network between market and society [25], cooperative and collaborative relationships between buyers and sellers [26], and the utilization of organizational structure and cultural changes to improve operational efficiency. CRM capabilities reflect the skills and knowledge to identify prospective customers, maintain relationships and leverage those relationships into profit [14]. CRM capability increases the ability of organizations to translate customer data into customer relationships through the active use of customer information [11].

The importance of CRM capability has attracted significant attention in several management disciplines including manufacturing, retailing, supply chain and services (e.g., banking, insurance, hospitality) [13,27]. However, there is a limited focus in the literature on developing CRM capabilities in credence services like healthcare. CRM in healthcare essentially means fundamental changes in service provisioning in order to create a long-term relationship and providing assurance of quality and efficiency in services [28]. Some studies suggest that due to complexity in the design of services, implementing CRM in healthcare is a difficult process and requires a better understanding of the resources and capabilities [29]. Customers prefer hospitals with efficient and quality healthcare service delivery, as well as recommend services by evaluating the experience [30].

CUSTOMER SERVICE FLEXIBILITY

Customer service flexibility (CSF) is referred to as the ability to adjust the service capacity to deliver customized services rapidly [31]. Recent studies emphasize that customer service flexibility is essential in customer value creation [32,33]. In a healthcare delivery environment, building and sustaining a service-oriented culture is important for overall performance [34]. Customers' changing needs and complaints about healthcare are repeatedly caused by the need for personalized care and customized service, which induces variability in the service delivery environment [5,35]. As a result, service deliveries become more customer-centric, adaptable and responsive, which facilitates responding to customer requirements and brings about changes in service design Consequently, healthcare organizations develop the abilities to innovate and redesign services.

SERVICE INNOVATION

Service innovation is referred to as "a set of practices to create value through improvements or new service proposals, service processes, and models of service deliveries" [36]. This is one of the strategies creating new services, and exists in order to respond to a customer's needs, and can achieve competitive advantage [37].

Some studies emphasize that service innovation bring about the changes in current service offerings and thus affect customer emotions and attitudes [38]. As a prerequisite of service innovation, it is crucial to close the gap between service design and standards that allows better managerial perceptions of customer expectations. In this scenario, public healthcare organizations can be positioned in a successful innovation system, providing a quality of customer experience and affecting customer emotions.

DESIGN AND CONTEXT OF THE STUDY

The context of the study is selected as in public healthcare in India for the following reasons. First, the Indian healthcare sector is growing at tremendous pace and is expected to reach $USD280 by 2020 [39]. India is a land full of opportunities in healthcare sector and public healthcare remains a dominant force. Second, similar to other emerging healthcare markets, Indian public healthcare organizations have made remarkable efforts in service innovation and providing quality of service to the patients [39]. Third, the government has emphasized customer experience quality in public healthcare and indicated that concerted efforts are required to increase the quality of experience [40].

Against this background, a case-based approach is undertaken for an in-depth understanding of the underlying dynamics of development and execution of CRM capabilities [41]. The case study is conducted in a regional level public healthcare organization which offers a range of clinical and para-clinical services, including Surgery, Neonatology, Gynecology, Ophthalmology, Oncology, Cardiology, Urology, Neurology, Otolaryngology, Radio diagnosis, Pathology and Microbiology, to the community. The organization has a bed capacity of 3250 with a 98 % bed occupancy rate, and the number of employees is approximately 2570 at various levels. The reason why this organization was chosen as sample case was the phenomenon of significant efforts towards innovative services and customer experience [42].

DATA COLLECTION

This study adopted a qualitative method to answer the research question. Qualitative methods provide an in-depth mechanism to explore the phenomena under study [43]. The case study consisted of in-depth interviews with healthcare professionals from the public healthcare organization and document analysis [44]. More specifically, the study focused on extricating the dynamics of CRM capability. An interview schedule was developed from preliminary interviews and contacts in the organization. The semi-structured guide deliberately included questions concerning experience quality, utilization of resources for CRM practices, and employee willingness for relationship management to obtain an overview of CRM capability. In the second stage, further questions were added to understand the dimensions of CRM capability in the public healthcare context. The author conducted 56 interviews over an 8-week period between September and October 2022. Typically, interviews lasted from 40 to 60 minutes, with some interviews conducted multiple times for clarity.

The author approached the management of the hospital (RIMS, India) for ethical clearance. However, they opined that it is not required, as the study intends to capture the managerial perceptions and it has no clinical interventions.

TABLE 1:

	Level	Experience	No. of Interviewees	No. of Interviews	Focus area
Stage I					
	Senior medical professionals	>15 years	8	11	Relationship strategies in healthcare
	Middle/supervisory	10-15 years	6	9	
Stage II					Dimensions of CRM in healthcare
	Senior medical professionals	>15 years	6	10	
	Middle/supervisory	10-15 Years	7	12	
	Lower level employees	5-10 Years	10	16	
Stage III					Validation

	Senior medical professionals	>15 Years	4	5	
	Middle/supervisory	10-15 Years	5	6	
Total			**56**	**68**	

DATA ANALYSIS

A set of interview proceedings were transcribed and analyzed using NVIVO 10 software [45]. Previous studies have suggested that NVIVO 10 provides an environment [45] to the important themes can be observed within the descriptions of the informants regarding the phenomenon under study [46]. The percentage agreement on the presence of themes was calculated using the formula proposed by [47]: [2x (no. of times both coders saw it present)]/ [(no. of times the first coder saw it present) + (no. of times the second coder saw it present)]. The dimensions of CRM capability were identified and validated through the constant matching with the statements of the informants (35,48). The findings of the thematic analysis contributed to the following three dimensions of the CRM capability in public healthcare.

TABLE 2: QUALITATIVE INTERVIEW THEMES

Dimensions of CRM capability	Percentage agreement	Sample Quotes
Clinical Capability	71.6	"*…The clinical knowledge of medical professional can convert medical data into wisdom for patients, and improve performance…For better decisions regarding patient care and diagnosis, the data about the patient is interpreted by clinicians, nursing staff, and para-medical technicians to make sense out of such vast medical records of patients and properly incorporated in the clinical decision-making process*".
Service Capability	69.3	"*…standardized practices and intense competition with private players for high-quality services, […] and changing demands are major reasons for customer-oriented services. The service capability enhance relationship with customers and a quick response to them*".
IT Capability	62.3	*Several IT-based services are implemented…patient registration, diagnostics, clinical information system, medical records, telemedicine, and text-mining for patient feedback analysis. IT provides healthcare organizations to serve patients better at different levels.*

SYNTHESIS OF FINDINGS

CLINICAL CAPABILITY

Clinical capability is defined as the ability of healthcare organizations to provide quality of clinical services and treatment modalities [49]. It refers to the degree to which organizations adopt standardized procedures for treatment. Quality of clinical care, as a product of hospitals, attracts customers and retains customers. Quality of treatment and process of care increase the image of a hospital and gives a unique competitive advantage over other service providers and competitors. Customers are pleased during service consumption as they are assured of better care and early recovery, thus the encounters are valued by them [11]. Therefore, organizations essentially need to develop excellent clinical practices and treatment modalities to attract new customers and repeat customers. Clinical capability is the result of complex clinical processes that require training and knowledge codification. Healthcare employees need to have a candid configuration of organizational capabilities that conforms to standardized practices resulting in positive patient outcomes. Thus, clinical capabilities enrich value, thereby contributing to improved relationships with customers. Hence it is proposed that:

P1a: Clinical capability (CLC) positively influences CRM capability.

SERVICE CAPABILITY

Services represent a wide range of intangible product offerings which are valued by customers [33]. Service is referred to as customer-determined benefits [11]. Thus, it is inherently relational and customer oriented. Many authors suggests that goods and products are valued for the services they provide (50). The healthcare delivery systems are focused toward developing service capabilities. Given the turbulent environment of the healthcare sector, service capability occupies a prominent position in developing a superior relationship with customers. The benefits of service capability include increased customer relationships and satisfaction, customer retention, positive impact on healthcare experience, and prompter response to varied needs. Hence, in the current volatile healthcare service environment, service capabilities positively influence relationship capabilities and play an important role in responding to customers' requirements. Thus, it is proposed that:

P1b: Service capability (SC) positively influences CRM capability.

IT CAPABILITY

Information Technology (IT) has been widely employed in healthcare service operations. With technology infusion, healthcare organizations provide tremendous support for effective and efficient service deliveries as well as facilitate better management of customer relationships [51]. Technology allows immediate access to clinical information and aids in providing better services, thereby strengthening customer-related capabilities. CRM in healthcare calls for clinical information intensive strategies which utilize computer technologies in relationship building and establishing the linkage of technology deployment to targeted businesses initiatives [11]. Advances in information technology equip healthcare organizations with the capability to record, analyze and disseminate the required information in ways that enhance the ability to respond to individual need and therefore attract and retain customers. Hence, IT capabilities of healthcare organizations facilitate service consumption, increase interaction quality, and influence relationships with customers. Hence, it is proposed that:

P1c: IT capability (ITC) positively influences CRM capability.

THE MEDIATING MECHANISM OF CSF

CRM capabilities support a rapid adjustment as per customer requirements. Based on CRM capability, organizations increase the attentiveness for adaptation and opportunities for customization in operations [52]. CRM capability allows the capture of accurate and timely requirements of customers pertaining to fast-changing needs. Thus, organizations possessing CRM capabilities are adaptive to environmental changes whilst simultaneously responding to customer needs. The utilization of CRM capabilities facilitates coping with uncertain customer requirements and allows customer-centric customized delivery [8]. Therefore, the commitment of the service provider to its customer relationships generates CSF. Additionally, building a stronger relationship with customers helps to understand customer preferences, which provides greater opportunity to recover and appropriate ways to respond to them flexibly. Therefore, the author proposes that:

P.2a CRM capability positively influences customer service flexibility (CSF).

CSF creates a basis that supports the promise of improvements in services. CSF concerns individual demand and response awareness of customers, thus indicating the ability to identify new forms of value. CSF involves rapid modification of service capacity and the introduction of new services rapidly [53]. Combining the functional characteristics of services, CSF attempts to improve on service processes and new service proposals to fulfil customer experience. CSF allows the organization to learn about customer preferences and analyze customer insights. Increased responsiveness and the degree of customization may facilitate the redesign of services. Organizations that exhibit CSF are in a better position to improve their ability to innovate services that meet customers' requirements (54). Thus, the author proposes that:

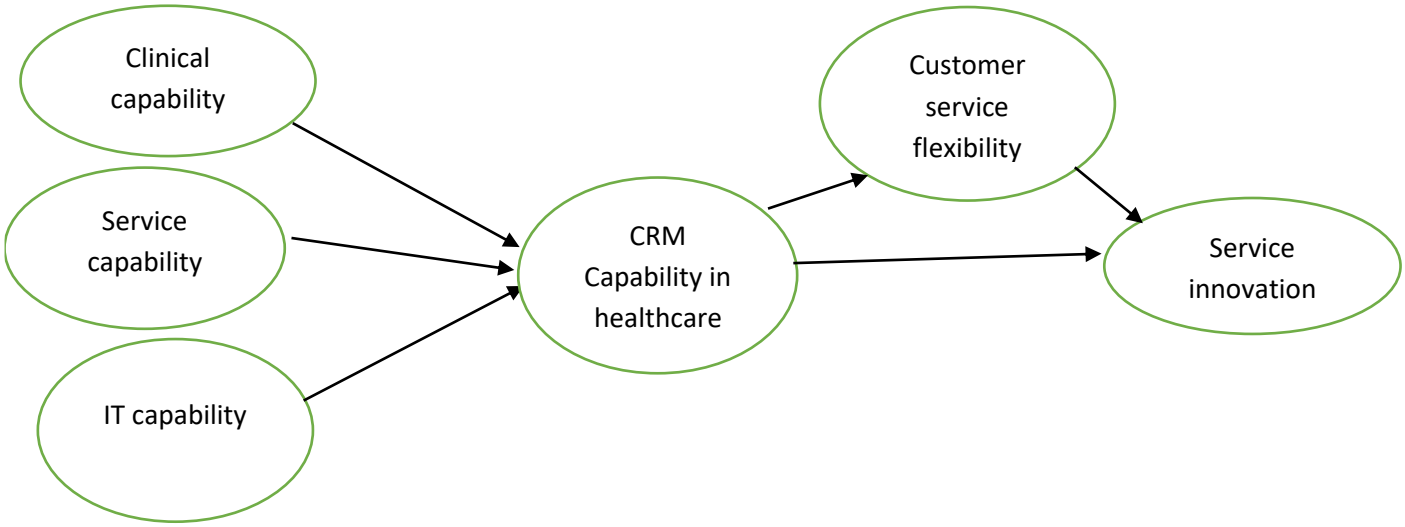
P.2b CSF positively influences service innovation.

DISCUSSIONS AND IMPLICATIONS

The present study makes an attempt to investigate several dimensions of CRM capability in public healthcare. As a reflection of organizational skills and knowledge, the dimensions of CRM capabilities routinely establish, maintain and upgrade relationships with customers. CRM has received much attention from researchers and practitioners in terms of its integration with marketing and technology-based services. An array of CRM outcomes is also studied. However, very few studies have established the constituents of CRM capabilities, particularly in

healthcare services. This study explored and identified three specific dimensions of CRM capabilities. Service capability is the most important dimension of CRM capability focusing on a service-oriented culture in public healthcare. The second important dimension was found to be IT capability, which indicates the growing importance of technology-based services in public healthcare. Then, clinical capability was established as an influential factor of CRM capability, which is the treatment and diagnostic capacity of the organization. Furthermore, the framework of CRM capability, customer service flexibility, and service innovation was propounded (Figure 1) The results explain that CRM capabilities contribute to flexible capabilities of organizations in order to realize the needs of customers, provide a customized response to customers, and recover them quickly.

FIGURE 1: AN INTEGRATIVE FRAMEWORK OF CRM CAPABILITY, CUSTOMER SERVICE FLEXIBILITY, AND SERVICE INNOVATION IN HEALTHCARE: AN INTEGRATIVE FRAMEWORK



Note: (Author's Proposition)

IMPLICATIONS FOR THEORY

The study has several implications to theory. The current study contributes to the extant literature by specifying what constitutes CRM capability in public healthcare. Second, the findings of this study explain how marketing resources [29] are helpful in overall performance. The author argue that the dynamics of CRM capability make the organization customer-oriented, developing cross-functional coordination, and facilitating remaining competitive with private healthcare providers. Hence, the author posit that CRM capabilities make organizations market-oriented [55], in turn, enabling flexible service deliveries. Third, goes beyond the established framework (e.g., [21,56,57] in proposing an integrative approach to explain service innovation, and argues that CSF mediates the linkage between CRM capability and service innovation.

IMPLICATIONS FOR PRACTICE

A major finding of potential interest to healthcare practitioners and policymakers is that successful service innovation is achieved not only by the resources, but also capability to develop a superior relationship with customers. The findings indicate that such capabilities could be a function of flexible response mechanisms subsequently increasing service innovation. Hence, this research guides to develop flexible capabilities in order to combat uncertain situations and renew the system as fast as possible. Management should also pay attention to improving the quality of customer-interactions in various encounters (e.g., out-doors, diagnostic centers), providing technology-based services for reliable, convenient and quality encounters, the clinical competence of medical employees, and the impact of the overall service environment. From the patient's perspective, CRM capabilities would improve the level of trust towards public healthcare delivery systems, specifically in developing

countries like India. Such an improved service and superior relationship is likely to generate a responsive delivery system that increases the revisit intentions and positive word-of-mouth regarding public healthcare. Healthcare managers and practitioners who are concerned with customer relationship management must take an early lead in the process of building CRM capabilities. Therefore, healthcare practitioners and policymakers need to focus on three CRM capability dimensions in order to attain customer service flexibility and, in turn, increased service-innovation. This subsequently improves physical and mental health, customer satisfaction, loyalty, and experience.

LIMITATIONS AND DIRECTION FOR FUTURE RESEARCH

This study has certain limitations. First, the study indicated that CRM capabilities were significantly associated with customer service flexibility and service innovation in a public healthcare context. But there may be a limit to the benefits of CRM capabilities on executing flexibility practices. Future studies could compare and identify the different organizational capabilities under the dynamic conditions. The environmental studies could also be captured to explore the phenomena. Second, this study reveals three specific capabilities as clinical capability, service capability, and IT capability as constituents of CRM capabilities. However, the other dimensions of CRM capabilities may also be explored for superior relationships with customers. Third, previous studies suggest that the concept of customer relationships and customer profiles in healthcare, particularly in public healthcare, are different than their counterparts in private organizations, as well other service sectors (e.g., restaurants, tourism, airlines). Therefore, the other complex parameters in the public healthcare domain remain unexplored, which needs further investigation.

References:

1. Brailsford S, Vissers J. OR in healthcare: a European perspective. J Oper Res. 2011;212(2):223–34.
2. Pyne K, McAllister M, Davies LM. Valuing the economic benefits of complex interventions: When maximising health is not sufficient. Health Econ. 2013;22:258–71.
3. Mckinsey. COVID-19: Implications for business [Internet]. New Delhi; 2021. Available from: https://www.mckinsey.com/business-functions/risk-and-resilience
4. Fleerackers T, Bilgeri N. Artificial Intelligence Improving CRM, Sales and Customer Experience [Internet]. University of Applied Sciences Voralberg; 2020. Available from: https://opus.fhv.at/frontdoor/deliver/index/docId/3646/file/BilgeriNadine_MasterThesis.pdf
5. Kumar P, Sharma SK, Dutot V. Artificial intelligence (AI)-enabled CRM capability in healthcare: The impact on service innovation. Int J Inf Manage. 2023;69(May 2022).
6. Shukla SK, Sushil. Evaluating The Practices of Flexibility Maturity For the Software Product and Service Organizations. Int J Inf Manage. 2020;50(April 2019):71–89.
7. Healthineers S. Healthcare in Emerging Markets: Chalenges and opportunities. New Delhi; 2015.
8. Kumar P, Singh AP. Flexibility in service operations: review, synthesis and research agenda. Benchmarking. 2019;27(7):2108–29.
9. Rapp A, Trainor KJ, Agnihotri R. Performance implications of customer-linking capabilities: Examining the complementary role of customer orientation and CRM technology. J Bus Res [Internet]. 2010;63(11):1229–36. Available from: http://dx.doi.org/10.1016/j.jbusres.2009.11.002
10. Venturini WT, Benito OG. CRM software success : a proposed performance measurement scale. J Knowl Manag. 2015;19(4):856–75.
11. Sin LYM, Tse ACB, Yim FHK. CRM : conceptualization and scale development. Eur J Mark. 2005;39(11/12):1264–90.
12. Nevin JR. Relationship marketing and distribution channels: exploring fundamental issues. J Acad Mark Sci. 1995;Fall:327–34.
13. Frow P, Payne A, Wilkinson IF, Young L. Customer management and CRM : addressing the dark side. J Serv Mark. 2011;25(2):79–89.
14. Ryals L. Making customer relationship management work: the measurement and profitable management of customer relationships. J Mark. 2005;69(4):252–61.
15. Javalgi RG, Whipple, Thomas W, Ghosh AK, Young RB. Market orientation, strategic flexibility , and performance : implications for services providers. J Serv Mark. 2005;19(4):212–21.
16. Lusch RF, Vargo SL, Tanniru M. Service, value networks and learning. J Acad Mark Sci. 2010; 38:19–31.
17. Aarikka-Stenroos L, Jaakkola E. Value co-creation in knowledge intensive business services: a dyadic perspective on the joint problem solving process. Ind Mark Manag. 2011;41(1):15–26.
18. Vorhies DW, Morgan NA. Benchmarking marketing capabilities for sustained competitive advantage. J Mark. 2005;69(1):80–94.

19. Kim H, Kim Y, Park C. Integration of firm's resource and capability to implement enterprise CRM : A case study of a retail bank in Korea ☆. Decis Support Syst [Internet]. 2010;48(2):313–22. Available from: http://dx.doi.org/10.1016/j.dss.2009.07.006
20. Maklan S, Knox S. Dynamic capabilities: the missing link in CRM. Eur J Mark. 2009;43(11/12):1392–410.
21. Battor M, Battor M. The impact of customer relationship management capability on innovation and performance advantages : testing a mediated model. J Mark Manag. 2010;26(9–10):842–57.
22. Chang W, Eun J, Chaiy S. How does CRM technology transform into organizational performance? A mediating role of marketing capability ☆. J Bus Res [Internet]. 2010;63(8):849–55. Available from: http://dx.doi.org/10.1016/j.jbusres.2009.07.003
23. Nguyen TH, Sherif JS, Newby M. Strategies for successful CRM implementation. Inf Manag Comput Secur. 2007;15(2):102–15.
24. Berry L. Relationship marketing in services- growing interest, emerging perspectives. J Acad Mark Sci. 1995;23(4):236–45.
25. Gummesson E. Relationship marketing in the new economy. J Relatsh Mark. 2002;1(1):37–57.
26. Dwyer FR, Schurr PH, Oh S. Developing buyer-seller relationships. J Mark. 1987;51(April):11–27.
27. Vesel P, Zabkar V. Comprehension of relationship quality in the retail environment. Manag Serv Qual. 2010;20(3):213–35.
28. Ponsignon, FreWilliams M, Hall J. Healthcare experience quality: an empirical exploration using content analysis techniques. J Serv Manag. 2015;25(3):3–29.
29. Kumar P, Dwivedi YK, Anand A. Responsible Artificial Intelligence (AI) for Value Formation and Market Performance in Healthcare: the Mediating Role of Patient's Cognitive Engagement. Inf Syst Front. 2021;
30. McFadden KL, Gregory N, Charles R. Implementation of patient safety initiatives in US hospitals. Int J Oper Prod Manag. 2006;25(3/4):326–47.
31. Brozovic D, Nordin F, Kindstrom D. Service flexibility: conceptualizing value creation in service. J Serv Theory Pract. 2016;26(6):868–88.
32. Gronroos C, Ravald A. Service as business logic: implications for value creation and marketing. J Serv Manag. 2010;22(1):5–22.
33. Gronroos C, Gummerus J. The service revolution and its marketing implications: service logic vs service-dominant logic. Manag Serv Qual. 2014;24(3):206–29.
34. Kumar P, Bera S, Chakraborty S. An Examination of the Association between Service Convenience Flexibility in Healthcare Delivery Systems and Patient Satisfaction †. South Asian J Manag. 2019;24(4):35–55.
35. Kumar P. The impact of patient recovery flexibility on service experience in public healthcare. J Asia Bus Stud. 2019;14(2):159–79.
36. Katzan H. Design For Service Innovation. J Serv Sci. 2015;8(1):1–7.
37. Meyer CR, Skaggs BC, Nair S, Cohen DG. Journal of International Management Customer Interaction Uncertainty , Knowledge , and Service Firm Internationalization. J Int Manag [Internet]. 2015;21(3):249–59. Available from: http://dx.doi.org/10.1016/j.intman.2015.04.003
38. Snyder H, Witell L, Gustafsson A, Fombelle P, Kristensson P. Identifying categories of service innovation : A review and synthesis of the literature. J Bus Res [Internet]. 2016;69(7):2401–8. Available from: http://dx.doi.org/10.1016/j.jbusres.2016.01.009
39. WHO. Healthcare Statistics [Internet]. Geneva; 2015. Available from: www.who.in
40. NSSO. "Annual Report 2015-16" [Internet]. Government of India. New Delhi; 2020 [cited 2017 Apr 15]. p. 82–7. Available from: http://www.mospi.gov.in
41. Yin DR. Case Study Research: Design and Methods. 4th ed. Thousand Oaks, CA: Sage Publications Inc.; 2008.
42. Eisenhardt K. Building Theories from Case Study Research. Acad Manag Rev [Internet]. 1989;14(4):532–50. Available from: http://www.jstor.org/stable/258557
43. Bluhm DJ, Harman W, Lee TW, Mitchell TR. Qualitative research in management: A decade of progress. J Manag Stud. 2011;48(8):1866–91.
44. Kumar P. Internal flexibility in health-care organizations: a value-laden perspective on sustainability. Int J Organ Anal. 2020;
45. Welsh E. Dealing with Data : Using NVivo in the Qualitative Data Analysis Process. Forum Qual Soc Res. 2002;3(2).
46. Braun V, Clarke V. Using Thematic Analysis in Psychology. Qual Res Psychol. 2006;3(2):77–101.
47. Boyatzis RE. Transforming Qualitative Information: Thematic Analysis and Code Development. New York: Sage; 1998.
48. Kumar P. Managing service flexibility in healthcare for improved customer experience: a data-driven approach. J Strateg Mark [Internet]. 2022;00(00):1–22. Available from: https://doi.org/10.1080/0965254X.2022.2096671

49. Nair A, Nicolae M, Narasimhan R. Examining the impact of clinical quality and clinical flexibility on cardiology unit performance — Does experiential quality act as a specialized complementary asset? J Oper Manag [Internet]. 2013;31(7–8):505–22. Available from: http://dx.doi.org/10.1016/j.jom.2013.09.001
50. Vargo SL, Lusch RF. From goods to service (s): Divergences and convergences of logics. Ind Mark Manag. 2008;37:254–9.
51. Jayachandran S, Sharma S, Kaufman P, Raman P. The role of relational information processes and technology use in customer relationship management. J Mark. 2005;69(October):177–92.
52. Chatterjee S, Nguyen B, Ghosh SK, Bhattacharjee KK, Chaudhuri S. Adoption of artificial intelligence integrated CRM system: an empirical study of Indian organizations. Bottom Line. 2020;33(4):359–75.
53. Lin C-P, Joe S-W, Chen S-C, Wang H-J. Better to be flexible than to have flunked: The mediating role of service flexibility and its determinants for team performance. J Serv Manag. 2015;26(5):823–43.
54. Zhu Z, Nakata C, Sivakumar K, Grewal D. Fix It or Leave It? Customer Recovery from Self-service Technology Failures &. J Retail [Internet]. 2013;89(1):15–29. Available from: http://dx.doi.org/10.1016/j.jretai.2012.10.004
55. Cheng CC, Krumwiede D. The role of service innovation in the market orientation — new service performance linkage. Technovation [Internet]. 2012;32(7–8):487–97. Available from: http://dx.doi.org/10.1016/j.technovation.2012.03.006
56. Skålén P, Gummerus J, Koskull C Von, Magnusson PR. Exploring value propositions and service innovation : a service-dominant logic study. J Acad Mark Sci. 2015;43:137–58.
57. Kumar P. Green service production in healthcare and role of value chain flexibility. Int J Product Perform Manag. 2020;69(8):1721–42.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

COST ANALYSIS OF OUTPATIENT CARE FOR MENTAL AND BEHAVIORAL DISORDERS DUE TO PSYCHOACTIVE SUBSTANCE USE: A STUDY OF FOUR COMMUNITY AND TWO GENERAL HOSPITALS IN THAILAND

Passakorn Suanrueang[1,2,3], *Utoomporn Wongsin**[3,4]

1. Division of Multidisciplinary/ Interdisciplinary, Graduate School, Srinakharinwirot University, Bangkok, Thailand
2. Healthcare Administration Specialty in Psychology, College of Medical and Health Science, Asia University, Taichung, Taiwan
3. Foundation for Research Institute on Social Protection and Health (FRoSPaH), Nonthaburi, Thailand
4. Global Health and Health Security program, College of Public Health, Taipei Medical University, Taipei, Taiwan

Correspondence: utoomporn wongsin: d537108007@tmu.edu.tw

ABSTRACT

This cost analysis study gathered cost information from four community and two general hospitals in the fiscal year 2014, including service data, hospital statistics, and financial information. This study aimed to estimate the treatment costs of outpatient care for mental and behavioral disorders (MBDs) due to psychoactive substance use, which are provided in the community and general hospitals in Thailand. We used ICD-10 codes F11-F19, to handle the diagnosis codes of MBDs due to psychoactive substances and cost analysis. The unit cost per OPD visit was analyzed according to the cost analysis guidelines of the Ministry of Public Health, Thailand, using two procedures: a traditional method and a cost-to-charge ratio. The inflation rate from 2015 to 2021 was employed to adjust the cost to demonstrate the actual cost in 2021.

The majority of service expenses were labour costs (53%), followed by material costs (42%) and capital costs (6%). The unit cost per OPD visit for substance use disorders (SUD) in 2014 ranged between 172 and 762 THB. After being adjusted by the inflation rate to estimate the cost for 2021. The costs were growth in the range of 204 to 905 THB. The median cost estimated in 2021 from four community and two general hospitals, accounting for between 396 and 769 THB respectively.

The unit SUD visit costs of OPD from these six hospitals were quite close to the unit costs of the drug treatment centers. The greatest proportion of the total service expenses was the labor cost. Accordingly, human resources are believed to be a crucial challenge that needs to be considered and planned to deliver successful services.

Notably, these hospitals were selected using purposive sampling and might not be representative of each hospital type. More hospitals should, therefore, be recruited in further research to represent the actual cost by hospital type.

KEYWORDS

unit cost, outpatient cost, psychoactive substances use, drug abuse, cost per visit.

INTRODUCTION

Substance dependence is a major problem that is affecting all countriesandneeds immediate and appropriate means to address this problem, especially the problem in youth groups which is reported in an increasing number of new incidences worldwide. In Asian countries, substances such as marijuana (synthetic cannabinoids (SCs)), Kratom, and volatile nitrites (known as poppers), have been found to be the most common [1]. Marijuana is often used in combination with other addictive substances, such as opioids, synthetic substances (heroin), or alcohol, which was pointed out in a survey of adolescents in the United States [2]. Furthermore, opioid overdoses have been reported to be the cause of an increase in the number of deaths in the United States [3].

A National Household Survey on Substance Abuse in Thailand in 2016 estimated that more than 2.9 million people had used at least one substance during their lifetimes, or 5.8% of the population aged 12 to 65. The most commonly used substances were Kratom or Mitragyna speciosa, methamphetamine, methamphetamine hydrochloride crystal (ice), and marijuana (cannabis) [4]. Thailand is one of many countries that faces substance use problems on a larger scale. The number of people with substance use being treated under the judicial process is likely to increase continuously, with 44,342 cases in 2013 and 203,381 in 2018, which showed a nearly five-fold increase in just five years [5].

There is information available from a survey of the 15-64 age group with 30,411 participants in 2016, which indicated that 49.7% were new psychoactive substance users [6]. Although many people who use substances have received therapy, some clients in recovery from substance use have a high incidence of relapse. Many variables contribute to the recurrence of substance misuse, such as being able to purchase substances at a cheap price, beginning to abuse substances at a young age, and self-deprecation without therapy [7]. Substance abuse has a significant impact on the number of crimes committed. In 2013, more than 80% of crimes were attributed to illicit substance use [4].

One significant impact of substance abuse is its effects on brain functions, neurotransmitter functions, and neurotransmission pathways in the brain [8, 9]. It is one of the leading causes of substance use disorders (SUD) and substance-related disorders, and it also contributes to other psychiatric disorders. The World Health Organization (WHO) categorized and published clinical descriptions and diagnostic guidelines for mental and behavioral disorders due to psychoactive substance use [10]. These categories consisted of nine blocks, including the use of opioids, cannabinoids, sedative-hypnotics, cocaine, caffeine, hallucinogens, tobacco, volatile solvents, and multiple drug use and the use of other psychoactive substances.

There will, of course, be expenses associated with therapy, such as the cost of pharmacological treatment, holistic rehabilitation therapy (including physical, psychological, and social therapy), cognitive and behavioral therapy, and random urine drug testing. Therefore, it is critical to have information related to the cost analysis of the treatment to support efficient and successful management of the hospital system. Additionally, this knowledge may be applied to healthcare financing or budgetary planning for the mental healthcare system. Cost analysis of individuals suffering from mental and behavioral problems caused by psychotropic drug usage is therefore critical. According to a cost study conducted in Thailand, occupational therapy expenses were found to be the highest cost [11]. In terms of outpatient drug treatment, Thanyarak Institute's cost analysis research on drug addiction treatment found that the costs of outpatient substance abuse treatment are equivalent to THB 831. When categorized by drug type, it was found that the cost of outpatient services for amphetamines was THB 29,718, while that for heroin and volatile substances were THB 29,397 [12]. Moreover, the study of drug addiction treatment cost accounting in the compulsory treatment system of Thanyarak Khon Kaen Hospital reported the cost of providing treatment for amphetamine addiction was THB 52,854 (unit cost: THB 244.69). The cost of volatile substance treatment was THB 161,863 (unit cost: THB 1,586.89), cannabis treatment was THB 3,003 (unit cost: THB 231), treating ice was THB 2,406 (unit cost: THB 240.60), and the cost per unit of treating two or more substances was around THB 231 [13].

Besides psychiatric hospitals and drug treatment centers, community hospitals and general hospitals are also essential service units in the provision of drug addiction treatment services. It is obvious to see that many outpatients have been extensively getting into the services in these two types of hospitals. Another point of view, there is little academic research evidence published investigating the cost of services among patients with psychoactive and behavioral disorders caused by psychotropic substances in the community and general

hospitals in Thailand. Therefore, the purpose of this study is to determine the overall cost of providing treatments to individuals suffering from mental and behavioral disorders due to psychoactive substance use. We are primarily interested in cost analysis at community and general hospitals, where cost information is officially available and may be used for research. This study analyzed and emphasized the cost of services per visit. The details of services were classified by type of hospital and according to the cost types, such as labour cost, material cost, and capital cost. The analytic findings also demonstrated the total cost and average cost of services per visit. We hope that the findings of this study might be used to support and be a part of the information for financial management in serving these psychiatric patients.

METHODS

STUDY SITE

This cross-sectional study collected officially available cost information, including service data, hospital statistics, and financial information, from four community hospitals and two general hospitals in the fiscal year 2014. The inclusion criteria were: 1) the hospital provides treatment for mental and behavioral disorders due to psychoactive substances use, and 2) the hospital has enough data to calculate outpatient costs.

HANDLING OF DIAGNOSIS DATA

This study used the medical classification codes of the ICD-10 codes to select and process the diagnosis codes of MBDs due to psychoactive substance use [10], including F11-F19: (1) opioid-related disorders (F11); (2) cannabis-related disorders (F12); (3) sedative, hypnotic, or anxiolytic related disorders (F13); (4) cocaine-related disorders (F14); (5) other stimulant related disorders (F15); (6) hallucinogen related disorders (F16); (7) nicotine dependence (F17); (8) inhalant related disorders (F18); (9) other psychoactive substance-related disorders (F19).

COST ANALYSIS

The cost of MBDs due to psychoactive substance use per visit was calculated using two methods: a traditional approach which shows total hospital cost and total hospitals' department cost, and a cost-to-charge ratio, which is a micro-costing method to estimate patients' individual cost, in accordance with the Ministry of Public Health of Thailand's cost analysis [14]

The procedure was composed of the following steps: 1) hospital financial and accounting information in fiscal year 2014 auditing, 2) cost center assignment, dividing hospital departments into two main cost centers which are supporting cost centers (all administrative offices in the hospitals) and service cost centers (all clinics and departments providing care to the patients), 3) direct cost including labour cost (e.g,. salary and fringe benefits) , material cost (e.g., medicine, medical supply), and capital cost (i.e., depreciation from building and equipment, and amortization from software) estimation, 4) Cost allocation from supporting cost center to service cost center to obtain total cost using allocation criteria such as a number of staff, a number of patient, space of office, medical supply expenditure, 5) summing total cost of each service center and total charge by hospital charge groups (e.g,. room and board, medicine, x-ray, doctor fees, 6) combing each charge group with service cost center (i.e., cost of dentistry was total cost from dentist department included labour cost, material cost, capital cost and indirect cost), 7) dividing the total charge of each charge group by total cost of each charge group to obtain the cost to charge ratio 8) calculating the unit cost of outpatient per visit by diving the total cost of mental and behavior disorders due to psychoactive substance use (ICD-10 codes; F11-F19) by a total number of visits. The unit cost in 2014 was adjusted from 2015 to 2021 [15] by the inflation rate from the Bank of Thailand to indicate the current unit cost. The inflation rate was -0.90 in 2015, 0.18 in 2016, 0.0067 in 2017, 0.0107 in 2018, 0.007 in 2019, and -0,0085 in 2020, accordingly.

Descriptive statistics of demographic data were analyzed as a maximum, median, mean, minimum, standard deviation, and interquartile range (IQR) as appropriate. Excel was used to perform data analysis.

ETHICAL CONSIDERATIONS

This study was not conducted on human research subjects or human participants. Data were employed from hospitals' databases based on our data requirements template, which was without personally identifiable information.

RESULTS

CHARACTERISTICS OF THE PARTICIPANTS

Participants from six public hospitals, consisting of two general and four community hospitals, were analyzed. Their average ages were between 29 and 43 years old. The total

utilization per person-year ranged from 2 to 8 visits, with an average utilization per person of 4 visits. The total utilization ranged from 129 to 490 people, with an average utilization of 250 people. Over 90% of patients in each hospital were found to be male (Table 1).

TABLE 1. CHARACTERISTICS OF THE PARTICIPANTS

Hospitals	Total utilization (visit/person)	Total utilization (persons)	Average age		Number of patients			
			Years	SD	Male (cases)	%	Females (cases)	%
A GH	2.27	125.0	42	11.9	259	91.2	25	8.8
B GH	7.66	490.0	43	15.7	3,483	92.8	271	7.2
C CH	5.66	254.0	31	12.4	1,394	96.9	44	3.1
D CH	2.86	169.0	40	11.0	432	89.4	51	10.6
E CH	5.10	143.0	29	8.6	677	92.7	53	7.3
F CH	2.88	321.0	37	13.6	866	93.5	60	6.5
Maximum	7.66	490.00	43	15.7	3,483	96.9	271	10.6
Median	3.99	211.50	39	12.1	772	92.8	52	7.2
Mean	4.41	250.33	37	12.2	1,185	92.8	84	7.2
Minimum	2.27	125.00	29	8.6	259	89.4	25	3.1
Standard deviation	2.09	138.77	6	2.4	1,192	2.5	92	2.5
Interquartile Range	3.00	178.00	11	3.0	962	3.0	16	3.0

Note: GH = General Hospital, CH = Community Hospital

In terms of hospital cost analysis, labour costs were the highest hospital expenditure, except for hospital D. The labour costs were between 50 and 57%, followed closely by material costs (from 37 to 44%), and capital costs (from 4 to 8%). From another point of view, material costs were the highest cost in hospital D, amounting to 51%, followed by labour costs and capital costs, accounting for 45% and 4%, respectively (Table 2).

In the case of outpatient costs for patients suffering from psychoactive substance use disorders, total outpatient costs ranged from 170,907 THB to 1,940,243 THB. Total visits ranged from 284 to 3,754 visits, with an average total visit of 1,269 visits. It was the highest number of visits to hospital B (3,754 visits), followed by hospital C (1,438 visits), and hospital F (926 visits). In 2014, the unit cost per outpatient visit ranged from THB 172 to THB 762. After adjusting for the inflation rate between 2015 and 2021, the unit cost per outpatient visit was estimated to range from THB 204 to THB 905 in 2021.

TABLE 2. HOSPITAL COST INFORMATION

Hospital	Labour cost (%)	Material cost (%)	Capital cost (%)
A GH	55	37	8
B GH	53	41	6
C CH	50	44	6
D CH	45	51	4

Hospital	Labour cost (%)	Material cost (%)	Capital cost (%)
E [CH]	57	38	5
F [CH]	57	39	4
Maximum	57	51	8
Median	54	40	6
Mean	53	42	6
Minimum	45	37	4
Standard deviation	4.67	5.20	1.52
Interquartile Range	7	6	2

Note: [GH] = General hospitals, [CH] = Community hospitals

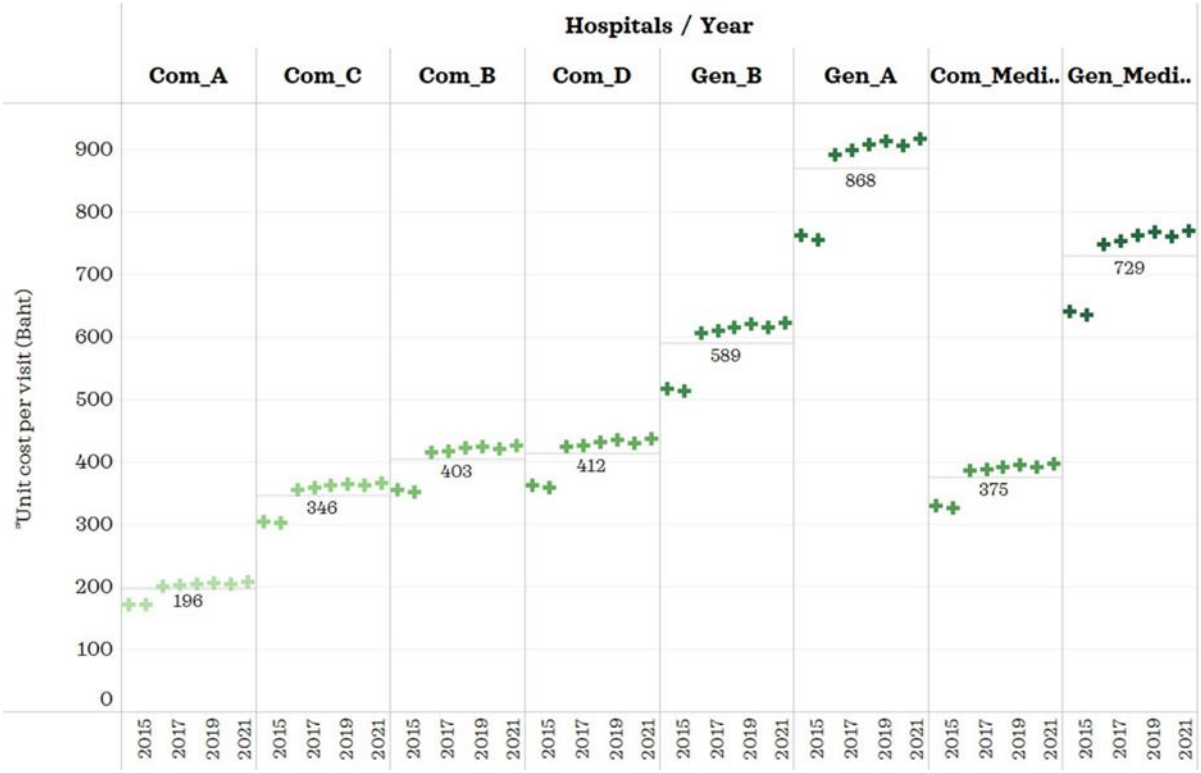
TABLE 3. THE UNIT COST OF OUTPATIENT WITH PSYCHOACTIVE SUBSTANCE USE DISORDER

Hospitals	Total Hospital cost (THB)	Total OPD SUD cost (THB)	Total OPD SUD visits	Unit cost per visit (THB)	
				2014	2021*
A [GH]	468,582,025	216,386	284	762	905
B [GH]	438,834,585	1,940,243	3,754	517	614
C [CH]	128,956,427	246,739	1,438	172	204
D [CH]	178,516,927	170,907	483	354	420
E [CH]	121,254,500	221,768	730	304	361
F [CH]	135,458,726	335,032	926	362	430
Maximum	468,582,025	1,940,243	3,754	762	905
Median	156,987,826	234,253	828	358	425
Mean	245,267,198	521,846	1,269	412	489
Minimum	121,254,500	170,907	284	172	204
Standard deviation	162,947,040.11	696,985.39	1,280.62	204.38	242.79
Interquartile Range	309878158	118646	955	213	253

Note: GH = General hospitals, CH = Community hospitals
SUD = Substance use disorder
*Adjusted by inflation rate from the year 2015 to 2021

The estimation of the unit cost per outpatient visit from 2014 to 2021 in four community hospitals was analyzed, along with the calculation of the median cost of these four hospitals. After adjusting the unit cost per visit in 2014 for inflation from 2015 to 2021, it was found that the trend for these four hospitals was an increase over the past six years, from 2016 to 2021. Hospitals D and F showed a similar unit cost trend, ranging from 414 to 426 THB and 423 to 435 THB, respectively. Hospital E's unit cost ranged from 355 to 366 THB, while hospital C was between 201 and 206 THB. The median cost estimate for these four hospitals was found to be around 385 to 396 THB (Figure 1.)

FIGURE 1. UNIT COST PER VISIT OF PSYCHOACTIVE SUBSTANCE USE DISORDER BY HOSPITALS (GENERAL AND COMMUNITY HOSPITALS) AND YEARS BETWEEN 2014 AND 2021



Notes: Com_A = community hospital A, Com_B = community hospital B, Com_C = community hospital C, Com_D = community hospital D , Gen_A = general hospital A, Gen_B = general hospital B, Gen_median = median of the unit cost of general hospital A and B, Gen_median = median of the unit cost of general hospital A, B, C, and D.

DISCUSSION

PARTICIPANT CHARACTERISTICS

Mental and behavioral problems caused by psychoactive substance use are a set of conditions induced by the use of substances such as cannabis, and other psychoactive substances. These illnesses can have a substantial influence on a person's emotional and physical well-being, causing issues in areas such as personal relationships, the job, and everyday activities. When comparing the occurrence of these disorders among genders, it is apparent that men are more susceptible to experiencing mental and behavioral disorders due to psychoactive substance use than women. This observation is supported by our study, which was evident as over 90% of the patients were male, while only a small proportion of less than 10% was female. This finding is consistent with previous studies indicating that men have a higher incidence of substance-related disorders [16], hazardous drinking, and heavy cannabis use [17], as well as drug and alcohol use or dependence across various age groups, compared to women [18]. Furthermore, males have a higher occurrence rate of nicotine use, cannabis use, and cannabis use disorder than females [19]. Some studies suggest that traditional masculinity [20], socioeconomic status [21], educational level [17], and employment status [17] are all positively associated with excessive substance use.

COST ANALYSIS

The present study estimated the treatment cost of outpatient mental and behavioral disorders due to psychoactive substance use, which are provided services, at six public hospitals (four community and two general hospitals). Our findings revealed that labour costs made up the vast majority of service cost ratios, followed by material costs and capital costs. Similar results were found in other studies, for example, a study of oncology and hematology unit cost analysis in the Netherlands [22], a study of medical service unit costs in five types of hospitals in India [23], and a study of outpatient parenteral antimicrobial therapy costs in Spain [24]. These studies indicated that the highest total cost was found in labour costs or human resources which were highly predictive of unit expenses. In particular, tertiary care and district hospitals in India found that labour

costs were over 60% and 55% of the total costs, respectively.

Our result showed that unit cost per outpatient visit ranged from 172 to 762 THB. Moreover, the unit cost per visit in 2020 and 2021 was less than THB 1,000 after being adjusted for the inflation rate [25]. There were not many studies on psychoactive substance use disorder cost analysis. Similar results were found in studies by Thanyarak Institute [12] and Thanyarak Khon Kaen Hospital [13]. In terms of Thayarak Institute, which was equivalent to a regional hospital type, it indicated that the unit cost per outpatient for substance abuse treatment was THB 831. For Thanyarak Khon Kaen Hospital, which was equivalent to a general hospital, it was found that the unit cost around THB 250 per visit for amphetamine addiction, THB 231 for cannabis treatment, and about THB 231 for substances. This is the study of a cost analysis of SUD using cost accounting in Thailand. Hospital accounting information auditing, and the total cost in this study was the actual cost for one fiscal year. It is indicated that the actual cost of providing care for people suffering from MBDs due to psychoactive substance use at hospitals in Thailand. In previous studies in Thailand, we found that the period of time in the first study was three months, and capital costs were not included in the second study.

Even though substance users who were admitted and received therapy in the inpatient departments have been reported to be more successful in therapy compared to day hospitals, certain study findings have highlighted that outpatient treatments are also considerably more effective than inpatient treatments, especially in the care of alcohol abuse [24]. Our findings show that the unit cost of outpatients for psychoactive substance use disorders in community hospitals and general hospitals is nearly identical to that in drug treatment centers. In terms of delivering mental healthcare services for various types of mental disorders, it was stated that support for expanding services to community hospitals and general hospitals may help alleviate congestion in specialized hospitals or drug treatment institutions. It also enhances community-based drug treatment [26] and access to care for psychiatric and SUD patients in the community. Therefore, the treatment units for psychiatric disorders and psychoactive substance use in community hospitals and general hospitals should be promoted. In the past, community hospitals faced challenges such as a lack of explicit structure for their psychiatric units and drug treatment sections. It is merely a unit under other structural divisions, like outpatients, nursing departments, or the Family Clinical Practice and Community Department. This needs a supportive method of improving mental health care services, specifically the mental health workforce: psychiatrists, psychiatric nurses, clinical psychologists, and so on [27]. However, other perspective points of view on the factors affecting effective remedies, such as biopsychological perspectives, social support dimensions, and the therapeutic intervention approaches provided by healthcare providers [28], should be taken into consideration. These factors influence the cost. Because SUD treatment is complicated and often requires a long-term duration. Encouraging patients to cooperate with continuous treatment can benefit both the patients and healthcare providers in terms of cost-effectiveness.

LIMITATIONS AND FUTURE RESEARCH

The participants of this study were recruited from six public hospitals, composed of four community and two general hospitals. The current findings of the cost analysis provide the initial insights that is able to highlight the unit cost per visit of these hospital samples. However, these findings cannot be generalized to all community and general hospitals. Accordingly, further studies are recommended to recruit more hospitals to improve generalizability. Another interesting perspective is a prospective cohort study investigating the unit cost incurred from the initial treatments to the end of the remedy for each patient. This study may provide invaluable evidence to determine the overall expense required for a patient undergoing the entire treatment process (from the initial treatment to the last treatment). Furthermore, a cost analysis of counseling, drug screening services [29], occupational health therapy, drug treatment, and rehabilitation should be conducted to help develop a plan for providing drug addiction treatment in community hospitals and general hospitals. These are interesting topics for further studies, which might be specifically evidence-supported.

IMPLICATIONS AND ACADEMIC SUGGESTIONS

Our findings demonstrated the unit cost of outpatient psychoactive substance use in community hospitals and general hospitals. This could prove that the unit cost ranges of these hospitals are quite similar to the unit costs of the drug treatment centers. Concerning service costs, it was determined that there are three important components to the high cost of treating psychoactive substance use patients: hospital medical expenses; home medication; and laboratory investigation and pathology. The unit cost and major cost of services should, therefore, be taken into consideration in the planning of the provision of services,

efficient treatment, and rehabilitation for drug users. Moreover, the hospital should consider three fundamental perspectives, such as psychological, medical, and socio-environmental dimensions.

CONCLUSION

Substance dependence has become a serious health burden globally, and Thailand is no exception. From our study, we found that patients experiencing mental and behavioral disorders due to psychoactive substance use were young adults aged between 29 and 43 years old. As this age group is an important workforce in economic development, unless the measures or strategies are taken to reduce this issue, healthcare expenditures will increase significantly. An appropriate intervention is, therefore, required to combat this problem.

Labour costs were the highest ratio of total costs. Manpower is an important issue that needs to be discussed and planned to provide effective services. Increasing patient access to healthcare and treatment is another point of interest. Besides, increasing productivity or increasing the utilization of patient visits can diminish unit costs.

ACKNOWLEDGMENTS

We wish to extend special thanks and appreciation to four community and two general hospitals for providing the cost information. This is the crucial data for this study, which was used to analyze the unit cost of outpatients with mental and behavioral disorders due to psychoactive substance use.

DECLARATION OF INTEREST STATEMENT

No potential conflict of interest was reported by the authors.

References

1. Bae K, Kwon NJ, Han E. A review on the abuse of three NPS (synthetic cannabinoids, kratom, poppers) among youths in Asia. Forensic Sci Int 2018;292:45–9. https://doi.org/10.1016/j.forsciint.2018.09.008 .
2. Zaman T, Malowney M, Knight J, Boyd JW. Co-Occurrence of Substance-Related and Other Mental Health Disorders Among Adolescent Cannabis Users. J Addict Med 2015;9:317–21. https://doi.org/10.1097/ADM.0000000000000138 .
3. Marsh JC, Amaro H, Kong Y, Khachikian T, Guerrero E. Gender disparities in access and retention in outpatient methadone treatment for opioid use disorder in low-income urban communities. Journal of Substance Abuse Treatment 2021;127. https://doi.org/10.1016/j.jsat.2021.108399.
4. Saingam D. Substance Abuse Policy in Thailand: Current Challenges and Future Strategies. J Drug Alcohol Res 2018;7:1–10. https://doi.org/10.4303/jdar/236058.
5. Office of the Narcotics Control Board. The number of people involved in narcotics was conducted according to the judicial process, fiscal year 2018. 2018. https://www.oncb.go.th/Home/Pages/DOC_narcotic_2561.aspx (accessed February 13, 2019).
6. Wonguppa R, Kanato M. The prevalence and associated factors of new psychoactive substance use: A 2016 Thailand national household survey. Addict Behav Rep 2018;7:111–5. https://doi.org/10.1016/j.abrep.2017.11.001 .
7. Moradinazar M, Farnia V, Alikhani M, Karyani AK, Rezaei S, Rezaeian S, et al. Factors Related to Relapse in Patients with Substance-related Disorders under Methadone Maintenance Therapy: Decision Tree Analysis. Oman Med J 2020;35:e89. https://doi.org/10.5001/omj.2020.07 .
8. Prom-Wormley EC, Ebejer J, Dick DM, Bowers MS. The genetic epidemiology of substance use disorder: A review. Drug Alcohol Depend 2017;180:241–59. https://doi.org/10.1016/j.drugalcdep.2017.06.040.
9. Fox TP, Oliver G, Ellis SM. The Destructive Capacity of Drug Abuse: An Overview Exploring the Harmful Potential of Drug Abuse Both to the Individual and to Society. ISRN Addiction 2013;2013:e450348. https://doi.org/10.1155/2013/450348 .
10. World Health Organization. ICD-10 Version:2019 2021. https://icd.who.int/browse10/2019/en#/F10-F19 (accessed July 16, 2021).
11. Patarakorn A, Singhtho T, Nilaban S. A Study of Activity Base Costing Analysis in Thanyarak Institute and the Cost Related to Drug Addict Absenteeism. Journal of Health Science 2015:305–16.
12. Pathayanant N, Ratniyom A. An analysis of economic costs of drug abuse treatment at Thanyarak Institute. Journal of Medicine and Health Science 2011;18:8–20.
13. Srikongpon P, Kanato M. The explore accounting cost on compulsory drugs abuse system for outpatient department, in patient department, male rehabilitative department, and female rehabilitative department in 2011 fiscal year of Thunyaruk Khon Kaen

Hospital. Community Health Development Journal 2014;2:81-101 (in Thai).
14. Thianjaruwatthana W, Sakulpanich T, Pongpattrachai D, Chiangchaisakulthai K. Guideline of unit cost for hospitals under Ministry of Public Health. Nonthaburi: MinistryofPublic Health: 2001.
15. Bank of Thailand. Economic indicators 2021. https://www.bot.or.th/App/BTWS_STAT/statistics/ReportPage.aspx?reportID=409&language=th (accessed February 10, 2023).
16. Suanrueang P, Peltzer K, Suen M-W, Lin H-F, Er T-K. Trends and Gender Differences in Mental Disorders in Hospitalized Patients in Thailand. INQUIRY 2022;59:00469580221092827. https://doi.org/10.1177/00469580221092827 .
17. Teixidó-Compañó E, Espelt A, Sordo L, Bravo MJ, Sarasa-Renedo A, Indave BI, et al. Differences between men and women in substance use: the role of educational level and employment status. Gaceta Sanitaria 2018;32:41–7. https://doi.org/10.1016/j.gaceta.2016.12.017 .
18. Regitz-Zagrosek V. Sex and gender differences in health. EMBO Rep 2012;13:596–603. https://doi.org/10.1038/embor.2012.87.
19. McHugh RK, Votaw VR, Sugarman DE, Greenfield SF. Sex and gender differences in substance use disorders. Clin Psychol Rev 2018;66:12–23. https://doi.org/10.1016/j.cpr.2017.10.012 .
20. Teese R, Van Doorn G, Gill PR. Prospective associations between traditional masculinity and cannabis, hard drug, and alcohol use in Australian emerging adult men. Personality and Individual Differences 2023;200:111877. https://doi.org/10.1016/j.paid.2022.111877 .
21. Saikia N, Debbarma B. The socioeconomic correlates of substance use among male adults in Northeast India. Clinical Epidemiology and Global Health 2020;8:149–57. https://doi.org/10.1016/j.cegh.2019.06.004 .
22. Tan SS, van Gils CWM, Franken MG, Hakkaart-van Roijen L, Uyl-de Groot CA. The Unit Costs of Inpatient Hospital Days, Outpatient Visits, and Daycare Treatments in the Fields of Oncology and Hematology. Value in Health 2010;13:712–9. https://doi.org/10.1111/j.1524-4733.2010.00740.x .
23. Chatterjee S, Levin C, Laxminarayan R. Unit Cost of Medical Services at Different Hospitals in India. PLoS One 2013;8:e69728. https://doi.org/10.1371/journal.pone.0069728 .
24. González-Ramallo VJ, Mirón-Rubio M, Mujal A, Estrada O, Forné C, Aragón B, et al. Costs of outpatient parenteral antimicrobial therapy (OPAT) administered by Hospital at Home units in Spain. Int J Antimicrob Agents 2017;50:114–8. https://doi.org/10.1016/j.ijantimicag.2017.02.017 .
25. Bank of Thailand. Inflation rate 2021. https://www.bot.or.th/App/BTWS_STAT/statistics/ReportPage.aspx?reportID=409&language=th (accessed August 5, 2021).
26. Finney JW, Hahn AC, Moos RH. The effectiveness of inpatient and outpatient treatment for alcohol abuse: the need to focus on mediators and moderators of setting effects. Addiction 1996;91:1773–96.
27. Bottlender M, Soyka M. Efficacy of an intensive outpatient rehabilitation program in alcoholism: predictors of outcome 6 months after treatment. Eur Addict Res 2005;11:132–7. https://doi.org/10.1159/000085548 .
28. Lamb S, Greenlick MR, McCarty D. Drug Treatment Programs and Research: The Challenge of Bidirectionality. National Academies Press (US); 1998.
29. Thornicroft G, Tansella M. Components of a modern mental health service: a pragmatic balance of community and hospital care: Overview of systematic evidence. The British Journal of Psychiatry 2004;185:283–90. https://doi.org/10.1192/bjp.185.4.283.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

INTEGRATION OF KNOWLEDGE, ATTITUDE, AND PREPAREDNESS OF HEALTH WORKERS IN FACING FLOOD DISASTER

Agustina Boru Gultom

Jurusan Keperawatan, Politeknik Kesehatan Kemenkes Medan, Indonesia

Correspondence: agnagultom682@gmail.com

ABSTRACT

The quality of health services in flood disaster conditions still needs to get better attention because health workers carry out actions in this condition that are not yet effective. It was closely related to the quality of preparedness of these health workers. It can reflect whether there was an integration of health workers' knowledge, attitude, and preparedness in dealing with flood disasters.

The study used a mixed method consisting of a quantitative design with a correlation test and a qualitative design with interviews. The quantitative design study involved a total population of 22 health workers, and the qualitative design involved 8 participants who are representatives of each profession. Analysis used univariate analysis and bivariate analysis with Fisher's exact test.

Knowledge and preparedness of health workers to face flood disasters were still not good and not ready when compared to attitudes. Knowledge relates to preparing the health workers to face flood disasters with p 0.009, and a study with a qualitative design using eight participants who are representatives of each profession. Health workers dealing with flood disasters have not fully integrated knowledge, attitudes, and preparedness. We need to improve aspects of behavior that are still not optimal.

KEYWORDS

integration, knowledge, attitude, preparedness, flood disaster

INTRODUCTION

In all parts of the world, disasters tend to occur with a significant increase, including in Indonesia which has the potential to experience the potential for flood disaster. The various kinds of natural formations in Indonesian such as lowlands, basins, and some ocean situations have caused floods. Global climate change creates uncertainty over seasons, land cover, and use [1], the declining condition of a watershed accompanied by an increase in the density of the surrounding population [2] is another cause of flood disasters.

North Sumatra Province is a province that has had the highest percentage of disaster events when compared to other areas. This province has two areas most prone to meteorological disasters- Medan City and Deli Serdang Regency. Data on flood events in the North Sumatra Province usually show a strong relationship between the pattern of the number of flood events and the design of variations in the amount of excess rainfall. The Medan and Deli Serdang areas are sites on the east coast of Sumatra and experience vulnerability to regional climate disturbances from the waters of the Malacca Strait and the South China Sea [3].

Floods can have an impact on society due to unfavorable conditions. Therefore, it is necessary to predict these impacts through preparedness efforts. Preparedness can reduce the effects of additional hazards through potent prevention efforts by ensuring efficient and appropriate management, timing, and response to help [4].

A Public Health Center is needed as the front line in reducing these risks. Its role includes first aid for victims, preparing the community for the prevention of emergency cases, and providing skills in performing first aid according to their abilities [5].

The quality of disaster preparedness will synergize with the quality of service when a disaster occurs. This means that during the preparedness before a disaster occurs, tools and efforts need to prepare so that when a disaster occurs, it can ensure that effort can use with the tools prepared [6]. If users receive services on time as expected, it will have a major affect the quality of health services [7].

The first parameter that becomes an important point for preparedness for natural disasters that will occur are knowledge and attitude. Knowledge is the principal and primary factor that is important for preparedness action. Existing knowledge can usually lead to the behavior attitude of being prepared to anticipate disasters [8].

A preliminary survey in Unit Disaster Management in the Health Sector of the Health Office of North Sumatra Province found that the highest disaster incidence in the city of Medan was in the Medan Maimun sub-district at a frequency of 2-3 times a year. This survey was based on the Kampung Baru Health Center, a Health Center located in the working area of Medan Maimun District, using only outpatient services and served cases due to the flood disaster. Interviews in the preliminary study with 30 residents of Medan Maimun District regarding the health services received during the 2011 flood disasters, set out that some of the health services available (as a result of the disaster) were lacking, especially regarding the treatment and management of risk factors that could arise after the disaster.

From this background, we can conclude that a problem is how to describe the integration between knowledge, attitudes, and behavior in the preparedness of health center health workers in dealing with flood disasters. The study aimed to describe the integration of knowledge, attitudes, and preparation of health workers at the public health centre level in dealing with flood disasters.

METHODS

DESIGN

The study used a mixed method design, a quantitative approach with a correlation description, and a qualitative approach.

PARTICIPANTS SAMPLE

The population were all health workers who worked at the Kampung Baru Public Health Center, Medan Maimun District. For a quantitative design, the entire center population became study informants involving 22 health workers.

As for the qualitative method, informants are representatives of each health profession, totaling eight people.

MEASUREMENT

This study used a quantitative data instrument that has validity and reliability tests, consisting of knowledge, attitudes, and flood preparedness. Preparedness for flood disasters is all actions and activities of health workers, driven by appropriate and effective efforts in anticipating health problems that will arise due to flooding in the future, consisting of 14 questions. Knowledge about flood disaster preparedness was how health workers at the Public Health Center understand everything about flood disaster preparedness at the Public Health Service level, consisting of 16 questions. The attitude of preparing for floods was how health workers at the Public Health Center tend to respond in carrying out flood preparedness actions, consisting of 16 questions. In addition, there was a checklist instrument for health supplies in disaster management. This study also used qualitative data consisting of 8 questions which developed into sub questions.

DATA COLLECTION

Collecting data on knowledge, attitudes, and preparedness for floods used guided interviews, and data on health supplies in disaster management used observation. While qualitative data used in depth interviews

RESEARCH PERMIT

This research has received permission from the Medan City Health Office with the number 440/150.37/V/2012 and the Kampung Baru Health Center, Medan Maimun District with the number 100/38/PKB/VI/2012.

DATA ANALYSIS

Data were analyzed using IBM SPSS stats 11 software, including univariate analysis and bivariate analysis with Fisher's Exact and multivariate analysis using Multiple Logistic Regression Test at 95% confidence level (a = 0.05) with Backward LR method.

RESULTS

PARTICIPANT CHARACTERISTICS

The 22 participants who participated in this study consisted of 3 general practitioners; 1 dentist; 8 nurses; 1 dental nurse; 4 midwives; 1 nutritionist; 2 health analysts; 1 pharmacist assistant; and 1 pharmacist.

Characteristics of participants including age, gender, length of work, education and training can be seen in Table 1.

TABLE 1. CHARACTERISTICS OF PARTICIPANTS

Characteristics	Amount (n)	Percentage (%)
Age (years)		
18 – 34	7	31.8
35 – 60	15	68.2
Amount	22	100.0
Gender		
Men	1	4.5
Women	21	95.5
Amount	22	100.0
Length of work (years)		
< 10	8	36.4
≥ 10	14	63.6
Amount	22	100.0
Education		
< Bachelor	14	63.6
≥ Bachelor	8	36.4
Amount	22	100.0
Training		
Ever	5	22.7
Never	17	77.3
Amount	22	100.0

From Table 1, it can seen that the majority of participants were aged 35-60 years {68.2%}; the majority were women participants {95.5%}; length of work experience was greater than 10 years for 14 participants {63.6%}; education levels for those with less than a bachelor's degree were recorded by 14 participants {63.6%}. The majority of those interviewed (17 participants)had never attended training regarding disasters or emergencies {77.3%}.

Preparedness Behavior in Facing Flood Disaster

The health worker knowledge questionnaire about preparedness for flood disasters consists of 16 questions with a 'good' category with correct answers equal to or more than eight questions. The attitude questionnaire consists of 16 questions with five answer choices from strongly disagree with a value of 1 to strongly agree with a value of 5, with a maximum score of 80. The positive attitude category if the score was equal to or more than 40. The preparedness questionnaire consisted of 14 questions with the ready category if the participant answered readiness in preparedness was the same to or more than seven items. Preparedness behavior in respect to those interviewed who were facing flood disasters can be seen in Table 2.

TABLE 2. DISTRIBUTION OF KNOWLEDGE, ATTITUDES AND PREPAREDNESS CATEGORIES FOR FLOOD DISASTERS

No	Knowledge	Frequency (n)	Proportion (%)
1.	Good	6	27.3
2.	Bad	16	72.7
	Amount	**22**	**100.0**
No	Attitude	Frequency(n)	Proportion (%)
1	Positive	21	95.5
2.	Negative	1	4.5
	Amount	**22**	**100.0**
No	Preparedness	Frequency (n)	Proportion (%)
1	Not Ready	17	77.3
2.	Ready	5	22.7
	Amount	**22**	**100.0**

From Table 2, it can see that the majority of participants had poor knowledge regarding preparedness for flood disasters with 16 participants having bad experiences (72.7%), 21 participants (95.5%) having a positive attitude, and 17 participants not being prepared (77.3%).

Relationship Between Characteristics, Knowledge, Attitude for Flood Disasters

The relationship between characteristic, knowledge, attitude and preparedness for flood disaster can be seen in Table 3

TABLE 3. RELATIONSHIP BETWEEN CHARACTERISTICS, KNOWLEDGE, ATTITUDE FOR FLOOD DISASTERS

No	Respondent Characteristics	Knowledge				Total		Sig.
		Good		Bad				
		n	%	n	%	n	%	
	Age (years)							
1	18 – 34	1	14.3	6	85.7	7	100	0.349
2	35 – 60	5	33.3	10	66.7	15	100	
	Length of work (years)							
1	< 10	1	12.5	7	87.5	8	100	0.255
2	≥ 10	5	35.7	9	64.3	14	100	
	Education							
1	< Bachelor	3	21.4	11	78.6	14	100	0.369
2	≥ Bachelor	3	37.5	5	62.5	8	100	
	Training							
1	Ever	4	80.0	1	20.0	5	100	0.009
2	Never	2	11.8	15	88.2	17	100	

No	Respondent Characteristics	Attitude				Total		Sig.
		Positive		Negative				
		n	%	n	%	n	%	
	Age (years)							
1	18 – 34	7	100.0	0	0.0	7	100	0.682
2	35 – 60	14	99.3	1	6.7	15	100	
	Length of work (years)							
1	< 10	8	100.0	0	0.0	8	100	0.636
2	≥ 10	13	92.9	1	7.1	14	100	
	Education							
1	< Bachelor	13	92.9	1	7.1	14	100	0.636
2	≥ Bachelor	8	100.0	0	0.0	8	100	
	Training							
1	Ever	5	100.0	0	0.0	5	100	0.773
2	Never	16	94.1	1	5.9	17	100	

No	Respondent Characteristics	Preparedness				Total		Sig.
		Ready		Not Ready				
		n	%	n	%	n	%	
	Age (years)							
1	18 – 34	1	14.3	6	85.7	7	100	0.477
2	35 – 60	4	26.7	11	73.3	15	100	
	Length of work (years)							
1	< 10	2	25.0	6	75.0	8	100	0.620
2	≥ 10	3	21.4	11	78.6	14	100	
	Education							

1	< Bachelor	2	14.3	12	85.7	14	100	0.233
2	≥ Bachelor	3	37.5	5	62.5	8	100	
	Training							
1	Ever	3	60.0	2	40.0	5	100	0.055
2	Never	2	11.8	15	88.2	17	100	

From table 3, it can see that only the training characteristics related to knowledge about flood preparedness with p 0.009.

Relationship Between Knowledge, Attitude and Preparedness for Flood Disasters

The relationship between knowledge, attitude and preparedness to face flood disasters can be seen in Table 4.

TABLE 4. RELATIONSHIP BETWEEN KNOWLEDGE, ATTITUDE AND PREPAREDNESS FOR FLOOD DISASTERS

No	Knowledge	Attitude				Total		Sig.
		Negative		Positive				
		n	%	n	%	n	%	
1.	Good	1	6.3	15	93.7	16	100	1.000
2.	Bad	0	0.0	6	100.0	6	100	

No	Knowledge	Preparedness				Total		Sig.
		Ready		Not Ready				
		n	%	n	%	n	%	
1.	Good	1	6.3	15	93.7	16	100	
2.	Bad	4	66.7	2	33.3	6	100	0.009

No	Attitude	Preparedness				Total		Sig.
		Ready		Not Ready				
		n	%	n	%	n	%	
1.	Negative	0	0.0	1	100.0	1	100	1.000
2.	Positive	5	23.8	16	76.2	21	100	

It can see from table 3 that worse knowledge was still not aligned with the majority positive attitude, and there was no relationship, bad knowledge was in line with not being ready, and there was a relationship. While a positive attitude tends to be unprepared, and there was no relationship between the two variables with Fisher's exact test.

Regression Analysis of Variables Related to Health Workers' Preparedness in Facing Disasters

Regression analysis of variables related to the preparedness of health workers for flood disasters can be seen in Table 5.

TABLE 5. REGRESSION ANALYSIS

Step		B	S.E.	Wald	df	Sig.	Exp (B)
Step 1(a)	Knowledge	3.332	1.350	6.096	1	0.014	28.000
	Attitude	185.64	40192.970	.000	1	1.000	115391061.737
	Constant	-.693	.866	.641	1	.423	.500
Step 2(a)	Knowledge	3.401	1.348	6.368	1	.012	30.000
	Constant	-.693	.866	.641	1	.423	.500

Regression analysis showed that there was one most related variable, namely knowledge. The equation model obtained P=1/(1+e ^(-y)), with y = -0.693 + 3.401(Knowledge), then the probability of a health worker was being prepared to face a flood disaster with good knowledge is 0.666 or 66.6%.

INTERVIEW RESULTS

The results of interviews regarding the knowledge of informants from various professions, 85.7%, stated that they played a role in flood disaster management in the emergency response and recovery stages by serving as health workers in places established in each village. 75% said they did not understand the meaning of flood preparedness and more often stated that preparedness is the duty of the emergency unit and health workers in general during the emergency response stage.62.5% of the

informants did not fully understand the function of the public health center as a development center with a health perspective that supports flood disaster preparedness, and 25% of informants knew the function of the public health center as a community empowerment center that supports flood disaster preparedness. 37.5% of informants knew correctly the function of the public health centre as a first level health service center that supports flood disaster preparedness.

The majority (87.5%) of informants knew correctly about the knowledge of medicines and supplies needed for emergency treatment and referrals. 50% of informants did not know in detail the availability of standard operating procedures for emergency handling.

87.5% of informants understood that preparedness was a common task for health workers during the emergency response stage and required effort to improve. One of the informants conveyed it as follows.

"... *Regarding preparedness at the Public Health Center, there was a program called emergency which was a flood or fire accident, and the officer prepared to go directly to the field*".

Interviews regarding the attitude of the informants concluded that most of them needed to carry out health surveillance, but some stated that it was the duty of the surveillance officer, and there were some participated in carrying out the activity. Most of the study informants were necessary to carry out health education to the community so that they were ready to face floods, but some did not tend to do this. Most stated that it was necessary to cooperate with parties outside the Puskesmas (community health center) in preparing for flood disasters because preparedness could not be carried out only by Puskesmas health workers and could not work independently.

Some informants stated that it was necessary to train the community to become trained cadres ready to deal with flood disasters, and some tended not to do that. A small number stated that they did not need to be involved in family empowerment for flood disaster preparedness because the family had been trained and was not part of the work of the health worker concerned. Some informants stated that they did not need to carry out standard operating procedures for handling emergencies and referrals because the duties of the Emergency Unit were handled directly and not by health workers. Several informants stated that they did not need to be involved in planning the provision of medicines and supplies or health facilities and infrastructure to deal with flood disasters because the Head of the Public Health Center had already arranged for the staff to be on duty.

All informants stated that it was necessary to hold competency improvement training in flood emergency management because knowledge was increased and refreshed, there was new information, and health workers at the Public Health Center who were prone to flooding would know more about this handling.

The frequency of training stated by informants varied from 1 to 3 months, 1 to 2 years or up to 5 years.

All study informants need to provide services to the community to improve public health so that the community can deal with floods and their impacts in the future.

One part of flood disaster preparedness attitude needs to be improved because some informants did not need to carry out standard operating procedures for handling emergencies and referrals. Some of the informants' statements are listed here:

Emergency department only … No need, we will only deal with it, we should, but there was nothing … I did not think so, there was not my job.

The results of interviews regarding the preparedness of informants to face flood disasters include some who have not taken action in assessing conditions in the work area of the public health center at risk or not at risk of flooding. All informants did not map flood-prone regions in the working area of the public health center. All informants did not know the signs of a flood disaster, and some could not interpret the mark of a disaster.

Several informants conducted health education to the community regarding flood preparedness. Some informants worked with village or sub district officials and partnered with community organizations or non governmental organizations in flood disaster preparedness efforts. Almost all of the informants coached cadres in implementing community based health efforts, and a small number empowered families as health development partners to experience disaster preparedness.

Almost all of them did not carry out standard operating procedures for handling emergency services and their referrals.

Several informants provided services to the community to improve public health so that the community experienced the ability to deal with floods and their impacts.

Several informants stated that they carried out health education to the community regarding flood preparedness efforts and that health workers needed to improve this intervention. Several informants stated this as stated here:

"...*At least explain about environmental cleanliness ... yes, dispose of trash in its place, and did not live in low areas ... where water flows ...*"

OBSERVATION RESULTS

Observations based on the checklist sheet for the equipment officer who also serves as a health worker in the medicine division showed that antibiotics, analgesics, skin medicines, eye medicines, oral rehydration solutions (ORS), and cough medicines fulfilled the supply. Meanwhile, antipyretic drugs, antacids, anti-allergy, anti-inflammatory, and psycho pharmaceuticals only fulfilled part of their supply.

The results of observations on the availability of medical supplies in disaster management at the public health center showed that medical service equipment met the availability. While the need for triage, airway resuscitation equipment, cardiac resuscitation equipment, wound care medical equipment, communication, and transportation facilities fulfilled some of the supplies. The evacuation tools and provision of additional food were not available. Table 6 describes the availability of health supplies for disaster management at the Public Health Center.

TABLE 6. AVAILABILITY OF HEALTH SUPPLIES

No	Supplies Type	Results
1.	Triage needs (identification, triage cards and labels, administrative equipment, stretchers, lighting equipment)	Partially available
2.	Airway resuscitation equipment (oxygen cylinders, intubation kits, tracheostomy kits, ambubags)	Partially available
3.	Cardiac resuscitation equipment (infusion sets, RL infusion fluids, NaCl, Dextrose, shock management drugs)	Partially available
4.	Medicines for wound care (cotton, elastic bandage, gloves, minor surgery set, antiseptic, splint/spalk, neck collar, blanket)	Partially available
5.	Evacuation equipment (lighting devices, stretchers)	Not available
6.	Treatment service equipment (sphygmomanometer, stethoscope, flashlight, minor surgery set)	Available
7.	Means of communication and transportation (radio, communication, ambulance), identity of officers	Partially available
8.	Provision of additional food (for pregnant women, mothers giving birth, infants and toddlers)	Not available

DISCUSSION

This study aimed at understanding how to integrate the preparedness behavior of public health workers in dealing with flood disasters. Behavioral motivation is important to achieve service quality and will lead to satisfaction [9].

Knowledge about flood disaster preparedness tended to show that it was still not at a satisfactory level based on these research results. The results of the cross table test between age, education, and training showed that training was closely related to the participants' knowledge.

The participants' knowledge tended to be poor, reinforced by the background characteristics of the participants who rarely attended disaster training.

The results of the in-depth interviews confirmed that the participants still lacked knowledge about flood disaster preparedness. On the other hand, attitudes tended to be positive because participants were more willing to intervene in dealing with floods. The results of the in-depth interviews confirmed that most of the participants showed a generally positive attitude toward flood disaster preparedness.

However, in association with the results of the cross table test between age, length of work, education, and training the tendency of the characteristic variables did not show a significant correlation with knowledge, attitudes, and flood preparedness efforts. Only the correlation between training and flood disaster preparedness knowledge showed significance.

The researcher concluded that attitude was not the result of expertise obtained through receiving information or training but rather the attitude that occurred in participants at the stage of having positive feelings about conditions or things that were happening or at the affective stage.

The results of the research showed that the tendency of health workers was not yet ready to face flood disasters. Statements from health workers through in-depth interviews strengthened these findings. They stated that they needed better efforts in preparing themselves for flood disasters.

Knowledge, attitudes, and practices are a combination of integrated variables. Good knowledge will lead to attitudes and actions that are in harmony with knowledge [10].

The results of this study showed that the integration between knowledge, attitudes and preparedness of health workers in dealing with flood disasters was still not optimal. This was evidenced only by knowledge related to flood disaster preparedness with p 0.009, while knowledge was not related to attitudes towards flood disasters, and also attitudes were not related to flood disaster preparedness. It was necessary to harmonize the knowledge and attitudes of health workers in dealing with flood disasters to achieve more effective preparedness.

The study showed that the majority of attitudes were positive, the majority of knowledge was still not at an optimal level, and there was a lack of preparedness for flood disasters. Therefore, it was the knowledge and preparedness of health workers that needs to be improved, with the intention of integrating the knowledge, attitudes, and preparedness of health workers to face flood disasters.

Various efforts to increase knowledge in working in flood disaster areas include reading materials and books about disaster management, searching and reading materials on disaster preparedness via the internet, and attending conferences and seminars related to disaster management [11]. Based on the results of this study's in-depth interviews, efforts to increase the preparedness of health workers for floods are to equip emergency service facilities, provide operational standards for emergency handling and referrals, and create support from policies and staff commitment.

CONCLUSIONS

Health workers already have the knowledge, attitudes, and preparedness for flood disasters, although the integration between these components did not complete. Therefore, it was necessary to improve aspects that are not yet optimal, including the knowledge and preparedness of health workers to face flood disasters. Efforts include increasing the capacity of health workers and support from various parties involved in the preparedness of health workers in dealing with flood disasters.

Reference

1. Suprapto. Statistik Pemodelan Bencana Banjir Indonesia {Kejadian 2002-2010}. J Penanggulangan Bencana BNPB [Internet]. 2011;2(2):34–47. Available from: Climate change, Flood. Available from : https://perpustakaan.bnpb.go.id/jurnal/index.php/JDPB/article/view/48
2. Suganda,E., Yatmo,Y,A., Atmodiwirjo,P. Pengelolaan Lingkungan dan Kondisi Masyarakat Pada Wilayah Hilir Sungai. Makara,Sosial Hum [Internet]. 2009;13(2):143–53. Available from: http://hubsasia.ui.ac.id/old/index.php/hubsasia/article/view/158
3. Handayani,A,S. Analisis Daerah Endemik Bencana Akibat Cuaca Ekstrim Di Sumatera Utara. J Meteorol dan Geofis [Internet]. 2010;11(1):54–8. Available from: http://202.90.199.54/jmg/index.php/jmg/article/view/62/56
4. Coppola,D,P. Introduction to International Disaster Management [Internet]. 2nd ed. Amsterdam: Elsevier; 2011. Available from: https://www.google.co.id/books/edition/Introduction_to_International_Disaster_M/m2KP3qbY1aUC?hl=en&gbpv=1&dq=pdf+disaster+preparedness&printsec=frontcover
5. Ditjen Binkesmas Depkes. Pedoman Puskesmas Dalam Penanggulangan Bencana. Jakarta; 2005.
6. Philips,S.,Huges,R.,Savitz,L,A. Synergistic Opportunity To Connect Quality Improvement and Emergency Preparedness. In: Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville: Agency For Healthcare Research And Quality; 2008.
7. Muninjaya,A,A,G. Manajemen Mutu Pelayanan Kesehatan. EGC; 2011.
8. LIPI-UNESCO/ISDR. Pengembangan Framework Untuk Mengukur Kesiapsiagaan Masyarakat Terhadap Bencana Alam. Jakarta; 2006.
9. Lu,T.,Tu,R.,Jen,W. The role of service value and switching barriers in an integrated model of behavioural intentions. 2011;22(10):1071–89. Available from: service qualityservice valuesatisfactionswitching barriersbehavioural intentions
10. Hernandes,B,L,M. Foundation Concepts of Global Community Health Promotion And Education. Sudbury: Jones & Bartlett Learning; 2011.
11.
12. Maulidar.,Hatthakit,U.,Chaowalit,A. Knowledge, Self-preparedness and Perceived Skills Regarding Tsunami Disaster Nursing Among Public Health Nurses Working in Tsunami Affected Area of Aceh Province, Indonesia. In: 5th Annual International Workshop & Expo on Sumatra Tsunami Disaster & Recovery. Thailand; 2010.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

AUTOMATED TEXT-BASED PSYCHOLOGICAL SUPPORT TO IMPROVE WORK-LIFE BALANCE AND SLEEP QUALITY: A PILOT STUDY REPORT OF WORK-FROM-HOME WORKERS IN INDONESIA

Herdiyan Maulana, Faras Hasna Azizah, Lupi Yudhaningrum, Erik Erik, Burhanuddin Tola*

Faculty of Psychology, State University of Jakarta, Indonesia

Correspondence: herdiyan-maulana@unj.ac.id

ABSTRACT

BACKGROUND:

Work-at-home jobs may raise the risk of mental health concerns as they blur the boundaries between one's job and personal responsibility. This study aimed to develop and test the feasibility of an online psychological intervention using the WhatsApp©messaging application.

MATERIALS AND METHOD:

During the 14-day intervention period, two messages were sent twice a day consisting of positive psychological affirmation aimed at assisting participants (N= 48; 13 males and 35 females) to achieve work-life balance and better sleep quality. The Indonesian-adapted Fisher's work-life balance scale and the sleep disturbance scale were used to measure both constructs. These measures were administered at the beginning and end of the intervention. In addition, we provided participants with brief open-ended questions to check the program's feasibility and acceptance of the intervention.

RESULTS:

A paired t-test analysis revealed that although there was an increase in work-life balance scores in the post-test compared to the pre-test, the difference was not significant ($t\ (47) = -1.75$, $p > .05$). Nevertheless, individuals' sleep quality scores improved significantly after the intervention ($t\ (47) = -2.85$, $p < .05$).

DISCUSSION:

The findings of this study are expected to provide a preliminary argument to further pursue the development of behavioral interventions using online strategies in Indonesia during the pandemic.

KEYWORDS

automated text-messages, COVID-19, Indonesia, sleep quality, tele-mental health, work-life balance

INTRODUCTION

The COVID-19 pandemic has led to major shifts in how people perform their jobs. Social restriction regulations require employees to apply the work from home (WFH) method. According to data from the Health Authority, more than one million workers returned to work from home in Jakarta alone during the Omicron variant wave that emerged early last year. With its widespread use in modern corporations, work from home (WFH) has not been widely adopted in Indonesia's traditional organizations because of

the lack of supporting infrastructure and high-context culture. [1]

While more people are engaging in this method of work during the pandemic, scholars have warned about the mental health consequences of this work trend. [2,3] An existing study highlighted that the biggest challenge for those working from home is maintaining a balance between work and personal life. [4] Under normal circumstances, the actions involved in moving from home to work are an inseparable part of the job. This physical mobility often gives people psychological flexibility, allowing for a smoother transition from their roles at work to their personal/social roles. Unfortunately, unstructured shift work, as commonly found in work-from-home methods, may be associated with psychological tensions, leading to adverse impacts on mental, social, and physical health. [5] Scholars have indicated that this work arrangement is also potentially associated with an increased risk of metabolic disorders and cardiovascular abnormalities, leading to a higher risk for poor sleepers. [6,7] In addition, previous studies linked lack of control over work hours to poor health and sleep quality outcomes. Individuals working in such shifts, including those working from home during the pandemic, frequently report disturbances in sleep and alertness. [8,9] This work-time control issue may be explained by the disparity between the physical and psychological demands of a shift work schedule and the oscillations of biochemical, physiological, and behavioral variables regulated by the individual's circadian clock.

Studies indicating the mental health impact of WFH have a foundation from a sociocultural perspective. Several studies have implied that Asian societies with strong collectivistic cultures might face challenges when applying such work arrangements. [1, 10] Collectivist cultures place high value on hierarchical ties, which are often symbolically articulated in noticeable cues (facial expressions, clothing, and body languages). [11] Unfortunately, WFH restricts such connections, making the manager-employer relationship less effective. Scholars indicate that leaders' authority to supervise and evaluate their subordinates will also be curtailed as soon as face-to-face contacts are confined. [12] In addition, individuals living with collectivist values consider society not just as a source of psychological support but also as a means of developing one's identity. [13] Working primarily from home during WFH may cause a sense of social isolation and further disrupt one's role in society [14] Consequently, the disruption of social roles during the COVID-19 pandemic can affect an individual's ability to maintain a psychological balance between their professional and social lives.

Earlier studies have shown that individuals who can manage work life balance (WLB) have better levels of psychological well-being and mental health; [15,16] stronger work commitments [17]; job satisfaction; [18] and a sense of well-being. [19] Previous study indicated that work/nonwork integration increases social role permeability. [20] There are few examples of organizational strategies to promote balance, such as providing family benefit packages, offering flexible working hours, encouraging job sharing, and allowing people to telecommute. [21] However, since the pandemic began, most workplace agendas have shifted to an online-based approach. Therefore, online intervention was the most plausible choice.

LITERATURE REVIEW

Scholars define WLB as the extent to which one's satisfaction in work and family roles is compatible with life role priorities [22]. They suggest that the 'role' theory is the foundation that underpins this concept. According to this theory, everyone is assigned a set of responsibilities based on their social roles and norms. When someone fails to fulfil their responsibilities, it will result in personal conflict [23]. Scholars indicated that this work/non-work integration increases one's role permeability, which means "the extent to which one position can be situated physically in the role's domain, but psychologically and/or behaviorally participating in another role" [23 p.27]. As such, individual attempts to balance often lead to inter-role conflict, which arises because of the social pressures from both work and life/personal outside of work. [24] Thomason & Williams argues that the pandemic exacerbates social divisions by amplifying a major separation between working and not-working responsibilities. This role conflict could obstruct individual's performance in the organization, which mostly manifests as absenteeism, low work productivity, high turnover, and physical disturbances (e.g., sleep quality).

Psychological intervention based on text messaging is a telemental health service widely used to help people with limited time and poor access to psychological services. [25,26] Several studies have demonstrated the effectiveness of text-based online intervention that significantly improve people's well-being level [27, 28] perceived social support; [29] sleep quality; [30] and self-

awareness. [31] Text messaging-based intervention is a popular telemental health service during pandemics,[25] however, the use of this instrument in occupational stress and work-related mental health problems is unclear, and there is very limited data to support its efficacy in the Indonesian community. The theoretical underpinnings for developing the messages used in this study were based on positive psychology interventions (PPIs) approach [32], refers to the Self Determination Theory (SDT) [33]. The SDT is a well-known human motivation theory that has been applied to a wide range of health and clinical studies, including in tobacco addiction [50], nutrition intake [51], and physical activity [52]. Earlier studies suggest that the SDT may be critical for understanding why people want to engage in psychological treatment or do not. This theory has become a notable model for explaining the motivational dynamics which underlies the regulation of health behaviors and interventions in health contexts. Instead of its limited use in the Indonesian context, growing evidence supporting its rationale and utility in promoting and explaining health behavior modification, including how it is applied in this current online intervention [51, 52].
The SDT suggests that individual's ability to be fully functional, including maintaining their mental health, is contingent upon their ability to perceive their own competence, feel connected to others, and be internally driven. When an individual can meet these goals, their quality of life is expected to improve [33]. The messages used in this study were based on three dimensions of SDT: 1) competence, which is the sense of being competent or effective in performing behaviors and dealing with situational demands; 2) relatedness, which is the need to feel connected to and accepted by a significant other in a particular context; and 3) autonomy, which refers to the individual's need to feel empowered and in control of their own behavior. When these requirements are met, people are more likely to feel motivated and able to adapt to adverse work demands [33]. A study examining the use of online psychological therapies based on the SDT discovered that participants expressed satisfaction with the intervention and felt it assisted them in establishing access to mental health resources [34].

We used the WhatsApp application, which is one of the most popular electronic message services in Indonesia. [35] Despite its growing use [36, 37] the utility of this tool in mental health practice is uncertain and evidence supporting the efficacy and feasibility of its application in the Indonesian population is lacking [38, 35]. Hence, our primary objective of this study was to examine the feasibility and efficacy of a text-based psychological intervention to enhance work-life balance and sleep quality among Indonesians working from home during the pandemic. This is the first study to investigate the feasibility of an online tele-mental health strategy for Indonesian employees during the pandemic using a pre-experimental approach. As such, this study is expected to serve as important preliminary evidence of online-based positive psychology interventions that aim to improve individual work-life balance and sleep quality during the pandemic.

In response to the preceding literature discussion above, we aim to adjudicate this knowledge gap by establishing a number of research questions set out below:

R1: How online messenger-based positive affirmation would assist individuals working from home in maintaining their work-life balance?

R2: How online messenger-based positive affirmation would assist individuals working from home in improving their sleep quality?

Based on the above research questions, this study proposed the two following hypotheses:

H1: Online messenger-based positive affirmations significantly impact an individual's work-life balance during work from home.

H2: Online messenger-based positive affirmations significantly impact an individual's sleep quality during work from home.

METHOD

DATA COLLECTION

Safety and ethical clearance were obtained from the Indonesian Scientific Consortium of the Psychology (KPIN) Ethical Committee (Number: 016/2021-Etik/KPIN).

Participants were invited through an internet link on social media and e-mail advertisements. Considering the pandemic social restrictions in place at the time of this study, the online recruitment method was deemed as the best option. The submission of online forms was regarded as consent to participate in the study. Participants were informed of the confidential nature of the study and their right to withdraw from the intervention without any penalty.

Participants did not receive any financial reward for their voluntary participation in the study; however, we provided 50.000-Indonesian rupiah worth of phone credit to reimburse their internet/data usage during the study. Any personal information (WhatsApp phone number and demographic information) collected in this study was stored in a secure drive folder with a password that could be accessed only by the lead author. Non-personal data (raw scores of the scales) are publicly available in an open-access data repository.

PROCEDURE

An online link consisting of information about the study and pretest batteries was sent to the prospective participants. Participants who met the demographic inclusion criteria and had a minimum cut-off standard score from the pre-test were notified that they would automatically receive text messages through the WhatsApp application at a predetermined time. The short messages contained positive affirmations and a question on how long participants slept at night ("How many hours did you sleep last night?"). While the positive affirmation messages were made with reference to three aspects of the SDT theory, namely Autonomy, Competence, and Relatedness. [32, 33] Prior to delivery, all messages were polled and curated by a professional psychologist to ensure validity. These messages were delivered in Indonesian and sent twice a day (morning and evening), while the slept question was only asked in the morning session. Participants received different messages during each session. Each participant received 28 different text messages over 14 consecutive days. Participants were told that there would be no personal dialogue through these messages and that there was no need to respond or reply to any messages they received. We also provided an open-ended question about the participants' experiences of the program on the 7th and 14th day of the intervention. To ensure participants had received the messages, we asked them to enable the 'read receipt' feature, so we could monitor when the messages were opened or read. At the end of the program, participants were debriefed and asked to fill out the post-test questionnaire and three additional questions about their satisfaction with the program.

SAMPLE

Participants were recruited from an Indonesian general population with the following specific inclusion criteria:1) Indonesian adults aged 18–55 years, 2) had a full/part-time job, 3) had been working from home for at least a month, 4) had an active WhatsApp number, 5) lived with parents/family members/friends, and 6) scored low to medium on the work-life balance scale provided in the pre-test session.

RESEARCH INSTRUMENTS

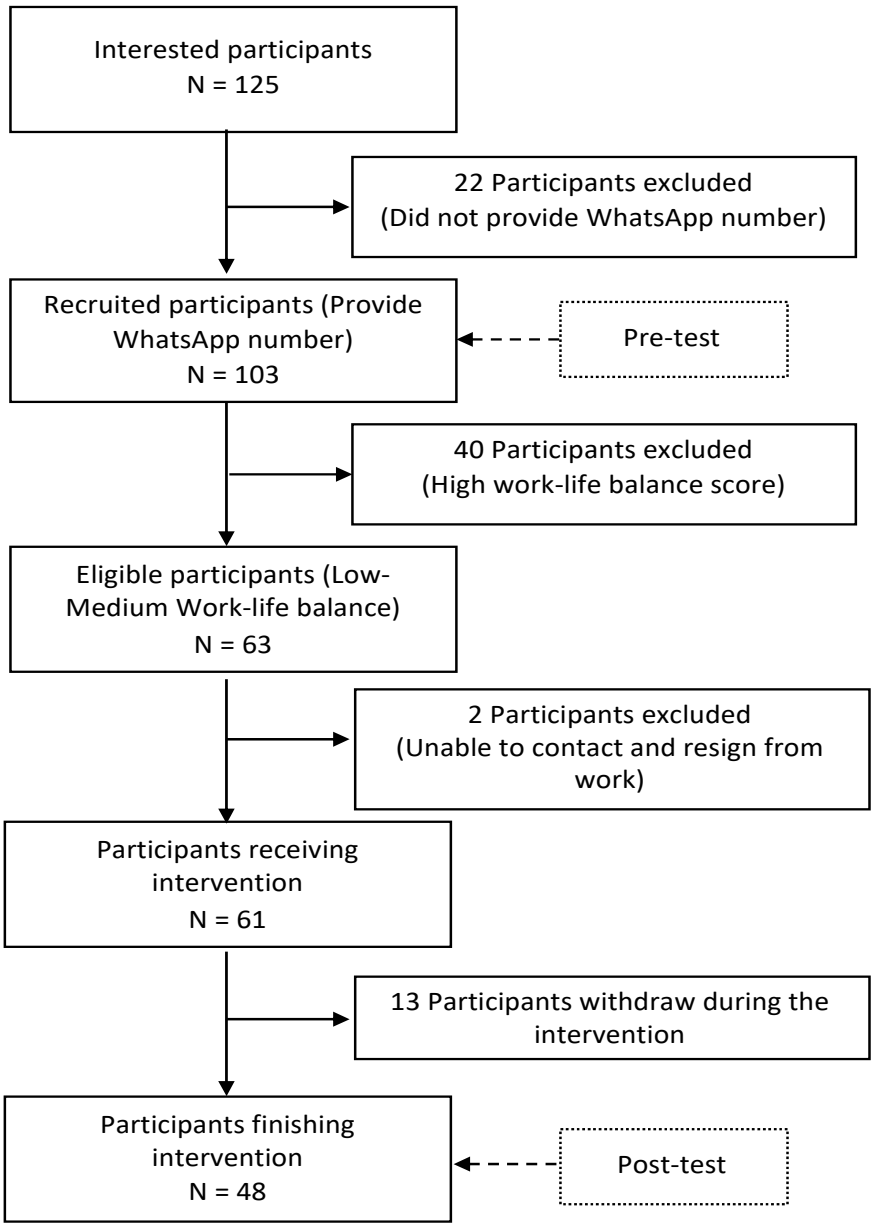
The demographic information collected included age, sex, employment status, residence status, occupation, educational background, marital status, and income. A work-life balance test developed by Fisher [40] was used in this study. The scale consists of 17 items rated on a Likert scale (1 = strongly disagree to 5 = strongly agree) and includes two main dimensions of work-life balance (work demands and resources). The scale was translated into Indonesian and tested for validity. [41] We assessed participant's sleep quality using the Sleep Disturbance Scale. [40] This scale comprises eight items covering six individual sleep quality factors (daytime dysfunction, post-sleep restoration, sleep difficulties, difficulty waking, sleep satisfaction, and sleep quality). Each item was measured using four response ranges (0 = rarely, 1 = sometimes, 2 = often, and 3 = always). This scale has been adapted into Indonesian and showed good validity and reliability 38. At the end, we used five short questions in an open-ended format to evaluate participants' satisfaction and acceptability.

RESULTS

DESCRIPTIVE

A total of 125 people responded to the email and social media advertisements. Of these, 22 were excluded because they were unable to provide WhatsApp numbers for the study. The remaining 103 individuals completed the pretest assessment; however, only 61 met the inclusion criteria. Prospective participants were contacted via text messages to confirm their participation in the intervention. The participation attrition rate was 82%; 48 of 61 confirmed participants completed the study, which was defined as receiving all messages and completing the post-test at the end of the intervention (see Figure 1 for details). This number was deemed appropriate for pilot study design [49].

FIGURE 1. PARTICIPANT RECRUITMENT PROCESS



Descriptive statistics were calculated for the 48 study participants (see Table 1).

TABLE 1. DESCRIPTIONS OF STUDY PARTICIPANT CHARACTERTISTICS

Characteristic	Distribution *n* (%)
Gender	
Female	35 (73 %)
Male	15 (27 %)
Age group	
Young adult (20-30 years old)	39 (81%)
Middle adult (31-40 years old)	7 (14%)
Late adult (41 - 50 years old)	2 (5%)
Marital status	
Married	11 (27%)
Not married	37 (73%)
Highest education	
Senior high school	9 (18%)
Undergraduate	33 (72%)
Post-graduate	6 (10%)
Monthly income (in IDR)	
< 1.5 million	8 (17%)
1.5 – 3.5 million	4 (8%)
3.5 – 7 million	24 (50%)
7 – 10 million	10 (21%)
> 10 million	2 (4%)
Employee status	
Full-time	37 (77%)
Freelance	11 (23%)

HYPOTHESIS TESTING RESULTS

Preliminary analysis showed data met the normality assumption (Shapiro-Wilk test > .05). Paired sample t-test analysis revealed that there was no significant difference in work-life balance scores between the pre-test and post-test sessions (t (47) = - 1.75, p >.05; 95%CI [-.54, .03]. Inspection of the results suggested that, although there was a slight increase in scores in the post-test (M = 54.69; SD = 8.81) compared to the pre-test (M = 50.5; SD = 9.51), this increment was small (Cohen's d = .253). Nevertheless, our t-test results indicated a significant difference in sleep quality before and after the program (t (47) = − 2.85, p <.05; 95%CI [-.70, -.11] with a moderate effect size (Cohen's d = .411). This means that there was a statistically significant increase in sleep quality scores before the intervention (M = 22.29; SD = 6.79) compared with scores after the intervention (M = 25.73, SD = 4.58) (see Figure 2).

FIGURE 2. WORK-LIFE BALANCE (LEFT) AND SLEEP QUALITY (RIGHT) SCORES PLOT ON PRE AND POST INTERVENTION

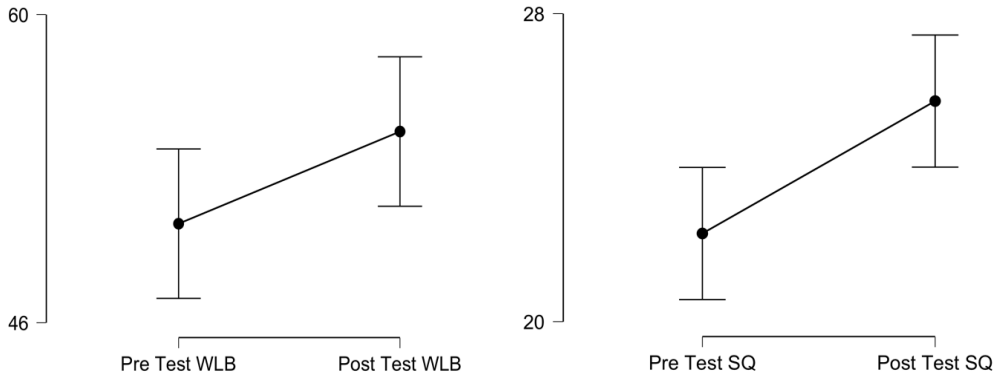


TABLE 2. SATISFACTION AND ACCEPTABILITY MEASURES

Questions (N = 48)	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Are you satisfied with the program?	0	0	12.5% (*n* = 6)	52% (*n* = 25)	35.5% (*n* = 17)
Do you want to keep receiving the messages?	2% (*n* = 1)	17% (*n* = 8)	46 % (*n* = 22)	17 % (*n* = 8)	18 % (*n* = 9)
Do you want to recommend this program to others?	0	2% (*n* = 1)	41% (*n* = 20)	34% (*n* = 16)	23% (*n* = 11)

A total of 87.5% of participants were reported to be satisfied with the program, and 58% suggested intervention for others. Most participants found that the program was helpful in giving prompts for self-reflection and reminders to maintain their sleep quality and work-life balance. Regardless of the advantages, several participants mentioned that they did not have time to read every message received. It is only approximately 35% of the respondents indicated an intention to continue receiving messages (see Table 2).

DISCUSSIONS

Although there was an improvement in work-life balance scores from pre- to post-intervention, this study indicates that the increment was not significant. Nevertheless, participants' sleep quality increased significantly from pre- to post-intervention. This significant result implies that a combination of positive message delivery and daily sleep monitoring messages may help enhance participants' awareness and attentiveness to maintain a healthier sleep schedule.

Our data indicated that some participants missed messages because of a backlog of unread messages. It is possible that the messages were too generic and only received fleeting attention. Previous studies suggest that in a randomized control trial, personalized text messages would contribute to the effectiveness of the intervention by increasing participant retention. [47] Scholars have asserted that tailored messages might be created by including participants' personal information, such as name, age, and gender in the text 43. Meanwhile, the sleep reminder feature may have a stronger influence on participants' awareness of managing their time compared to text messages. It is therefore important to note that the non-significant results in the work-life balance feature might also be attributed to a ceiling effect resulting from mixing the messages with the daily sleep monitor. Future studies should investigate this relationship to ascertain whether similar results would occur in different samples.

Another potential problem may lie in the sociocultural context. While previous studies have demonstrated the effectiveness of text-based interventions in Asian populations [37,41], caution should be exercised when implementing online-based psychological interventions in diverse sociocultural settings. [43] In collectivist cultures such as Indonesia, where social bonds are often expressed physically, working is more than just getting a job. A job is a reflection of an individual's social identity. [46] Wearing a uniform, commuting to an office building, and sharing a workplace are all connected to social status and identity. Nevertheless, through this study, we have been able verified that the use of text-based technology to deliver mental health services in Indonesia is promising. The evaluation part is a unique strength of this preliminary study because research on the development of digital technologies for mental health purposes during pandemics in Indonesia is limited.

This pre-experimental study has certain limitations. First, to maintain intervention efficacy, the inclusion criteria of this study should have considered participants' familiarity with mobile phone technology. Second, we may need to enhance participants' engagement by providing them with a tailored message, which would be beneficial in managing participants' retention in the intervention. Third, the sample size of this study was relatively small and most of the participants came from the unmarried young adult

group, which may mean that they had fewer social/familial burdens relative to the married and older adult groups. Suggestions for future studies include a recommendation for a possible randomized control design (RCT) study that allows for a recall test as part of the manipulation check. Subsequently, a close examination of the timing variance, frequency, and number of text messages sent to participants each day may help identify potentially confounding variables as well as needs to include a larger sample size.

CONCULSIONS

Despite the statistically non-significant results, our pilot study concluded that text message prompts are promising. Recommendations for further analysis involving participants' personal characteristics and tailored messages are critical parts of the current study and must be cautiously considered. One of the most important takeaways of this study is that the sociocultural context of how the intervention is provided may aid mental health professionals in increasing its efficacy.

ACKNOWLEDGMENT

The authors would like to express their appreciation for the support provided in this pilot study.

CONFLICT OF INTEREST DECLARATION:

The authors declare that they have no affiliations with or involvement in any organization or business entity with any financial interest in the subject matter or materials discussed in this manuscript.

AUTHOR CONTRIBUTIONS:

HM and FHA contributed to the design and implementation of the research, HM and E contributed to the analysis of the results and to the writing of the manuscript. LY and BT conceived and supervised the study.

FUNDING STATEMENT

This study was supported by the LPPM UNJ and Faculty of Psychology, State University of Jakarta Research Grant year 2021. The funders had no role in the study design, data collection and analysis, decision to publish, or manuscript preparation.

References

1. Sutarto AP, Wardaningsih S, Putri WH. Work from home: Indonesian employees' mental well-being and productivity during the COVID-19 pandemic. International Journal of Workplace Health Management. 2021 May 25.
2. Thomason B, Williams H. What will work-life balance look like after the pandemic. Harvard Business Review. 2020 Apr 16;2020:1-4.
3. Schieman S, Badawy PJ. A. Milkie, M., & Bierman, A.(2021). Work-life conflict during the COVID-19 pandemic. Socius.;7:237802312098285-17. https://doi.org/10.1177/2378023120982856
4. Kramer A, Kramer KZ. The potential impact of the COVID-19 pandemic on occupational status, work from home, and occupational mobility. Journal of Vocational Behavior. 2020 Jun 1;119:103442. https://doi.org/10.1016/j.jvb.2020.103442
5. Jones F, Burke RJ, Westman M. Work-life balance: A psychological perspective. Psychology Press; 2013 Apr 15. https://doi.org/10.1080/07448481.2019.1626860
6. Ruggiero JS. Correlates of fatigue in critical care nurses. Research in nursing & health. 2003 Dec;26(6):434-44. https://doi.org/10.1002/nur.10106
7. Gangwisch JE. Work-life balance. Sleep. 2014 Jul 1;37(7):1159-60. https://doi.org/10.5665/sleep.3826
8. Salo P, Ala-Mursula L, Rod NH, Tucker P, Pentti J, Kivimäki M, Vahtera J. Work time control and sleep disturbances: prospective cohort study of Finnish public sector employees. Sleep. 2014 Jul 1;37(7):1217-25. https://doi.org/10.5665/sleep.3842
9. Amin KP, Griffiths MD, Dsouza DD. Online gaming during the COVID-19 pandemic in India: Strategies for work-life balance. International Journal of Mental Health and Addiction. 2020 Jul 10:1-7. https://doi.org/10.1007/s11469-020-00358-1
10. Himawan KK, Helmi J, Fanggidae JP. The sociocultural barriers of work-from-home arrangement due to COVID-19 pandemic in Asia: Implications and future implementation. Knowledge and Process Management. 2022 Apr;29(2):185-93. https://doi.org/10.31124/advance.12250190
11. Ensari N, Murphy SE. Cross-cultural variations in leadership perceptions and attribution of charisma to the leader. Organizational Behavior and Human Decision Processes. 2003 Sep 1;92(1-2):52-66. https://doi.org/10.1016/s0749-5978(03)00066-9

12. Stoker JI, Garretsen H, Lammers J. Leading and working from home in times of COVID-19: On the perceived changes in leadership behaviors. Journal of Leadership & Organizational Studies. 2022 May;29(2):208-18.
13. Jetten J, Postmes T, McAuliffe BJ. 'We're all individuals': Group norms of individualism and collectivism, levels of identification and identity threat. European Journal of Social Psychology. 2002 Mar;32(2):189-207. https://doi.org/10.1002/ejsp.65
14. Liu J, Dalton AN, Lee J. The "Self" under COVID-19: Social role disruptions, self-authenticity and present-focused coping. PloS one. 2021 Sep 3;16(9):e0256939.
15. Greenhaus JH, Collins KM, Shaw JD. The relation between work–family balance and quality of life. Journal of vocational behavior. 2003 Dec 1;63(3):510-31. https://doi.org/10.1016/S0001-8791(02)00042-8
16. Haar JM, Roche M, ten Brummelhuis L. A daily diary study of work-life balance in managers: Utilizing a daily process model. The International Journal of Human Resource Management. 2018 Oct 11;29(18):2659-81. https://doi.org/10.1080/09585192.2017.1314311
17. Frame P, Hartog M. From rhetoric to reality. Into the swamp of ethical practice: implementing work-life balance. Business Ethics: A European Review. 2003 Oct;12(4):358-68. https://doi.org/10.1111/1467-8608.00337
18. Chen J, Leung WS, Evans KP. Are employee-friendly workplaces conducive to innovation?. Journal of Corporate Finance. 2016 Oct 1;40:61-79. https://doi.org/10.1016/j.jcorpfin.2016.07.011
19. Althammer SE, Reis D, van der Beek S, Beck L, Michel A. A mindfulness intervention promoting work–life balance: How segmentation preference affects changes in detachment, well-being, and work–life balance. Journal of Occupational and Organizational Psychology. 2021 Jun;94(2):282-308. https://doi.org/10.1111/joop.12346
20. Ashforth BE, Kreiner GE, Fugate M. All in a day's work: Boundaries and micro role transitions. Academy of Management review. 2000 Jul 1;25(3):472-91. https://doi.org/10.5465/amr.2000.3363315
21. Robbins S, & Coulter M, Management. Prentice Hall (Vol 470)
22. Helmle, J. R., Botero, I. C., & Seibold, D. R. (2014). Factors that influence perceptions of work-life balance in owners of copreneurial firms. *Journal of Family Business Management*. https://doi.org/10.1108/JFBM-06-2014-0013
23. Rantanen, J., Kinnunen, U., Mauno, S., & Tillemann, K. (2011). Introducing theoretical approaches to work-life balance and testing a new typology among professionals. In *Creating balance?* (pp. 27-46). Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-16199-5_2
24. Thomason, B., & Williams, H. (2020). What will work-life balance look like after the pandemic. *Harvard Business Review*, 1-4. Available at https://hbr.org/2020/04/what-will-work-life-balance-look-like-after-the-pandemic
25. Aguilera A, Muñoz RF. Text messaging as an adjunct to CBT in low-income populations: A usability and feasibility pilot study. Professional Psychology: Research and Practice. 2011 Dec;42(6):472.
26. Stonbraker S, Haight E, Soriano L, Guijosa L, Davison E, Bushley D, Messina L, Halpern M. Establishing content for a digital educational support group for new adolescent mothers in the Dominican Republic: a user-centered design approach. International Journal of Adolescent Medicine and Health. 2020 Aug 27. https://doi.org/10.1515/ijamh-2020-0054
27. García Y, Ferrás C, Rocha Á, Aguilera A. Exploratory study of psychosocial therapies with text messages to mobile phones in groups of vulnerable immigrant women. Journal of medical systems. 2019 Aug;43(8):1-9. https://doi.org/10.1007/s10916-019-1393-3
28. Schnall R, Okoniewski A, Tiase V, Low A, Rodriguez M, Kaplan S. Using text messaging to assess adolescents' health information needs: an ecological momentary assessment. Journal of medical Internet research. 2013 Mar 6;15(3):e2395. https://doi.org/10.2196/jmir.2395
29. Hoermann S, McCabe KL, Milne DN, Calvo RA. Application of synchronous text-based dialogue systems in mental health interventions: systematic review. Journal of medical Internet research. 2017 Aug 7;19(8):e7023. https://doi.org/10.2196/jmir.7023
30. Gipson CS, Chilton JM, Dickerson SS, Alfred D, Haas BK. Effects of a sleep hygiene text message intervention on sleep in college students. Journal of American College Health. 2019 Jan 2;67(1):32-41. https://doi.org/10.1080/07448481.2018.1462816
31. Giordano V, Koch H, Godoy-Santos A, Belangero WD, Pires RE, Labronici P. WhatsApp messenger as an adjunctive tool for telemedicine: an overview. Interactive journal of medical research. 2017 Jul 21;6(2):e6214. https://doi.org/10.2196/ijmr.6214

32. Donaldson SI, Lee JY, Donaldson SI. Evaluating positive psychology interventions at work: A systematic review and meta-analysis. International Journal of Applied Positive Psychology. 2019 Dec;4(3):113-34. https://doi.org/10.1007/s41042-019-00021-8
33. Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian psychology/Psychologie canadienne*, *49*(3), 182. https://doi.org/10.1037/a0012801
34. Muroff, Jordana, Winslow Robinson, Deborah Chassler, Luz M. López, Erika Gaitan, Lena Lundgren, Claudia Guauque et al. "Use of a smartphone recovery tool for Latinos with co-occurring alcohol and other drug disorders and mental disorders." *Journal of dual diagnosis* 13, no. 4 (2017): 280-290. https://doi.org/10.1080/15504263.2017.1348649
35. Kinnafick FE, Thøgersen-Ntoumani C, Duda J. The effect of need supportive text messages on motivation and physical activity behaviour. Journal of behavioral medicine. 2016 Aug;39(4):574-86. https://doi.org/10.1007/s10865-016-9722-1
36. Dean B. Social network usage & growth statistics: How many people use social media in 2021. Retrieved on July. 2021 Mar 9;2:2021.
37. Ifdil I, Fadli RP, Suranata K, Zola N, Ardi Z. Online mental health services in Indonesia during the COVID-19 outbreak. Asian journal of psychiatry. 2020 Jun;51:102153. https://doi.org/10.1016/j.ajp.2020.102153
38. Wiradendi Wolor C, Solikhah S, Fidhyallah NF, Lestari DP. Effectiveness of e-training, e-leadership, and work life balance on employee performance during COVID-19. Journal of Asian Finance, Economics and Business. 2020 Aug 28;7(10). https://doi.org/10.13106/jafeb.2020.vol7.no10.443
39. Arjadi R, Nauta MH, Scholte WF, Hollon SD, Chowdhary N, Suryani AO, Uiterwaal CS, Bockting CL. Internet-based behavioural activation with lay counsellor support versus online minimal psychoeducation without support for treatment of depression: a randomised controlled trial in Indonesia. The Lancet Psychiatry. 2018 Sep 1;5(9):707-16. https://doi.org/10.1016/S2215-0366(18)30223-2
40. Fisher GG. Work/personal life balance: A construct development study. Bowling Green State University; 2001.
41. Gunawan G. Reliabilitas dan validitas konstruk work life balance di Indonesia. JPPP-Jurnal Penelitian dan Pengukuran Psikologi. 2019 Oct 30;8(2):88-94. https://doi.org/10.21009/JPPP.082.05
42. Yu L, Buysse DJ, Germain A, Moul DE, Stover A, Dodds NE, Johnston KL, Pilkonis PA. Development of short forms from the PROMIS™ sleep disturbance and sleep-related impairment item banks. Behavioral sleep medicine. 2012 Jan 1;10(1):6-24. https://doi.org/10.1080/15402002.2012.636266
43. Ubaidillah A, Nuriya VN. Pengaruh Terapi Musik Suara Alam Terhadap Kualitas Tidur Pasien Penyakit Ginjal Kronik Yang Menjalani Hemodialisis Di Ruang Rawat Inap RSD Gunung Jati. Jurnal Kesehatan Mahardika. 2017;4(1).
44. Fjeldsoe BS, Marshall AL, Miller YD. Behavior change interventions delivered by mobile telephone short-message service. American journal of preventive medicine. 2009 Feb 1;36(2):165-73. https://doi.org/10.1016/j.amepre.2008.09.040
45. Jones KE, Evans R, Forbes L, Schoenberger YM, Heaton K, Snyder S. Research on freshman and sleeping habits: A text message-based sleep intervention. Journal of American College Health. 2020 Nov 16;68(8):864-71. https://doi.org/10.4324/9780203536810
46. Fu Z, Burger H, Arjadi R, Bockting CL. Effectiveness of digital psychological interventions for mental health problems in low-income and middle-income countries: a systematic review and meta-analysis. The Lancet Psychiatry. 2020 Oct 1;7(10):851-64. https://doi.org/10.1016/S2215-0366(20)30256-X
47. Liem A, Sit HF, Arjadi R, Patel AR, Elhai JD, Hall BJ. Ethical standards for telemental health must be maintained during the COVID-19 pandemic. Asian journal of psychiatry. 2020 Oct;53:102218. https://doi.org/10.1016/S2215-0366(20)30256-X
48. Mustajab D, Bauw A, Rasyid A, Irawan A, Akbar MA, Hamid MA. Working from home phenomenon as an effort to prevent COVID-19 attacks and its impacts on work productivity. TIJAB (The International Journal of Applied Business). 2020 Apr 30;4(1):13-21. https://doi.org/10.20473/tijab.v4.i1.2020.13-21
49. Hertzog, Melody A. "Considerations in determining sample size for pilot studies." *Research in nursing & health* 31, no. 2 (2008): 180-191. https://doi.org/10.1002/nur.20247
50. Choi, Jounghwa, Ghee-Young Noh, and Dong-Jin Park. "Smoking cessation apps for smartphones: content analysis with the self-determination theory." *Journal of medical Internet research* 16, no. 2 (2014): e44. https://doi.org/10.2196/jmir.3061

51. De Man, Jeroen, Edwin Wouters, Peter Delobelle, Thandi Puoane, Meena Daivadanam, Pilvikki Absetz, Roy Remmen, and Josefien van Olmen. "Testing a Self-Determination theory model of healthy eating in a South African township." *Frontiers in Psychology* 11 (2020): 2181. https://doi.org/10.3389/fpsyg.2020.02181
52. Ntoumanis, Nikos, Johan YY Ng, Andrew Prestwich, Eleanor Quested, Jennie E. Hancox, Cecilie Thøgersen-Ntoumani, Edward L. Deci, Richard M. Ryan, Chris Lonsdale, and Geoffrey C. Williams. "A meta-analysis of self-determination theory-informed intervention studies in the health domain: Effects on motivation, health behavior, physical, and psychological health." *Health psychology review* 15, no. 2 (2021): 214-244. https://doi.org/10.1080/17437199.2020.1718529

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

DETERMINANTS, INEQUALITIES AND GEOGRAPHICAL DIFFERENCES IN COGNITIVE PERFORMANCE AMONGST THE ELDERLY POPULATION IN SOUTH KOREA

Sylvia Szabo[1], *Malay Pramanik*[2], *Sayem Ahmed*[3], *Kevin Leeson*[4]

1. Department of Social Welfare and Counselling, Dongguk University, 14620 Seoul, South Korea
2. Urban Innovation and Sustainability Program, Asian Institute of Technology (AIT), Pathumthani 12120, Thailand
3. Health Economics and Health Technology Assessment, School of Health and Wellbeing, University of Glasgow, Glasgow, UK
4. College of Sciences and Engineering, University of Tasmania, Hobart, Tasmania, Australia

Correspondence: sylviaszabo@dongguk.edu

ABSTRACT

Using the most recent 2018 Korean Longitudinal Study of Aging (KLoSA) survey data, this study aimed to examine the key determinants of cognitive impairment (CI) and to explore the inequalities and geographic differences of CI amongst the South Korean elderly population.

The findings show that being super-aged, poor general health, and lack of exercise are positively associated with CI, while household wealth, educational level, participation in social activities and regular exercise all have a significant negative effect on CI. Compared to males, female respondents are more likely to experience CI. We found little difference between the specific determinates for the two subsamples. Inequalities in the prevalence of cognitive impairment were greatest in rural areas as well as amongst the respondents living in the Chungcheong region, Seoul Metropolitan Area and the Kangwan region.

The results are helpful for the early intervention and prevention strategies to tackle the cognitive impairment problems of the elderly.

KEYWORDS

Aging; cognitive impairment; super-aged society; socio-economic inequalities; South Korea.

INTRODUCTION

Since the establishment of the Sixth Republic in 1978, South Korea has experienced a rapid demographic transition and is considered to be one of the most rapidly aging societies [1, 2]. It is estimated that 5.7% of the total population is aged 65 years or more and this is projected to reach 46% by 2067 [3]. At the same time, assuming the medium population growth scenario, South Korea's life expectancy is projected to exceed 90 years [3]. According to the United Nations (UNs) benchmarks, before 2030, South Korea is expected to become a super-aged society [4]. With its rapid transformation and relatively young social welfare system, the material, physical and mental

wellbeing of the elderly populations remains one of the key social policy issues.

Cognitive performance is a critical wellbeing factor because it is related to whether or not, individuals can manage their daily activities independently and maintain effective communications. It can also have critical health consequences, including disability and death [5]. Cognitive performance is known to decline with age regardless of the 'cognitive reserve', although epidemiological studies suggest that this reserve can be increased through lifetime educational, social and professional activities as well as lifestyle in later life [6]. Another study in South Korea has shown that the primary cause of cognitive decline is related to heredity, family history of dementia, brain trauma, disability and lifestyle [7]. Quantitative analyses of factors affecting the level of cognitive performance show that socio-economic factors, health status, health behaviour and geographical location can all constitute risk factors. For example, a recent study of an elderly population in Shanghai, China, showed that low income, non-married status and being a male were all associated with a higher probability of CI [5].

Specifically, in the South Korean context, a study conducted on 4,369 rural elderly in Sokcho found that cognitive performance was positively associated with their level of education, age, and being a female [8]. Although existing literature examines drivers of cognitive decline in later life [9, 10], recent evidence examining specific risk factors of impaired cognitive performance in South Korea is still lacking. Our study aims to fill this gap by statistically analyzing data from the most recent Korean Longitudinal Study of Ageing (KLoSA) survey. Previous literature has indicated that being aware of the potential risk factors should be a priority, as effective strategies need to be developed to prevent further cognitive impairment [11]. Thus, in addition to providing predictive models of the identified risk factors, this study will contribute to ongoing policy debate by providing a discussion on key selected policy implications in the South Korean context.

DATA AND METHODS

DATA

We used data from the 7th wave of the KLoSA (Korean Longitudinal Study on Aging) which is a comprehensive nationwide household survey designed and implemented by the Korea Employment Information Service (KEIS). It applies a multi-stage, stratified probability sampling technique using census-based enumeration districts (EDs), residence, and accommodation type [12]. The survey started in 2006 has been repeated every two years. It currently covers all regions in South Korea except for the Island of Jeju. The 7th wave was conducted in 2018 on a sample size of 6,940 consisting of 6,136 from previous panels and 804 new observations.

MEASURES

The study uses the Mini-Mental State Examination (MMSE) score, a standard measure of cognitive performance. MMSE used several domains related to thinking and learning abilities, such as memory, orientation, attention and visual-spatial skills. Based on the KLoSA classification, in line with other studies, if the MMSE is 17 or less, one can suspect dementia, if the MMSE value is between 18 and 23, it implies cognitive function decline, and if it is 24 and above, the cognitive function is normal [8, 13, 14]. For analytical purposes, in line with other studies [8, 14], we categorized this variable into a dichotomous one with values of 24 and above, indicating normal cognitive function, and the values below this threshold indicating cognitive impairment.

This study has considered standard demographic and socio-economic status measures, health outcome and health behavior variables, life satisfaction, and participation in social activities in terms of independent variables. Socio-demographic factors include age, gender, education, marital status, and household income. Age was divided into two categories (65 to less than 80 years of age, and people who are equal to or greater than 80). Education was divided into four categories based on the South Korean educational system classification (primary school, middle school, high school, and university). Living arrangements were divided into living alone and living with others. The wealth of the participants was measured by their household income and classified into wealth quintiles.

Health status was divided into three categories (very good and good, average and rather bad, and bad). This data combined the information based on a self-assessment of health status and health history. Drinking, smoking, and exercising were considered healthy behaviours. The participants were asked to choose among three options (currently drinking, not drinking, and past drinker). Regarding smoking, the participants were asked to choose among currently smoking, not smoking, and past smoker. In

terms of exercise, they were asked whether they exercise regularly or not exercise regularly. In this study, the frequency of exercising regularly is more than "at least once a week". Finally, the respondents self-assessed their life satisfaction by choosing among low, medium, and high, while participation in social activities was dichotomized and based on whether they took part in any social gathering or met close people.

DATA ANALYSIS

The chi-squared test was employed to examine differences between study subjects with cognitive impairment and those without cognitive impairment. Binary multiple logistic regression modeling was used to estimate the association between cognitive performance and different explanatory (e.g.) variables. The results of the binary multiple logistic regression analysis were expressed in OR with a confidence interval of 95%. The binary multiple regression models were specified as follows:

$$\text{logit}(Yi)=\beta 0+\beta 1X1i+\beta 2X2i+\cdots+\varepsilon i \ldots\ldots\ldots (I); \quad i=1,2\ldots n$$

Where, Yi denotes incidence of cognitive impairment with values 1 or 0 (1 = suffering from CI, 0 = normal cognition), X2i, X3i,… denote the explanatory variables included in the model, β1, β3… denotes regression coefficients adjacent to the corresponding outcome variables and εi denotes the error term.

Socio-economic inequalities were assessed using household income quintile ratios and concentration curves and indices [15-17]. We used purposeful selection procedure to select final models, as we were primarily interested in identification of risk factors rather than prediction [18]. All analyses were performed using STATA 16.

RESULTS

CHARACTERISTICS OF THE STUDY PARTICIPANTS

Characteristics of the study participants by cognitive impairment status are summarized in Table 1 (geographical distribution can be seen in supplementary material). Of all the samples, females constituted 58.1% and were more likely to suffer cognitive impairment (43.8% vs 26.3% for males). Considering age, those respondents who are classified as super-aged (80+) also had a significantly higher proportion of individuals with cognitive impairment compared to respondents in the age bracket 65-80 (63.8% vs 27.8%) Respondents who were living alone at the time of the survey and those who were not working also contained a higher proportion of individuals with cognitive impairment (49.8% and 41.2% respectively). A clear descending trend can also be noticed when considering wealth and educational level. Respondents in the wealthiest category with a university degree, having the lowest proportion of individuals with cognitive impairment (27.0% and 13.0%, respectively).

TABLE 1. CHARACTERISTICS OF THE STUDY PARTICIPANTS BY COGNITIVE IMPAIRMENT STATUS.

Independent variable	All, N (%)	Cognitive impairment n (%)	Normal cognition n (%)	p-value
Age				
65 to <80	2,643 (70.69)	733 (27.75)	1,910 (72.25)	<0.001
80+	1,096 (29.31)	699 (63.75)	397 (36.25)	
Gender				
male	1,566 (41.88)	412 (26.33)	1,154 (73.67)	<0.001
female	2,173 (58.12)	952 (43.81)	1,221 (56.19)	
Living arrangements				
living alone	798 (21.34)	397 (49.76)	401 (50.24)	< 0.001
living with others	2,941 (78.66)	952 (32.38)	1,989 (67.62)	
Employment				
yes	884	198 (22.41)	686 (77.59)	< 0.001
no	2,855	1,175 (41.17)	1,680 (58.83)	

Education				
primary school	2,044	1,067 (52.18)	977 (47.82)	
middle school	646	160 (24.81)	486 (75.19)	<0.001
high school	771	161 (20.85)	610 (79.15)	
university	278	36 (13.01)	242 (86.99)	
Income rank				
highest	585	158 (27.01)	427 (72.99)	
high	745	190 (25.45)	555 (74.55)	
medium	748	236 (31.57)	512 (68.43)	<0.001
low	862	374 (43.42)	488 (56.58)	
lowest	799	422 (52.80)	377 (47.20)	
Health status				
very good and good	709	158 (22.34)	551 (77.66)	<0.001
average	1,714	494 (28.83)	1,220 (71.17)	
rather poor and poor	1,316	716 (54.43)	600 (45.57)	
Regular exercise				<0.001
exercising regularly	1,191	267 (22.43)	924 (77.57)	
not exercising regularly	2,548	1,112 (43.66)	1,436 (56.34)	
Life satisfaction				
Low	341	225 (66.01)	116 (33.99)	<0.001
medium	2,656	979 (36.86)	1,677 (63.14)	
high	742	152 (20.45)	590 (79.55)	
Participation in social activities				
yes	2,195	557 (25.39)	1,638 (74.61)	<0.001
no	1,544	793 (51.38)	751 (48.62)	
Region				
Seoul Metropolitan Area	1,766	640 (36.26)	1,126 (63.74)	
Gyeongsang	614	228 (37.18)	386 (62.82)	<0.001
Jeolla	681	262 (38.48)	419 (61.52)	
Chungcheong	531	142 (26.69)	389 (73.31)	
Kangwon	147	75 (51.22)	72 (48.78)	

DETERMINANTS OF COGNITIVE IMPAIRMENT

The results of the regression models (Table 2) showed that age, wealth, level of education, employment status, life satisfaction, self-assessed health status, participation in social activities and regular exercise are all significant factors associated with cognitive performance. More specifically, patients aged 80+ were significantly more likely to experience cognitive impairment (OR=2.43 for the overall sample; OR=2.82 for females; OR=1.99 for males).

Compared to the respondents with the lowest level of education, respondents with a university education were significantly less likely to be diagnosed with CI (OR=0.22). Also, respondents in employment were significantly less likely to suffer from CI compared to those who did not work (OR=0.66). We did not find significant differences between the male and the female samples in terms of these determinates.

TABLE 2. ODDS RATIOS, ADJUSTED ODDS RATIOS AND 95% CONFIDENCE INTERVALS OF COGNITIVE IMPAIRMENT AMONGST THE ELDERLY IN SOUTH KOREA.

Independent variable	All respondents OR (95% CI)	All respondents AOR (95% CI)	Females OR (95% CI)	Females AOR (95% CI)	Males OR (95% CI)	Males AOR (95% CI)
Income quintile						
highest	0.36 (0.29; 0.46)***	1.05 (0.79; 1.40)	0.40 (0.30; 0.53)***	0.92 (0.64; 1.32)	0.41 (0.28; 0.60)***	1.35 (0.84; 2.16)
high	0.31 (0.25; 0.38)***	0.84 (0.64; 1.10)	0.34 (0.26; 0.44)***	0.71 (0.51; 1.00)*	0.37 (0.26; 0.53)***	1.10 (0.71; 1.71)
medium	0.41 (0.33; 0.50)***	0.86 (0.67; 1.11)	0.48 (0.37; 0.62)***	0.97 (0.70; 1.33)	0.41 (0.29; 0.59)***	0.81 (0.53; 1.23)
low	0.63 (0.52; 0.77)***	0.95 (0.75; 1.19)	0.57 (0.45; 0.73)***	0.87 (0.65; 1.15)	0.90 (0.64; 1.26)	1.18 (0.80; 1.73)
pest (ref)						
Gender						
female		1.17 (0.98; 1.40)*				
male (ref)						
Age						
80+		2.43 (2.04; 2.89)***		2.82 (2.24; 3.55)***		1.99 (1.50; 2.62)***
65 to <80 (ref)						
Living arrangements						
living alone		1.09 (0.88; 1.33)		1.10 (0.86; 1.40)		0.79 (0.51; 1.22)
living with others (ref)						
Employment						
yes		0.66 (0.54; 0.81)***		0.67 (0.51; 0.89)***		0.61 (0.46; 0.83)***
no (ref)						
Education						
university		0.22 (0.15; 0.33)***		0.25 (0.11; 0.56)***		0.22 (0.13; 0.35)***
high school		0.37 (0.30; 0.47)***		0.32 (0.23; 0.45)***		0.43 (0.32; 0.58)***
middle school		0.48 (0.39; 0.60)***		0.45 (0.34; 0.61)***		0.56 (0.40; 0.78)***
primary school (ref)						
Health status						
rather bad and bad		1.73 (1.47; 2.05)***		1.82 (1.48; 2.25)***		1.53 (1.16; 2.02)***
average or good (ref)						

Regular exercise						
not exercising regularly		1.81 (1.52; 2.16)***		1.77 (1.41; 2.24)***		1.90 (1.44; 2.50)***
exercising regularly (ref)						
Life satisfaction						
low		2.39 (1.80; 3.16)***		2.31 (1.63; 3.28)***		2.53 (1.56; 4.10)***
medium or high (ref)						
Participation in social activities						
yes		0.54 (0.46; 0.64)***		0.62 (0.51; 0.76)***		0.43 (0.33; 0.55)***
no (ref)						
Region						
Gyeongsang		1.07 (0.86; 1.33)		1.02 (0.77; 1.36)		1.09 (0.77; 1.55)
Jeolla		1.07 (0.87; 1.32)		1.13 (0.86; 1.48)		0.96 (0.68; 1.36)
Chungcheong		0.62 (0.48; 0.80)***		0.60 (0.44; 0.83)***		0.63 (0.42; 0.95)**
Kangwon		1.61 (1.08; 2.40)		1.92 (1.08; 3.41)**		1.35 (0.77; 2.37)
Seoul Metropolitan Area (ref)						
constant	1.27 (1.10; 1.46)***	0.55 (0.40; 0.75)***	1.57 (1.33; 1.86)***	0.61 (0.42; 0.88)***	0.75 (0.58; 0.98)**	0.60 (0.37; 2.37)**
n	3,739	3,739	2,173	2,173	1,566	1,566

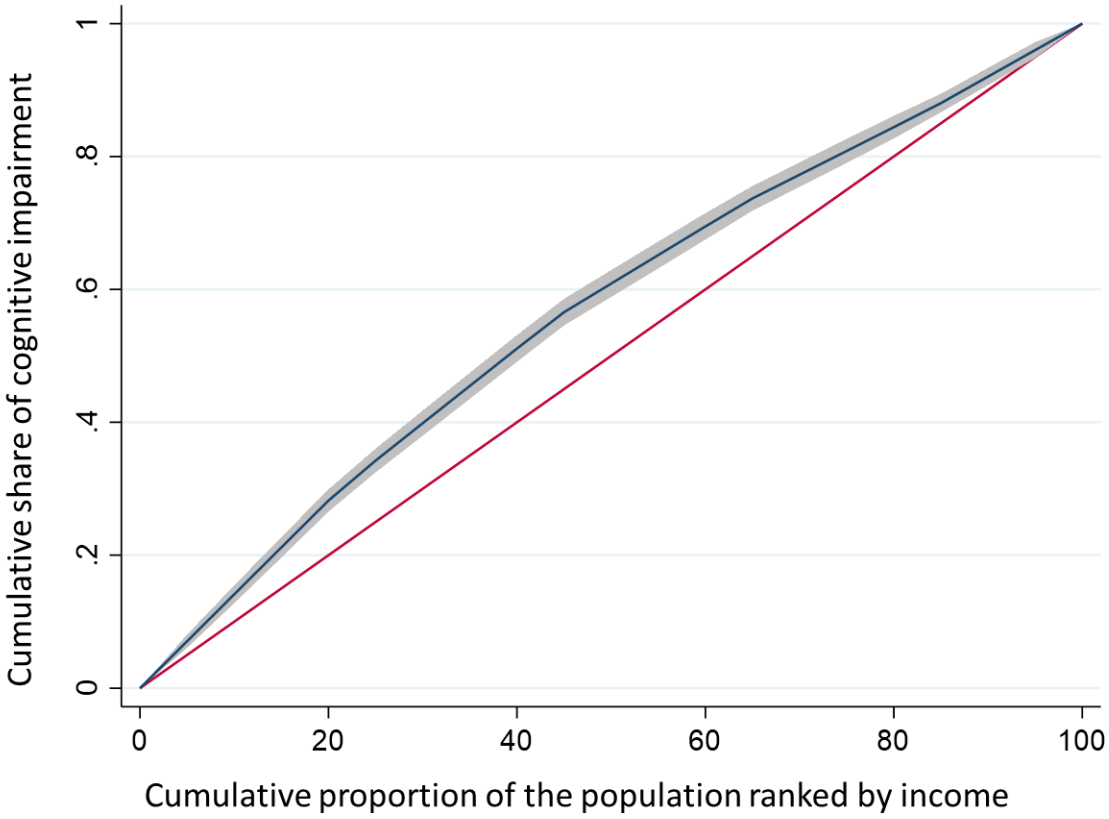
* p < 0.1, ** p < 0.05, *** p < 0.01

SOCIO-ECONOMIC INEQUALITIES

Figure 1 shows the income-based inequalities in the prevalence of cognitive impairment amongst the elderly in South Korea. The difference between the distribution of this variable, between the richest and the poorest population quintiles, was 25.8%. The relative inequality measured by the rich to poor quintile ratio was 2.0 for the overall sample. The negative value of the Wagstaff concentration index (-0.24) indicates that the prevalence of cognitive impairment was disproportionately distributed amongst the poorest strata of the population.

A similar analysis conducted for each wider region in South Korea shows that the greatest inequalities existed in the Chungcheong region (CC=-0.35, QR=3.53), followed by the Seoul Metropolitan Area and the Kangwon region (CC=-0.25, QR=2.1 and CC=-0.34, QR=2.5 respectively). In contrast, the smallest wealth-based inequalities in the prevalence of cognitive impairment were found in the Gyeongsang region (CC=-0.14, QR=1.1). See Fig. S3 and S4 (supplementary material) for more details.

FIGURE 1. CONCENTRATION CURVE MEASURING THE INCOME-BASED INEQUALITIES IN THE PREVALENCE OF COGNITIVE IMPAIRMENT AMONGST THE ELDERLY IN SOUTH KOREA. NOTE: CC= -0.24.



DISCUSSION AND CONCLUSIONS

This study is aimed at examining the factors influencing cognitive impairment amongst the elderly population in South Korea. The results of our analyses show that respondents' age, household wealth, level of education, employment status, participation in social activities, geographical location, and regular exercise are key determinants of cognitive performance for this population. The factors associated with cognitive impairment are similar for males and females, although age has a more substantial effect in the female sub-sample (OR=2.82 vs OR=1.99 for males). In comparison, participation in social activities has a stronger impact in the male sub-sample (OR=0.43 vs OR=0.62 for females).

The results of this study are largely in line with the existing literature on cognitive performance. For example, a study conducted among the rural elderly residents in South Korea's Sokcho area showed that education was positively associated with cognitive impairment [8]. Those with a mean education below six years were significantly more

likely to suffer from cognitive impairment. In line with our results, existing research also found that age and gender are both positively associated with lower cognition (stronger association was found among the female respondents) [8]. However, contrary to our results, living status was found to be a significant predictor of cognitive impairment [8]. Other studies have shown that living does not have a direct effect on cognitive performance but can affect it indirectly through the association with loneliness and social isolation (19, 20). The results of this study are consistent with recent research conducted in Spain, where it was observed that loneliness and social isolation are significantly associated with cognitive performance [21].

In accordance with our results, existing studies on the determinants of cognitive performance also found that educational level is positively associated with cognitive function amongst the elderly. The results are also consistent with the results of a recent study conducted amongst a middle-aged cohort in the USA [22]. This study showed that higher income and a higher level of education were both significantly associated with decreased mean total latency and a reduced number of trials required to reach criterion in the serial digit learning test (SDLT). These factors are strongly associated with varied levels of cognitive performance [22].

The prevalence of cognitive impairment amongst the elderly is higher in the poorest section of Jeolla, followed by Seoul Metropolitan Area, and the Kangwan region. However, the poorest elderly in the rural households have a higher prevalence of cognitive impairment compared to cities and small to medium towns. These results are also consistent with existing research, which found that cognitive impairment of elderly people is very high in the rural areas when compared to those living in cities [8].

While this study advances the knowledge on the determinants of cognitive performance amongst the elderly, it is not without limitations. Firstly, some variables (e.g., life satisfaction), are based on respondents' subjective assessment and could have been affected by their feelings or mood during the survey. Self-reported income and assets may have not fully captured any seasonal variations. Secondly, this study is based on a cross-sectional design and therefore, it could not capture any temporal variations in the prevalence or determinants of cognitive impairment. Future studies might therefore, consider trends or panel data analyses. Thirdly, although some efforts were made by the Panel Survey Organization of the Korea Employment Information Service to minimize bias (e.g., through training survey investigators), they could not exclude recall or response bias that could affect our findings.

As the youth and working-age population in South Korea continues to decrease, the proportion of the elderly is projected to exceed 20 percent of the overall population by 2026. Therefore, it is timely for the South Korean Government to have an even greater policy focus on the health and wellbeing of the elderly by investing further in mental health care [23]. Medical checks, such as routine screening for cognitive impairment in older adults (more than 65 years), and promotion of healthy diet and exercise, have a positive effect [24, 25]. There is also an urgent need to promote and implement anti-ageism policies in the workplace. More specifically, increased efforts are needed to enforce an age-diverse work culture that retains experienced workers over 50 years of age and creates part-time opportunities for those in retirement and low-income, or those wishing to stay in employment.

The comprehensive nature of the data collection and the inclusion of level of education, geographic location, participation in social activities, and regular exercise in this study will add new evidence to the existing literature. It will also provide further information to studies examining cognitive performance for different categories of age and gender.

This study contributes to the growing body of literature with cross-sectional evidence, and the common paths and risk factors that can lead to cognitive impairment. It is anticipated that our results will also be helpful for informing early intervention for prevention strategies with consideration to physical, social, and nutritional requirements to address cognitive impairment problems of the elderly.

CONFLICT OF INTEREST.

The Authors declare that there is no conflict of interest.

ETHICAL STATEMENT

N/a (this study is based on secondary data made available by the Korea Employment Information Service (KEIS).

References

1. Lee W, Yoon JH, Koo JW et al. Predictors and estimation of risk for early exit from working life by poor health among middle and older aged workers in Korea. Sci Rep. 2018; 26;8 (1):5180. doi: 10.1038/s41598-018-23523-y.
2. Um J, Zaidi A & Choi SJ. Active Ageing Index in Korea – Comparison with China and EU countries. Asian Soc Work Pol Rev. 2019; 13: 87–99. https://doi.org/10.1111/aswp.12159
3. Statistics Korea. Population Projections for Korea (2017~2067). 2019.
4. Koohsari MJ, Nakaya T & Oka K. Activity-Friendly Built Environments in a Super-Aged Society, Japan: Current Challenges and toward a Research Agenda. International Journal of Environmental Research and Public Health. 2018; 15(9), 2054. https://doi.org/10.3390/ijerph15092054 .
5. Ren L, Zheng Y, Wu L, Gu Y, He Y, Jiang B, Zhang J, Zhang L, Li J. Investigation of the prevalence of Cognitive Impairment and its risk factors within the elderly population in Shanghai, China. Sci Rep. 2018; 23;8(1):3575. doi: 10.1038/s41598-018-21983-w. PMID: 29476112; PMCID: PMC5824836.
6. Stern Y, Barnes CA, Grady C, Jones RN, Raz N. Brain reserve, cognitive reserve, compensation, and maintenance: operationalization, validity, and mechanisms of cognitive resilience. Neurobiol Aging. 2019; 83:124-129. doi: 10.1016/j.neurobiolaging.2019.03.022. PMID: 31732015; PMCID: PMC6859943.
7. Lee HJ, Jang J, Choi DW et al. Association between change in lifestyle and cognitive functions among elderly Koreans: findings from the Korean longitudinal study of aging (2006–2016). BMC Geriatr. 2020; 20, 317. https://doi.org/10.1186/s12877-020-01693-7
8. Kim H, Lee S, Ku, BD, Ham SG, Park WS. Associated factors for cognitive impairment in the rural highly elderly, Brain and Behavior. 2019. doi.org/10.1002/brb3.1203
9. Boyle PA, Wang T, Yu L, Wilson RS, Dawe R, Arfanakis K, Schneider JA, Bennett DA. To what degree is late life cognitive decline driven by age-related neuropathologies? Brain. 2021 Aug 17;144(7):2166-2175. Doi: 10.1093/brain/awab092. PMID: 33742668; PMCID: PMC8370442.
10. Wang XJ, Xu W, Li JQ, Cao XP, Tan L, Yu JT. Early-Life Risk Factors for Dementia and Cognitive Impairment in Later Life: A Systematic Review and Meta-Analysis. J Alzheimers Dis. 2019;67(1):221-229. doi: 10.3233/JAD-180856. PMID: 30636739.
11. Shin S. Factors Influencing Cognitive Dysfunction in Korean Patients with Rheumatoid Arthritis. 2020; 22(3):197-204.
12. Lee J. KLoSA—Korean Longitudinal Study of Aging, Korean Journal of Family Medicine 2020; 41(1):1-2
13. Korean Institute of Labor Studies (KIES) (2019) KLOSA User Guide.
14. Hwang J, Park S & Kim S. Effects of Participation in Social Activities on Cognitive Function Among Middle-Aged and Older Adults in Korea, International Journal of Environmental Research and Public Health. 2018; 15, 2315; doi:10.3390/ijerph15102315.
15. Wagstaff A. The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality. Health Econ. 2005; 14: 429–32.
16. Szabo S, Hajra R, Baschieri A, Matthews Z. Inequalities in Human Well-Being in the Urban Ganges Brahmaputra Meghna Delta. Sustainability. 2016; 8, 608. https://doi.org/10.3390/su8070608
17. Hasan MM, Tasnim F, Tariqujjaman M, et al. Examining the prevalence, correlates and inequalities of undiagnosed hypertension in Nepal: a population-based cross-sectional study. BMJ Open 2020;10:e037592. doi:10.1136/ BMJ open-2020-037592.
18. Bursac, Z., Gauss, C.H., Williams, D.K. et al. Purposeful selection of variables in logistic regression. Source Code Biol Med 3, 17 (2008). https://doi.org/10.1186/1751-0473-3-17
19. Wang B, He P & Dong B. Associations between social networks, social contacts, and cognitive function among Chinese nonagenarians/centenarians. Archives of Gerontology and Geriatrics, 2015; 60, 522–527. https://doi.org/10.1016/j.archger.2015.01.002.
20. Evans IEM, Llewellyn DJ, Matthews FE, Woods RT, Brayne C, Clare L; CFAS-Wales research team. Living alone and cognitive function in later life. Arch Gerontol Geriatr. 2019; 81:222-233. doi: 10.1016/j.archger.2018.12.014.
21. Lara E, Caballero FF, Rico-Uribe LA, Olaya B et al. Are loneliness and social isolation associated with

cognitive decline? Int J Geriatr Psychiatry. 2019; 34(11):1613-1622. doi: 10.1002/gps.5174.

22. Zhu S, Zhao J, Chen Z, Wang Y. Influential factors on cognitive performance in middle-aged cohort: Third National Health and Nutrition Examination Survey-based study. Medicine (Baltimore). 2018; 97(37):e12033. doi: 10.1097/MD.0000000000012033.
23. United Nations, Department of Economic and Social Affairs, Population Division World Population Prospects 2019: Data Booket. ST/ESA/SER.
24. Smith PJ, Blumenthal JA. Diet and neurocognition: review of evidence and methodological considerations. Curr Aging Sci. 2010; 3:57–66.
25. Smith PJ & Blumenthal JA. Dietary Factors and Cognitive Decline. The journal of prevention of Alzheimer's disease. 2016; 3(1), 53–64. https://doi.org/10.14283/jpad.2015.71.

SUPPLEMENTARY MATERIAL: SOCIO-ECONOMIC INEQUALITIES IN THE PREVALENCE OF COGNITIVE IMPAIRMENT

FIGURE S1. REGION-WISE NUMBER OF PARTICIPANTS BY COGNITIVE IMPAIRMENT (LEFT) AND NORMAL COGNITION STATUS (RIGHT) IN SOUTH KOREA.

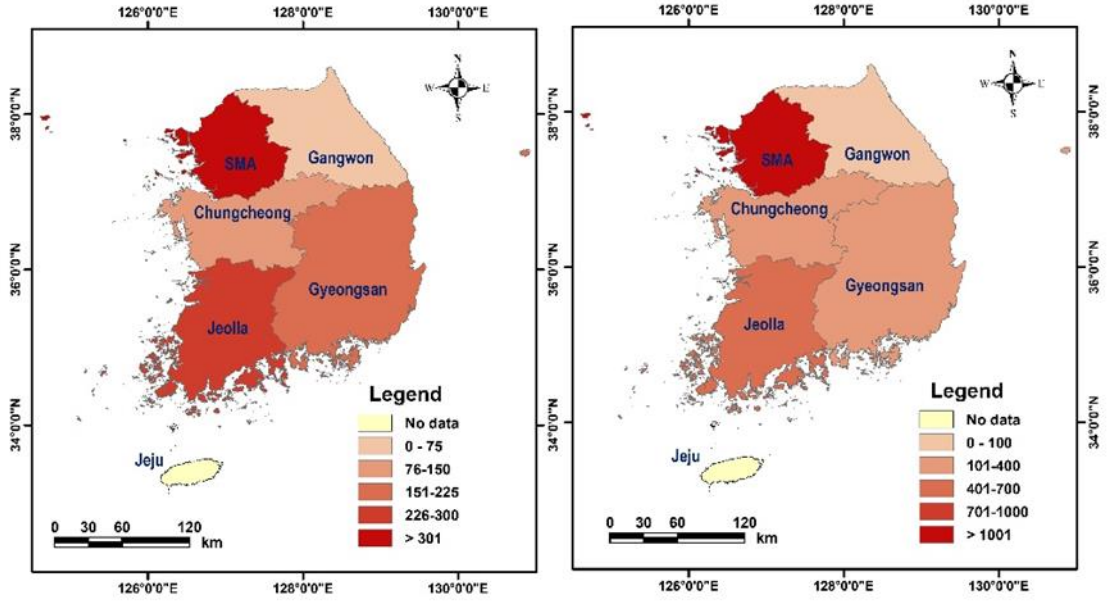


FIGURE S2. MODEL PREDICTED ODD-RATIOS OF THE COGNITIVE IMPAIRMENT OF ALL RESPONDENTS (LEFT), FEMALE (MIDDLE), AND MALE (RIGHT) AMONGST THE ELDERLY IN THE SOUTH KOREAN REGION.

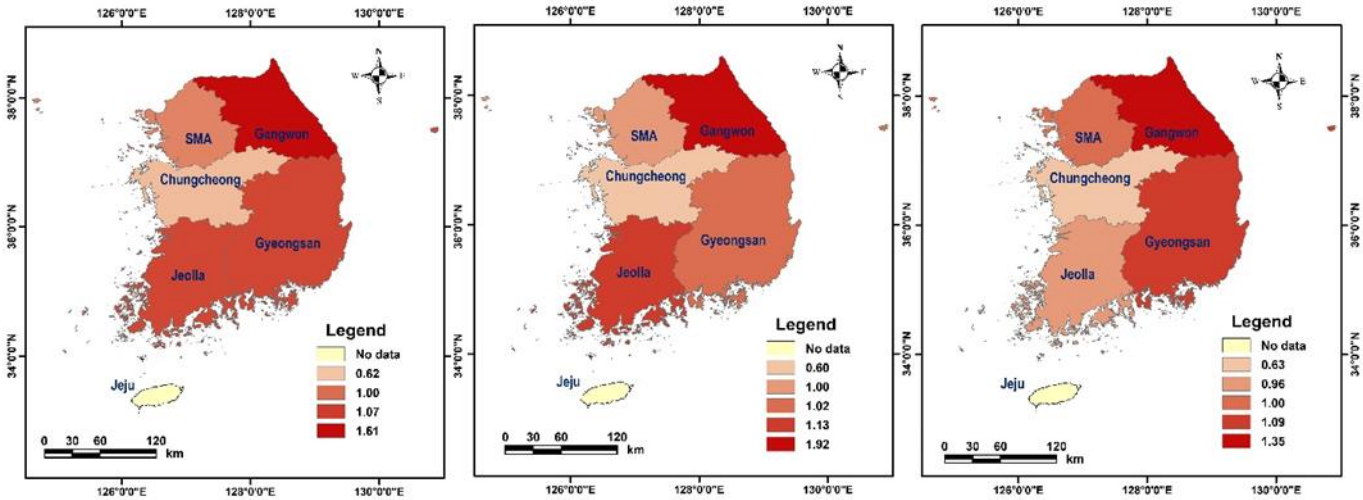
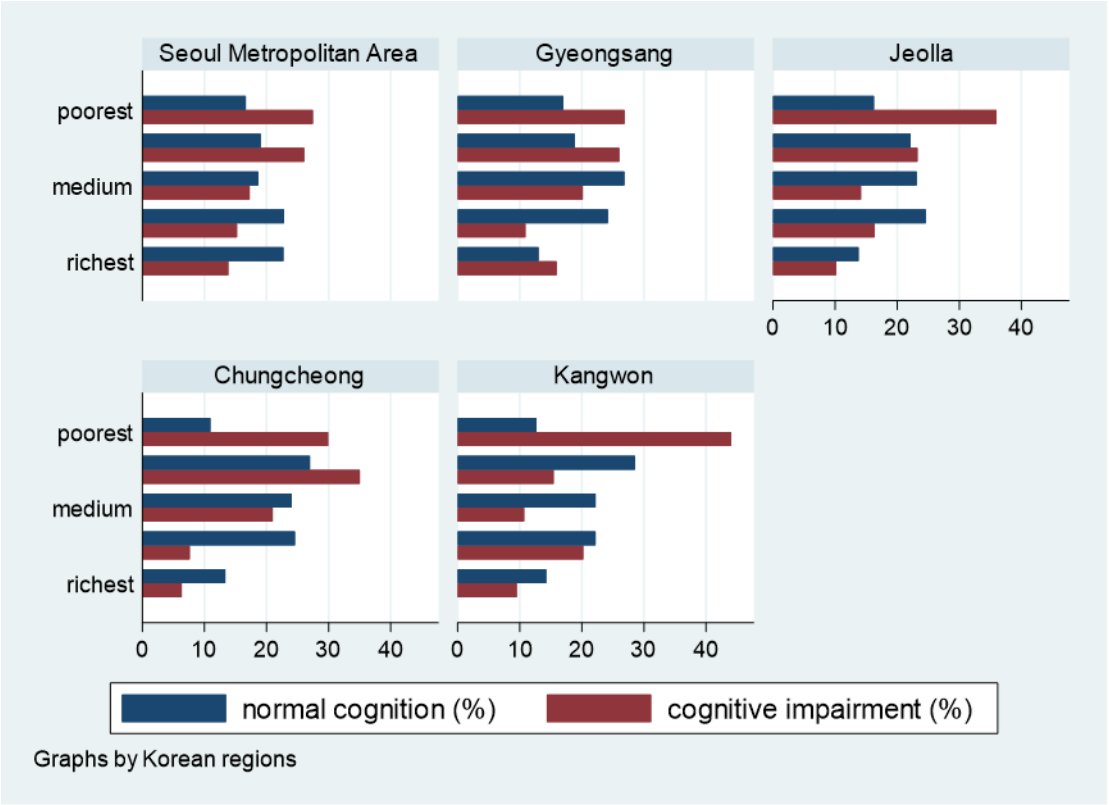
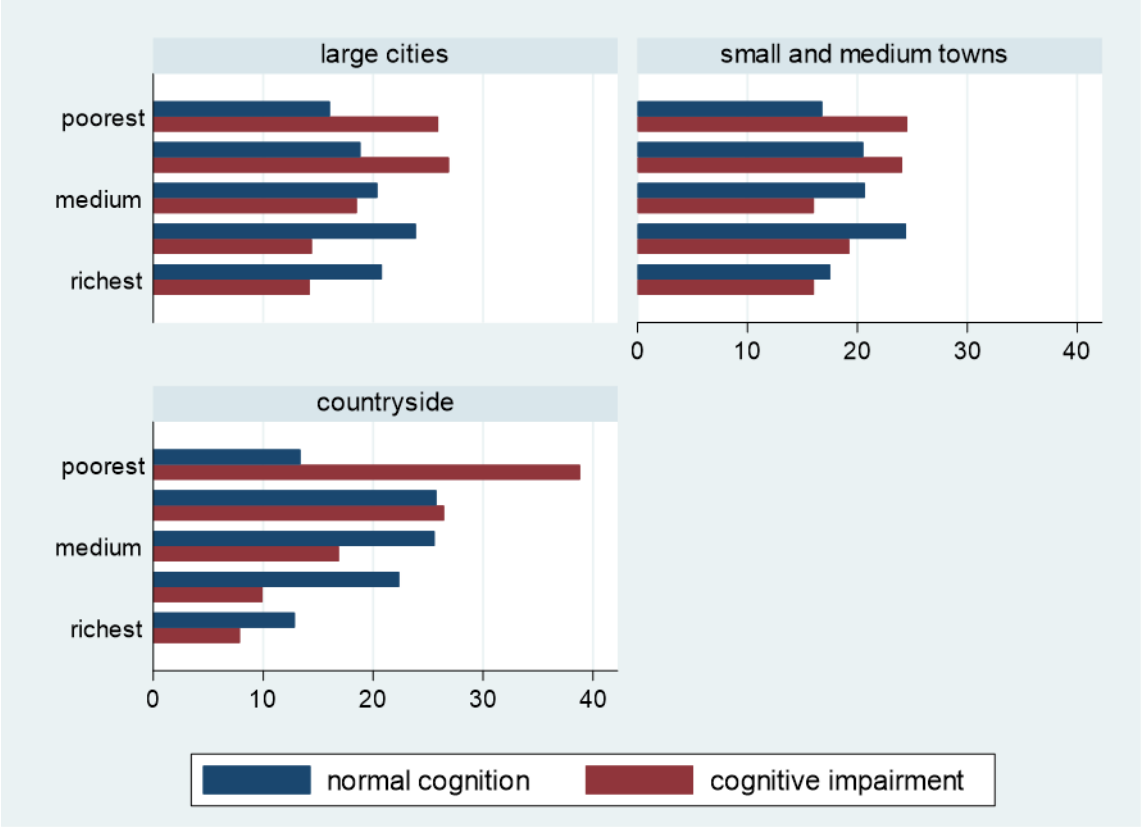


FIGURE S3. SOCIO-ECONOMIC INEQUALITIES IN THE PREVALENCE OF COGNITIVE IMPAIRMENT AMONGST THE ELDERLY IN SOUTH KOREA. NOTE: SEOUL METROPOLITAN AREA (SMA): CC=-0.25, QR=2.1; GYEONGSANG: CC=-0.14, QR=1.1; JEOLLA: CC=-0.23, QR=1.9; CHUNGCHEONG: =-0.35, QR=3.53; KANGWON: CC=-0.34, QR=2.5.



IGURE S4. SOCIO-ECONOMIC INEQUALITIES IN THE PREVALENCE OF COGNITIVE IMPAIRMENT AMONGST THE ELDERLY IN SOUTH KOREA. NOTE: LARGE CITIES: CC=-0.22, QR=1.9 SMALL AND MEDIUM TOWNS: CC=-0.15, QR=1.4; COUNTRYSIDE: CC=-0.35, QR=2.4



ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

THE IMPACT OF ON-CAMPUS HEALTH PROMOTION ACTIVITIES ON HEALTHY LIFESTYLE BEHAVIOURS OF INDIAN UNIVERSITY STUDENTS

Manisha N. Gore[1], Rajiv C. Yeravdekar[2], Kavitha Menon[3]*

1. Symbiosis Community Outreach Programme and Extension, Faculty of Medical and Health Sciences, Symbiosis International (Deemed University), Lavale, Mulshi, Pune, Maharashtra, India 412115
2. Provost, Faculty of Medical and Health Sciences, Symbiosis International (Deemed University), Lavale, Mulshi, Pune, Maharashtra, India 412115
3. Nutrition and Dietetics Programme, Symbiosis Institute of Health Sciences, Faculty of Medical and Health Sciences, Symbiosis International (Deemed University), Lavale, Mulshi, Pune, Maharashtra, India 412115

Correspondence: kavitha.menon3@gmail.com; kavitha@sihspune.org

ABSTRACT

BACKGROUND:

A paucity of information exists on the impact of health-promoting activities conducted in low-and-middle-income country settings including Indian Higher Education Institution (HEI). Health promoting universities offer a variety of on-campus health promotion activities to improve the health and lifestyle of the university students. However, the information on the impact of such programmes is scanty.

AIM:

The study aimed to assess the university students' Health-Promoting Lifestyle Profiles (HPLP) before and after exposure to the ongoing on-campus health promotional activities for one year.

METHODS:

All freshmen admitted to an international university in India, with campuses across the major cities, were enrolled in the study. The study was conducted in two phases; phase 1 assessed the baseline existing HPLP scores of these students and phase 2 investigated the impact of on-campus health promotion activities for one year on the HPLP scores, a proxy for healthy lifestyle behaviour.

RESULTS:

The total HPLP scores differed significantly between the two phases (137.9 vs 130.9; p=0.000). Similarly, a significant increase in physical activity scores between the two phases was observed (17.8 vs 19.5; p=0.000). A gender-wise comparison of total and sub-scale HPLP scores of phase I reported significantly higher total HPLP, health responsibility, nutrition, and interpersonal sub-scale scores in females; and significantly higher physical activity scores in males (18.5 vs 17.3; p=0.000). In phase 2, females had significantly higher scores in total HPLP, nutrition, interpersonal, and physical activity sub-scale scores. In both phases females had significantly higher total HPLP scores than males (Phase 1: 137.6 vs 139.8; p=0.000; Phase 2 130.6 vs 131.3; p=0.000).

CONCLUSIONS:

A gender-wise difference on the impact of on-campus health promoting activities with higher impact on females was observed. A more focused, systematic, and targeted approach through curricular, co-curricular and extracurricular courses may further improve the HPLP scores of Indian university students.

KEYWORDS
health promotion, physical activity, nutrition, university students, India, higher education institutes

INTRODUCTION

Higher Educational Institutions (HEIs) have the potential to promote health and inculcate healthy lifestyle practices in young adults.[1] The concept of a Health Promoting University (HPU) is gaining importance and positions the University as a unique platform for attaining the above objective.[2]

Students at HEIs are in a phase of transition from adolescence to adulthood, experiencing changes in mind, body, and social relationships.[3]. In addition, they are exposed to academic pressures and peer influences, leading to unhealthy lifestyle practices.[4]. Evidence indicates that at least half of the young adults have inappropriate food/diet habits and poor nutritional status.[4] Further, students have low physical activity levels and difficulty handling stress and interpersonal relations. [5,6,7,8] Therefore, supporting these young adults with healthy lifestyle practices through appropriate health promotion initiatives, implemented on an ongoing basis, could reduce their risk for NCDs, including mental health challenges. [9,10,11]

At the HEI, health promotion strategies could be provided through various curricular, co-curricular and extracurricular activities. Many HEIs have implemented interventions to improve nutrition, physical activity and offer weight management programmes to improve the health and wellbeing of university students with modest benefits.[4]. However, most such studies that evaluated the potential interventions were conducted in developed country settings and contextualising such health promotion activities to the Indian settings may be challenging due to the lack of cultural appropriateness, less adaptability and feasibility.

A paucity of information exists on the effects of health-promoting interventions or programmes conducted in Indian HEI settings. Information on the beneficial effects of such programmes or interventions could be helpful to many other universities and colleges across India or in other low-and-middle-income country settings. Additionally, in Indian context, an earlier study reported gender as a potential predictor of healthy lifestyle behaviours among Indian university students.[12] It is imperative to mitigate the gender-wise differences in healthy lifestyle profiles of young university students and interventions in such settings play an important role. Therefore, the study aimed to assess university students' Health-Promoting Lifestyle Profiles (HPLP) before and after exposure to the ongoing on-campus health promotional activities and explore whether these promotional activities improved their HPLP scores. Improvement in the HPLP scores was considered as a proxy for adapting healthy lifestyle and behaviour.

MATERIALS AND METHODS

STUDY SETTING

All freshmen admitted to an international university in Maharashtra in the academic year (AY) 2015-16 were enrolled for this study. The study was conducted in two phases; phase 1: to assess the baseline existing health-promoting lifestyle practices of these students using the HPLP scale, [12] and phase 2: to determine the same after their exposure to health promotion activities for two years (first-year students of AY 2015-16 who had by then became 2nd-year students). The HPLP scale was used to assess the health promoting lifestyle scores of HEI students because the scale was validated for Indian context with an internal consistency of 0.7 to 0.83, was an easy-to-administer scale widely used in the young populations from diverse settings. [13] Also, the overall HPLP scale was shown to have a high internal consistency and test-retest reliability.[14]

Phase 1 data were collected between June – August 2015, wherein first-year students of graduate and post-graduate programmes across seven faculties viz: Health and Biological Sciences, Media Communication and Design, Humanities and Social Sciences, Computer Studies, Management, Engineering and Law were enrolled. These students were spread across 28 institutes at five campuses of the University at Pune, Hyderabad, Bengaluru, Noida and Nashik. After seeking permission from the respective authorities, a Google form was shared with students on their group email ids of the individual class to explain the details of the study. Written informed consent was obtained from the participants. The number of enrolled participants for

phases 1 and 2 were 4,253 and 3,575 respectively. All freshmen admitted to the different institutions during their induction period in the first year were included in the study based on their willingness to participate in the study. In the phase 2, the same cohort of students was followed up to their second year.

Briefly, in Phase 1, trained researchers collected data from students using a pretested HPLP questionnaire, including a brief section on the socio-demographic questionnaire. All fresher students who consented to participate, and agreed to provide data were included in the study. The details of phase 1, protocols used, data collection, and data analysis are published elsewhere.[12] The sociodemographic section of the questionnaire collected information on age, gender, faculty and institution wherein students were enrolled, zone (i.e. place of permanent residence of the students aligned to four zones- East, West, North and South), original residential location (i.e. urban vs rural), and location of the institute. The modified HPLP scale was used to assess the health-promoting behaviour and emotional wellbeing of students through self-initiated actions, and perceptions that enhance the level of wellness, self-actualisation, and fulfilment.[15] The health-promoting lifestyle of the university students was collected using an HPLP questionnaire. The HPLP questionnaire was a Likert scale with a score range 1-4, 1 = never, 2 = sometimes, 3 = often, and 4 = routinely. Further information regarding the HPLP scale used in the present study is available elsewhere.[12] A higher score on the HPLP scale indicated healthier lifestyle choices and participation in healthy lifestyle activities.

In phase 2, all the students who participated in phase 1 were followed up (n=4,253), and their healthy lifestyle scores were reassessed using the HPLP scale. Data were collected only from consenting students and students who did not opt out of the follow-up study (n=3,575). Ethical approval was re-obtained from the Independent Ethics Committee (IEC) of the University.

The university, being a Health Promoting University, has Recreation & Wellness Centres (RWCs), a Centre for Yoga and a health centre on each of its campuses. The RWC & Centre for Yoga organised different recreational and wellness activities on an ongoing basis for all the students in the university. Similarly, the Health Centre organised annual health check-ups, health promotion sessions and health promoting activities for all enrolled students in the university. All participants of this study were encouraged to attend these health promotion activities organised on the campuses on a regular basis.

The data on different health promotion activities of the above two centres were collated (between August 2015 to August 2016) to understand the type, nature & number of ongoing health promotion activities on the campuses under the study. Later, the activities were aligned under respective HPLP sub-scales based on health responsibility, physical activity, nutrition, stress management, interpersonal relationship, and spiritual growth. The study assumed that all freshmen who participated in the phase 1 study were exposed to a series of health promotion activities in the subsequent one year (i.e., 2015-16) organised on the university campuses. We believe that participation in these health promotion activities might have benefitted students by improving their HPLP scores.

The data for the same participants for phase 1 and phase 2 was retrieved, cleaned, and validated. Statistical analyses were conducted using SPSS software (version 23). Descriptive statistics such as frequency, percentages, mean, and standard deviation summarised the participant profile and HPLP scores. Chi-square was applied to study the association between the sociodemographic variables between phase 1 and phase 2. Repeated measures of the ANOVA test were applied to investigate the mean differences in the total HPLP scores between the zones and faculty. Further, paired t-tests were used to assess the mean gender-wise differences in total HPLP and sub-scale scores and test the difference in the total HPLP and sub-scale scores between phases 1 and 2. P-value <0.05 was considered significant in all statistical tests.

RESULTS

The study was conducted at 28 institutes across India. A total of 4,253 and 3,575 university students participated in phases 1 and 2, respectively, from 5 campuses. The students were of the same cohort followed up in the second year of the university who were exposed to varied health promotion activities in the university. The attrition rate for the study was 16% (678 participants) over the one-year phase.

A comparison of phase I and 2 socio-demographic characteristics was presented (Table 1). The study participants comprised of 46% (n=1792) females and 54% males (n=2130) in phase 1 and 45.2% (n=1617) females and

54.8% males (n=1,958) in phase 2 (Table I). The proportion of young adults in the age group (i.e., 16-≤25 years) was higher than the older age group (i.e., >25-45 years) in both phases (Table I). In phase 2, the proportion of participants from Science, Technology, Engineering and Medicine (STEM) disciplines was significantly higher than students of Management and Law (P=0.000). Further, the zone-wise distribution of students varied significantly between the two phases (p=0.000). A zone-wise comparison of total HPLP scores reported a significant difference, with the highest score in the West zone (135.2) and the lowest in the East zone (122.0) (data not presented). Similarly, faculty-wise distribution of total HPLP scores indicated significantly higher scores in participants from STEM faculty compared to management and law and social sciences (133.1 vs 130.8 vs 129.4; p=0.000) (data not presented). International students from different low-and-middle-income countries (LMICs) constituted (1.8% and 2.1% of the study participants) who had participated in phase 1 & phase 2, respectively (Table-1).

The data indicated a difference in the number of students between the two phases- an increase in the participants from the Hyderabad campus compared to a decrease in the number of students from the Nasik campus (Table 2). More Pune students participated in the study in both phases than other campuses across India (n=3,522 vs n=2,995).

The total and sub-scale HPLP scores and a similar gender-wise comparison of the HPLP scores were presented (Table 3). The total HPLP scores differed significantly between the two phases (i.e., 137.9 vs 130.9; p=0.000). Similarly, a significant increase in physical activity scores between the two phases was observed (17.8 vs 19.5; p=0.000). Conversely, a significant decrease in the sub-scale scores of health responsibility (24.2 vs 17.7; p=0.000), nutrition (21.3 vs 19.5; p=0.000) and spiritual growth (27.1 vs 26.7; p=0.000) was observed after a one-year follow-up. A comparison of females' total and sub-scale HPLP scores between the two phases reported a significant decrease in total and all subscale scores except physical activity (17.3 vs 19.6; p=0.000). On the other hand, comparing the total and sub-scale HPLP scores of males between the two phases showed a significant decrease in total health responsibility and nutrition scores. However, a significant increase in physical activity (18.5 vs 19.5; p=0.000) and stress management (20.4 vs 20.6; p=0.001) scores were observed between the two phases in males. The sub-scale scores of interpersonal relations and spiritual growth remained unchanged over the two-year phase (Table 3).

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF INDIAN UNIVERSITY STUDENTS

Parameters	Phase 1 n=4253	Phase 2 n=3575	*P* value
	% (n)		
Age (Years)[1]	20.2 (2.9)	21.6 (2.9)	0.0001
16–≤25	96.1 (3990)	86.8 (3103)	0.990
>26–45	3.9 (161)	13.2 (472)	
Gender			
Females	45.7 (1792)	45.2 (1617)	0.440
Males	54.3 (2310)	54.8 (1958)	
Faculty			
STEM[2]	17.9 (755)	24.2 (865)	
Management and Law	51.5 (2152)	43.9 (1568)	0.000
Social Sciences, Humanities and Media-communication	30.6 (1290)	31.9 (1142)	
Location of the students			
Urban	96 (3540)	93.5 (3343)	0.235
Rural	4 (147)	6.4 (232)	
Zones			
East	6.9 (269)	10.2 (360)	
West	48.7 (1887)	48.1(1687)	0.000
North	28.1 (1171)	28.7(1008)	
South	14.1 (546)	12.8(450)	
Residential status			
Domestic students	98.2% (3873)	97.9 (3503)	0.083
International students	1.8% (71)	2.1 (72)	

[1]Mean (SD) = Mean (Standard deviation); [2]STEM= Science, Technology, Engineering and Mathematics

TABLE 2: NUMBER OF STUDENTS PARTICIPATED IN THE STUDY FROM DIFFERENT CAMPUSES ACROSS INDIA

Sl No	Name of the campus	Number of institutes	Phase I	Phase 2
1	Pune	21	3597	2995
2	Hyderabad	2	91	150
3	Bangalore	2	216	187
4	Noida	2	218	224
5	Nashik	1	91	19
	Total	**28**	**4253**	**3575**

TABLE 3: TOTAL, SUB-SCALES AND GENDERWISE HPLP SCORES OF PHASES 1 AND 2

Scales (scores)	Expected (Min, Max)	Total HPLP Scores n (Mean (SD)					Females n (Mean (SD)					Males n (Mean (SD)				
Scores		Phase I		Phase 2		*P* value	Phase 1		Phase 2		*P* value	Phase 1		Phase 2		*P* value
Health responsibility	9, 36	4236	24.2 (3.4)	3575	17.74 (2.8)	0.000	1788	24.6 (2.8)	1617	17.8 (2.8)	0.000	2129	24.0 (3.2)	1958	17.66 (2.7)	0.000
Physical activity	7, 28	4231	17.8 (4.3)	3575	19.54 (4.06)	0.000	1788	17.3 (4.1)	1617	19.6 (4.1)	0.000	2125	18.5 (4.2)	1958	19.55 (4.04)	0.000
Nutrition	9, 36	4225	21.3 (4.3)	3575	19.59 (3.1)	0.000	1787	21.9 (3.8)	1617	19.6 (3.1)	0.000	2116	21.1 (3.9)	1958	19.59 (3.1)	0.000
Stress management	8, 32	4219	20.4 (3.9)	3575	20.6 (3.7)	0.021	1786	21.0 (3.4)	1617	20.7 (3.6)	0.000	2117	20.4 (3.6)	1958	20.61 (3.7)	0.001
Interpersonal relations	9, 36	4227	26.9 (5.3)	3575	26.68 (4.7)	0.007	1782	27.7 (4.2)	1617	26.8 (4.7)	0.000	2106	27.1 (4.5)	1958	26.6 (4.7)	0.274
Spiritual growth	9, 36	4192	27.1 (5.6)	3575	26.72 (5.4)	0.000	1779	27.6 (4.5)	1617	26.8 (5.4)	0.000	2099	27.5 (4.7)	1958	26.6 (5.3)	0.180
Total HPLP scores	**50, 200**	**4237**	**137.9 (19.3)**	**3575**	**130.94 (16.3)**	**0.000**	**1791**	**139.8 (15.9)**	**1617**	**131.3 (16.7)**	**0.000**	**2130**	**137.6 (18.8)**	**1958**	**130.6 (16.06)**	**0.000**

TABLE 4: GENDERWISE COMPARISON OF TOTAL HPLP AND SUB-SCALE SCORES FROM PHASE 1 AND PHASE 2

Scales (scores)	Expected (Min, Max)	Phase 1				*P* value	Phase 2				*P* value
Scores		Males		Females			Males		Females		
		n	Mean (SD)	n	Mean (SD)		n	Mean (SD)	n	Mean (SD)	
Health responsibility	9, 36	2129	24.0 (3.2)	1788	24.6 (2.8)	0.000	1958	17.7 (2.7)	1617	17.8 (2.8)	0.796
Physical activity	7, 28	2125	18.5 (4.2)	1788	17.3 (4.1)	0.000	1958	19.6 (4.0)	1617	19.6 (4.1)	0.007
Nutrition	9, 36	2116	21.1 (3.9)	1787	21.9 (3.8)	0.000	1958	19.6 (3.1)	1617	19.6 (3.1)	0.009
Stress management	8, 32	2117	20.4 (3.6)	1786	21.0 (3.4)	0.000	1958	20.6 (3.7)	1617	20.7 (3.6)	0.872
Interpersonal relations	9, 36	2106	27.1 (4.5)	1782	27.7 (4.2)	0.000	1958	26.6 (4.7)	1617	26.8 (4.7)	0.006
Spiritual growth	9, 36	2099	27.5 (4.7)	1779	27.6 (4.5)	0.300	1958	26.6 (5.3)	1617	26.8 (5.4)	0.313
Total HPLP scores	**50, 200**	**2130**	**137.6 (18.8)**	**1791**	**139.8 (15.9)**	**0.000**	**1958**	**130.6 (16.1)**	**1617**	**131.3 (16.7)**	**0.000**

TABLE 5: HEALTH PROMOTION ACTIVITIES CONDUCTED IN DIFFERENT INSTITUTES FOR STUDENTS ACROSS THE UNIVERSITY AND THE RESPECTIVE HPLP DOMAINS COVERED BY THE THESE ACTIVITIES

Sr. No	On Campus Health Promotion activities conducted	2015-2016		HPLP domains covered					
		No.of activities	No of students benefited	Health Responsibility	Physical Activity	Nutrition	Stress Management	Interpersonal Relations	Spiritual Growth
1	**Health and Wellness** -Balanced diet, healthy diet, information about nutrition labels, exercise and its benefits, importance of sleep	74	7312	✓		✓			
2	**Stress management**- Ways of coping stress, handling peer pressure, sharing thoughts, working on improving mental health,avoiding drinking smoking habits, healthy friendship	74	7312	✓			✓	✓	✓
3	**Computer Ergonomics**- Correct posture, Distance from Computer	74	7312	✓					
4	**Recreational Activities**- Standing Broad Jump, Biggest Looser, Plank, Medicine Ball Crunches, Shuttle Run	55	1409		✓				
5	**Recreational Wellness programmes**-Best of Three, Farmer's Walk, Battle Rope, Burpees, Shuttle Run, Power Balance, Step Jump, Rack the Weight, Reverse push ups on bar, Shuttle run, Battle rope (Alt. wave), Pull Ups Challenge, Body weight bench press, Naukasana (Boat Pose) Hold Step Test (18")	NA	NA		✓				
6	**Sports Activities**-Inter institute badminton,football, tennis, swimming, basketball, cricket, volleyball,squash, table tennis,chess (Athlete 2017)	9	2363		✓				
7	Fitness for freedom run	1	1200		✓				
8	Symbi Fit	1	NA		✓				

NA: Not Available

A comparison of total and sub-scale HPLP scores between males and females of phase I reported significantly higher total HPLP, health responsibility, nutrition, and interpersonal sub-scale scores in females (Table 4). Conversely, males had significantly higher physical activity scores than their female peers (18.5 vs 17.3; p=0.000). In phase 2, females had significantly higher total HPLP, nutrition, interpersonal, and physical activity sub-scale scores. In both phases females had significantly higher total HPLP scores than males (Phase 1: 137.6 vs 139.8; p=0.000; Phase 2 130.6 vs 131.3; p=0.000). Sub-scale scores of stress management and spirituality remained the same between both male and female participants in phase 2 (Table 4).

Analysis of the health promotion activities conducted on different campuses of the University over a year (i.e., August 2015 to August 2016) showed several health-promoting activities organised during the study period (Table 5). The health promotion activities were categorised to suit the sub-scale domains of the HPLP scale. The table reported the total number of events that covered a large group of students; however, most of the activities focused on the physical activity sub-scale domain (5 out of 8 activities). Although other health promotion activities were organised, they were conducted 1-2 times/ annum/ institute. The sub-scale domains such as nutrition, interpersonal relations and spiritual growth were covered in a limited number of activities (Table 5).

To summarise, a significant increase in the physical activity subscale scores between the two phases, among both males and female participants of the University, was observed in the study. The health-promoting activities improved female participants' subs-scale HPLP scores on physical activity, nutrition, and interpersonal domains.

DISCUSSION

The present manuscript aimed to investigate the effects of on-campus health promotion activities on the total HPLP and sub-scale scores of students at an Indian university. The study was the first to assess the impact on HPLP scores of Indian students across the country. The results indicated that the participant zone and the faculty (STEM vs Management and Law vs Social science and Humanities) were significantly associated with the total HPLP scores. Also, the periodic health promotion activities significantly improved the physical activity scores of both male and female participants; however, there was no improvement

in the total scores. Further, it was observed that female participants had significant improvement in total HPLP and nutrition, physical activity, and interpersonal sub-scale scores at the end of one year period than their male counterparts.

To our knowledge, this is the first study from a low and middle-income country context that investigated the effects of periodic on-campus health promotion activities in a tertiary education setting across the country. We report that these periodic, on-campus health promotion activities could not significantly improve the total HPLP scores. This could be attributed to a lack of structured, domain-specific, systematic, consistent, frequent, and focused health promotion activities. The health promotion activities organised by the University predominantly focused on the physical activity domain and less on other domains. Also, health and wellness and stress management sessions were less frequent (i.e., 1-2 times/ institution/ year) to affect the sub-scale domains of nutrition, stress management, health responsibility, and spirituality. Further, our study showed a significant increase in physical activity sub-scale scores in male and female participants, which was not surprising because the physical and sports activities dominated the health-promoting activities.

Among the different subscales, the lowest scores were observed for health responsibility, followed by nutrition and physical activity. The results urge the necessity to educate students on health responsibility, nutrition, and improvements in physical activity levels. The health promotion activities conducted on-campus, although they address these domains broadly periodically, more focused, targeted, holistic, and systematic interventions may be required to improve the HPLP scores and, thereby, healthy lifestyle profiles of Indian university students.

The total HPLP scores were higher among the Indian university students in the present study (137.9 and 130.9 for phases 1 and 2) than similar other studies from Turkey (125) on medical students, and Japanese university students (130). [16,17]. Indian students scored higher in physical activity, stress management, nutrition, and health responsibility subscales than medical students from Turkey and Japan. Japanese and Turkish medical students had higher interpersonal relation scores, and Turkish medical students had higher spiritual growth scores than Indian university students). [16.17]

There is a scarcity of studies that have assessed the effects of periodic health-promoting interventions on HPLP scores. In this scenario, a systematic review of 41 studies that evaluated the effectiveness of interventions to improve physical activity, nutrition and healthy weight among university and college students was used to compare the results from our research.[4] The authors reported that 18/29 studies showed a significant increase in physical activity from pre-to-post intervention. Also, the study reported an increase in physical activity minutes, participation, and exercise duration.[4]

Our study did not find significant improvements in total HPLP scores and most sub-scale scores after two years of exposure to periodic health-promoting activities. Several factors could be attributed to the same as below: firstly, actions were periodic, and participation was voluntary for students; secondly, these activities were not curricular activities and were not graded to assess the impact; thirdly, these activities were generic, less focussed on specific individuals and not targeted towards specific sub-scale domains; and finally, students often engaged in physical activities to relieve the stress of the academic pressure, and to support the placement drives. Also, a significant increase in the physical activity scores among participants could be due to the access to the recreation and wellness centres, hands-on training, and motivation from the trained staff.

The gender of students was found to influence the HPLP scores and showed that female students had significantly higher total HPLP and subscale scores than their male peers compared to study in Saudi Arabia, Nepal, and Iran. [18,19,20] Although young women had better lifestyle practices essential from the point of intergenerational effects of malnutrition, evidence suggests that male lifestyle practices also impact the health of future generations. [21,22] Thus, University could be a platform to establish healthy lifestyle practices among today's youth to produce a healthy future generations.

Although the study was conducted on many university students across India, the study relied on self-reported data; the reproducibility of the results might be limited to only a similar population. However, the study provided insights into the lifestyle profiles of many Indian university students from different campuses. Hence, the results could be considered reflective of similar age groups from other parts of the country.

CONCLUSION

In summary, the total HPLP scores varied across the faculty and participant zones. The periodic health promotion activities improved the physical activity scores without improvements in total scores. In addition, the female students at the university improved in nutrition, and interpersonal domain scores at the end of one year period. The study recommends faculty, gender, and zone-specific interventions for university students on different domains of healthy lifestyle behaviours such as nutrition, interpersonal relations, health responsibility, spirituality and stress management through focused, systematic and targeted approach.

The interventions could be implemented more rigorously in a sustained manner through curricular, and co-curricular programmes and extracurricular activities. Additionally, strengthening the HEI ecosystem through multidisciplinary and multistakeholder health promotion activities that address core nutrition issues, develop healthy eating patterns, management of stress levels, awareness of individual health responsibility, and to develop healthy interpersonal skills would improve the HPLP scores of Indian students. From a futuristic public health perspective, this is important in helping raise a healthy future generation and a healthy world.

AUTHORS CONTRIBUTION

The study was conceptualized by RY, MG collected and analysed the data together with KM, and KM critically reviewed, interpretated and drafted the manuscript.

ACKNOWLEDGMENTS

We acknowledge Dr. Nayana Nimkar and Dr. Alaka Chandak for their support with information on the health promotion activities organized across the university campuses.

ETHICAL STATEMENT

All participants provided written informed consent. Ethics approval was obtained for both the phases from the Institutional Ethics Committee of the university.

DECLARATION OF CONFLICTING INTERESTS

The authors declare no conflicts of interest.

FUNDING

The authors declare no financial funding was available for the second phase of the study.

AVAILABILITY OF DATA AND MATERIALS

Data available upon request

References:

1. Hof-Nahor I, Biswas S. Health Promotion in Israeli Colleges of Higher Education—The Example of Oranim College of Education. Frontiers in Public Health. 2020;8. https://pubmed.ncbi.nlm.nih.gov/33042932/
2. Almutairi KM, Alonazi WB, Vinluan JM, Almigbal TH, Batais MA, Alodhayani AA, Alsadhan N, Tumala RB, Moussa M, Aboshaiqah AE, Alhoqail RI. Health promoting lifestyle of university students in Saudi Arabia: a cross-sectional assessment. BMC public health. 2018 Dec;18(1):1-0. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6126031/
3. Liu X, Ping S, Gao W. Changes in undergraduate students' psychological well-being as they experience university life. International journal of environmental research and public health. 2019 Jan;16(16):2864. https://pubmed.ncbi.nlm.nih.gov/31405114/
4. Plotnikoff RC, Costigan SA, Williams RL, Hutchesson MJ, Kennedy SG, Robards SL, Allen J, Collins CE, Callister R, Germov J. Effectiveness of interventions targeting physical activity, nutrition and healthy weight for university and college students: a systematic review and meta-analysis. International Journal of Behavioral Nutrition and Physical Activity. 2015 Dec;12(1):1-0. https://ijbnpa.biomedcentral.com/articles/10.1186/s12966-015-0203-7
5. Australian Government, Australian Institute of Health and Welfare, Insufficient Physical Activity, Web Report 2020. https://www.aihw.gov.au/reports/risk-factors/insufficient-physical-activity/contents/insufficient-physical-activity.
6. Haase A, Steptoe A, Sallis JF, Wardle J. Leisure-time physical activity in university students from 23 countries: associations with health beliefs, risk awareness, and national economic development. Preventive medicine. 2004 Jul 1;39(1):182-90. https://pubmed.ncbi.nlm.nih.gov/15208001/
7. Portoghese I, Galletta M, Porru F, Burdorf A, Sardo S, D'Aloja E, Finco G, Campagna M. Stress among university students: factorial structure and measurement invariance of the Italian version of the Effort-Reward imbalance student questionnaire. BMC psychology. 2019 Dec;7(1):1-7.

https://bmcpsychology.biomedcentral.com/articles/10.1186/s40359-019-0343-7

8. Saidi LG, Vu P. Students' perspective on higher educators: interpersonal relationship matters. SN Social Sciences. 2021 Jul;1(7):1-3. https://link.springer.com/article/10.1007/s43545-021-00176-9
9. Diem G, Brownson RC, Grabauskas V, Shatchkute A, Stachenko S. Prevention and control of noncommunicable diseases through evidence-based public health: implementing the NCD 2020 action plan. Global health promotion. 2016 Sep;23(3):5-13. https://pubmed.ncbi.nlm.nih.gov/25758171/
10. IJ PL, Delgado-Fernández M. Improvement of healthy lifestyle habits in university students through a gamification approach. Nutricion hospitalaria. 2017 Jul 28;34(4):942-51. https://pubmed.ncbi.nlm.nih.gov/29095020/
11. Sabharwal M. Effectiveness of lifestyle interventions among college students: An overview. Journal of Nutrition & Food Sciences. 2015 Jan 1;5(3):1. https://www.researchgate.net/publication/279172121
12. Gore MN, Menon KC, Safai AA, Shukla S, Yeravdekar R. Determinants of health-promoting lifestyles amongst Indian University students. International Journal of Health Promotion and Education. 2020 Feb 19:1-0. https://www.tandfonline.com/doi/abs/10.1080/14635240.2020.1726202
13. Senjam S, Singh A. Health-promoting behavior among college students in Chandigarh, India. Indian Journal of Community Health. 2012 Mar 31;24(1):58-62. https://www.iapsmupuk.org/journal/index.php/IJCH/article/view/221/221
14. Rathnayake N, Alwis G, Lenora J, Mampitiya I, Lekamwasam S. Effect of health-promoting lifestyle modification education on knowledge, attitude, and quality of life of postmenopausal women. BioMed research international. 2020 May 20;2020. https://pubmed.ncbi.nlm.nih.gov/32550229/
15. Walker SN, Sechrist KR, Pender NJ. Health promotion model-instruments to measure health promoting lifestyle: Health-promoting lifestyle profile [HPLP II] (Adult version). https://deepblue.lib.umich.edu/handle/2027.42/85349
16. Nacar M, Baykan Z, Cetinkaya F, Arslantas D, Ozer A, Coskun O, Bati H, Karaoglu N, Elmali F, Yilmaze G. Health promoting lifestyle behaviour in medical students: a multicentre study from Turkey. Asian Pacific Journal of Cancer Prevention. 2014;15(20):8969-74. https://pubmed.ncbi.nlm.nih.gov/25374238/
17. Wei CN, Harada K, Ueda K, Fukumoto K, Minamoto K, Ueda A. Assessment of health-promoting lifestyle profile in Japanese university students. Environmental health and preventive medicine. 2012 May 1;17(3):222-7. https://pubmed.ncbi.nlm.nih.gov/21987366/
18. Alzahrani SH, Malik AA, Bashawri J, Shaheen SA, Shaheen MM, Alsaib AA, Mubarak MA, Adam YS, Abdulwassi HK. Health-promoting lifestyle profile and associated factors among medical students in a Saudi university. SAGE open medicine. 2019 Mar;7:2050312119838426. https://pubmed.ncbi.nlm.nih.gov/30937167/
19. Paudel S, GC KB, Bhandari L, Arjyal A. Health related lifestyle behaviors among undergraduate medical students in Patan Academy of Health Sciences in Nepal. Journal of Biosciences and Medicines. 2017 Aug 23;5(9):43-53. https://www.scirp.org/journal/paperinformation.aspx?paperid=78904
20. Azami Gilan B, Janatolmakan M, Ashtarian H, Rezaei M, Khatony A. Health-Promoting Lifestyle and Associated Factors among Medical Sciences Students in Kermanshah, Iran: A Cross-Sectional Study. Journal of environmental and public health. 2021 Apr 27;2021. https://www.hindawi.com/journals/jeph/2021/6691593/
21. Varì R, Scazzocchio B, D'Amore A, Giovannini C, Gessani S, Masella R. Gender-related differences in lifestyle may affect health status. Annali dell'Istituto superiore di sanita. 2016 Jun 28;52(2):158-66. https://pubmed.ncbi.nlm.nih.gov/27364389/
22. Sharma R, Biedenharn KR, Fedor JM, Agarwal A. Lifestyle factors and reproductive health: taking control of your fertility. Reproductive biology and endocrinology. 2013 Dec;11(1):1-5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3717046/

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

THE ROLE OF PERCEIVED SOCIAL SUPPORT ON PSYCHOLOGICAL WELL-BEING OF UNIVERSITY STUDENTS DURING THE COVID-19 PANDEMIC

Jian Xin Aw, Nor Firdous Mohamed, Bahbibi Rahmatullah*

University Pendidikan Sultan Idris (UPSI), Malaysia

Correspondence: norfirdous@fpm.upsi.edu.my

ABSTRACT

Past research revealed concerns over the depressive symptoms and psychological well-being of university students. The present study utilizes a stratified random sampling to examine the role of perceived social support on psychological well-being between depressed and non-depressed university students during the COVID-19 pandemic in Malaysia. This study recruited a total of 244 university students from different universities across Malaysia from November 2021 to July 2022 through social media such as Facebook, Instagram, and WhatsApp.

A prevalence rate of 50.4% of university students was found to present significant depressive symptoms. There is a significant correlation between perceived social support and psychological wellbeing ($r = 0.769$, $p < 0.05$). Non-depressed university students reported significantly higher on their perceived social support and psychological well-being than university students with significant depressive symptoms with values of $p<0.001$ and $p<0.043$. Among depressed university students, perceived social support from friends and significant others was reported to be significantly lower than non-depressed university students with a value of $p<0.001$ and $p<0.023$.

Overall, the present study discovered that a higher level of perceived social support could predict greater psychological well-being and reduced depressive symptoms among university students. Hence, perceived social support should be promoted as an effective intervention for university students due to its accessibility and cost. Future research should look into the effectiveness of perceived social support and other psychological resources for university students with different mental health concerns.

KEYWORDS

Perceived social support, psychological well-being, depressive symptoms, university students, COVID-19, pandemic.

INTRODUCTION

University life is a significant transition that prepares adolescents to enter adulthood [1]. It has been argued that many young adults experience difficulties with maintaining their well-being and began to develop adulthood mental disorders in adolescence [2]. Previous research [1] reported that depression has been one of the common mental disorders experienced by university students because of the challenges encountered in academic life, sleep quality, friendship satisfaction, and self-confidence. Nahas et al [3] found that 36.4% of university students in Malaysia experienced mild to severe

depressive symptoms before the COVID-19 pandemic. Another study [4] conducted in New York City during the pandemic revealed that 23% of university students suffered from moderate depressive symptoms, followed by 15.3 moderate to severe depressive symptoms, and 12% severe depressive symptoms. The high prevalence rate and negative impact of depression have implied the need of identifying coping resources for university students to improve their psychological well-being during this critical period [5].

In addition to significant changes in university life due to the impact of the COVID-19 pandemic, Debowska et al [6] suggested that the alarmingly high rate of university students who experience depressive symptoms has raised concern over their psychological well-being. Gaining social support has become more challenging for university students during the COVID-19 pandemic because of the lockdown and movement control [5]. There are many situational factors such as the loss of gatherings, physical teachings in classes, and university activities caused by the COVID-19 pandemic that caused an adverse impact on the psychological well-being of university students [7].

Grey et al [8] revealed that the risk of developing depression was 63% lower when perceived social support was adequate. As for undergraduate students, perceived social support has also been identified as one of the valuable resources that could reduce depressive symptoms and improve their psychological domain of quality of life [9]. The study conducted by Alsubaie et al [9] argued that perceived social support has served as a protective factor for undergraduate students who are vulnerable to developing depressive symptoms. It was found that the perceived social support from family and friends was a significant predictor that could improve the quality of life among university undergraduate students and reduce their risk of experiencing depressive symptoms. University students who perceived a greater level of social support also reported that they had better adaptation to their university life [9].

Nahas et al [3] suggested that university students who perceived to have a greater level of social support from family, friends, and significant others would have experienced a higher level of psychological well-being during the COVID-19 pandemic. The present research aims to acknowledge and highlight the importance of perceived social support to undergraduate students and the mental health community in Malaysia so that it could be emphasized as a coping resource that could possibly help to reduce depressive symptoms among undergraduate students and improve their psychological well-being during future academic circumstances.

METHODS

The current study was designed to investigate the significant role of perceived social support on psychological well-being among depressed and non-depressed university students during the COVID-19 pandemic in Malaysia which was based on the pilot study on students' mental health among university students in Malaysia [10].

To ensure ethical considerations were met, an ethical approval letter was obtained from the UPSI Human Research Ethics Committee (approval number: UPSI/PPPI/PYK/ETIKA(M)/014(251)) prior to the online recruitment of undergraduate students.

A snowballing sampling method was used to recruit a diverse sample of university students from different universities in Malaysia. Potential participants were approached through various communication platforms, including WhatsApp, Facebook, Instagram, and email, and were provided with a link to an online questionnaire on Google Form. The inclusion criteria required participants to be undergraduate students between the ages of 18 and 25 with a good understanding of the English language. The study was limited to Malaysian university students only. Participants were given access to the Participant Information Sheet and Informed Consent Sheet, which provided detailed information about the research process, including its nature, potential risks and benefits, and their right to voluntary participation.

PARTICIPANTS

Participants were selected based by stratified random sampling. They were recruited from different universities or colleges in Malaysia with ages ranging from 18-25. They were informed about the research via phone, email, Instagram, and Facebook. They were given the link to assess to the 'Participant Information Sheet' and 'Informed Consent Sheet' which include detailed information about the research procedure, nature, risks, benefits, and their consent to voluntary participation. Participants who scored between 14 and 63, which indicates mild to severe depressive symptoms, on the BDI-II Questionnaire [11] were categorized as the depressed group, while participants

whose scores did not demonstrate significant depressive symptoms were categorized as the non-depressed group.

MEASUREMENT INSTRUMENTS

There were three measurement instruments used in the current study. The Beck Depression Inventory-II (BDI-II) [11] was used as a self-report measure for the evaluation of the severity of depression among university students across Malaysia. The Multidimensional Scale of Perceived Social Support (MSPSS) was used to measure the perceived social support of friends, family, and significant others among the participants [12]. The 18-item Psychological Wellbeing Scale (PWB) was selected to assess the psychological well-being of the participants [13,14].

STATISTICAL ANALYSIS

The present study utilized Pearson correlation coefficients to assess the bivariate relationships between perceived social support and psychological well-being. An independent t-test was carried out to examine if perceived social support could significantly predict the psychological well-being of university students between university students who were in depression and non-depression groups. The three subscales of perceived social support which included peers, family, and significant other were analyzed to see how well they predict the six subscales (autonomy, positive relationship with others, environmental mastery, self-acceptance, purpose in life, and personal growth) of psychological well-being. The statistical analysis was performed using SPSS (version 24.0) software. The data were tested at a significant $p<0.05$ to examine both the strength and functional relationship between the two variables in both depressed and non-depressed groups.

RESULTS

Table 1 sets out that 244 participants were recruited for the present study. Among the 244 participants, 132 (54.0%) were females, and 112 (45.9%) were males. In respect of race of participants, 70 (28.7%) were Malays, 132 (54.0%) were Chinese, 40 (16.3%) were Indians, and 2 (0.8%) were others. The marital status of participants was that 9 (3.6%) were married, and 235 (96.3%) were single.

Socioeconomic status was represented by the participants' household income. According to Table 1, the category of B40 (Bottom 40 with household income less than RM4849) accounted for 156 (63.9%), followed by 82 (33.6%) M40 (Middle 40 with household income between RM4850 and RM10959), and 6 (2.4%) T20 (Top 20 with household income above RM10691). Thus, the present study's results would be more representative of the university students who came from the B40 socioeconomic status in Malaysia.

TABLE 1: PARTICIPANTS' SOCIODEMOGRAPHIC CHARACTERISTICS (N = 244)

Variables		N	Percentages, %
Sex	Male	112	45.9
	Female	132	54.0
Race	Malay	70	28.7
	Chinese	132	54.0
	Indian	40	16.3
	Others	2	0.8
Marital Status	Single	235	96.3
	Married	9	3.6
Socioeconomic Status	B40 (Bottom 40)	156	63.9
	M40 (Middle 40)	82	33.6
	T20 (Top 20)	6	2.4

Notes: N = 244

A prevalence rate of 50.41% for university students in this study in Malaysia was reported as experiencing significant depressive symptoms. The mean score of the depressed group on the BDI-II revealed that the severity of depression among university students in Malaysia fell under the moderate range. There were 28 participants (11.47%) who presented mild depressive symptoms, followed by 57 (23.36%) moderate, and 38 (15.57%) severe. There is a strong positive significant positive correlation between perceived social support and psychological well-being

among the participants (r=0.769, p<0.05). The correlation analysis indicates that the higher the perceived social support, the higher the psychological well-being among university students with depressive symptoms.

As set out in Table 2, the statistical results revealed that perceived social support from friends was reported to be highly significantly among the non-depressed group (M=4.32, SD=0.57) than the depressed group (M=3.45, SD=1.35) among the three subscales of MSPSS. The highest significant difference was found in the perceived social support from significant others between the depressed (M=2.87, SD=1.49) and the non-depressed group (M=5.61, SD=1.12). Even though there was no statistically significant difference in the perceived social support from a family between depressed and non-depressed groups, the mean score of perceived social support from family was found to be greater among the non-depressed group (M=4.90, SD =0.57) than in the depressed group (M=2.79, SD=1.33).

Among the subscales of the PWB scale, the statistical findings have shown that personal growth had the highest mean score (M=5.85, SD=0.76) among the non-depressed group. The statistical differences in personal growth and environmental mastery between depressed and non-depressed groups are highly significant with a value of p< 0.001. In addition, other PWB subscales which include positive relations with others, and purpose in life were also observed to have a significant difference between both depressed and non-depressed groups. Self-acceptance was reported to have the highest difference in the total PWB scale between the depressed and the non-depressed groups (M=2.66, 95% CI=2.41-2.91).

Based on Table 2 data, the statistical t-tests indicate that the level of perceived social support among university students in the non-depressed group is significantly higher than those in the depressed group. The value of p<0.043 on the total PWB scale was found to be significantly higher among the non-depressed group than in the depressed group. The mean score of the total PWB scale for the non-depressed group was 5.29 ± 0.63 as opposed to 3.37 ± 0.76 for the depressed group. The t-tests suggest that university students in the non-depressed group reported having significantly greater psychological well-being than peers who experienced significant depressive symptoms with a value of p< 0.05.

TABLE 2: MEAN SCORE (±SD) OF MSPSS AND PWB SUBSCALES FOR DEPRESSED AND NON-DEPRESSED UNIVERSITY STUDENTS

Subscales	Non-Depressed Group (n=121)	Depressed Group (n=123)	t(df)	*p*-value
Friends	4.32 ± 0.57	3.45 ± 1.35	6.54 (164.49)	<0.001*
Family	4.90 ± 1.27	2.79 ± 1.33	12.68 (241.80)	<0.751
Significant Other	5.61 ± 1.12	2.87 ± 1.49	16.19 (226.75)	<0.023
Autonomy	5.32 ± 0.91	3.83 ± 1.02	12.05 (239.99)	<0.497
Environmental Mastery	5.06 ± 0.94	3.34 ± 0.68	16.42 (219.21)	<0.001*
Personal Growth	5.85 ± 0.76	3.70 ± 1.21	16.56 (205.40)	<0.001*
Positive Relations with Others	5.47 ± 0.89	2.91 ± 1.13	19.63 (231.02)	<0.086
Purpose in Life	4.55 ± 0.83	3.60 ± 0.81	9.01 (241.59)	<0.535
Self-Acceptance	5.48 ± 0.91	2.83 ± 1.06	21.06 (237.41)	<0.204
Total MSPSS	5.43 ± 0.79	3.04 ± 1.13	19.16 (217.87)	<0.001*
Total PWB	5.29 ± 0.63	3.37 ± 0.76	21.39 (234.98)	<0.043

*p-value is statistically significant at the 0.05 level (2-tailed)

DISCUSSION

The maladaptive adjustment could cause significant impact on university students' psychological well-being, especially when they did not find appropriate resources to mitigate their psychological adjustments during the COVID-19 pandemic [15]. Rudenstine et al [4] reported increased severity and prevalence of depression among university students after the pandemic started. Of 244 university students recruited to complete the online questionnaires across Malaysia, the current study found a prevalence rate

of 50.41% of university students who experienced mild, moderate, and severe symptoms. Before the pandemic started, a previous local study by Nahas et al [3] reported a prevalence rate of 36.4% of university students who demonstrated significant depressive symptoms. The present study has shown that the prevalence rate of depression among university students in Malaysia has increased significantly from 36.4 % to 50.41% after the pandemic occurred. The significant increase in the prevalence rate of depression has given warning signs to the mental health community with regards to the need of exploring available and accessible psychological resources for university students who are currently struggling with depressive symptoms during the COVID-19 pandemic in Malaysia.

Perceived social support has been explored in recent studies regarding its effect on the prediction of psychological well-being among university students with depressive symptoms during the COVID-19 pandemic [5,16]. It was reported by Yu et al [5] that 71.2% of university students reported a moderate level of perceived social support ($p<0.001$) and experienced reduced depressive symptoms. Similar findings were reported in the present research that perceived social support was reported to have a significant impact on the psychological well-being of university students ($p<0.001$). The present study also found that non-depressed university students had significantly better perceived social support ($M=5.43$, $SD=0.79$) and psychological well-being ($M=5.29$, $SD=0.63$) than university students with significant depressive symptoms ($M=3.04$, $SD=1.13$; $M=3.37$, $SD=0.76$). The statistical evidence supports the predicting role of perceived social support on the psychological well-being of university students.

In comparison with perceived social support from family and significant other, the perceived social support from friends was reported to be the highest ($M=3.45$, $SD=1.35$, $p<0.001$) among university students with significant depressive symptoms, and these statistical findings could indicate that these university students reported that they perceived the most social support from their friends during the COVID-19 pandemic. The present study found that the perceived social support from friends was positively associated with the PWB scale($r=0.733$) and negatively associated with depressive symptoms ($p<0.001$). Ioannou et al [17] also reported a negative association between perceived social support from friends ($b=-0.214$, $p= 0.002$) and depressive symptoms. Social support from friends could be more predictive of university students' depressive symptoms and psychological well-being because they were in the transitional stage in which they moved away from houses and shared more personal experiences with their peers [9]. However, it is important to highlight that both non-depressed and depressed university students perceived moderate social support from friends, this could indicate that most university students still felt supported by the social support provided by their peers.

University students who experienced significant depressive symptoms reported least on their perceived social support from family ($M=2.79$, $SD=1.33$) compared with non-depressed peers ($M=4.90$, $SD=1.27$). The current research found that there is no significant difference in the perceived social support from the family between these two groups ($p<0.751$). The low score of perceived social support on family for these university students could be explained by the possible effects of the pandemic. Some university students might experience distress due to family conflicts, loss of financial income in the family, or loss of family members [18]. Nevertheless, consistent with past research [17] which indicated a significant association between perceived social support from family and depressive symptoms ($b=-0.214$, $p=0.002$), the present study found that university students who perceived greater social support from family were found to report reduced depressive symptoms. The present research highlights the findings from previous research [9,17] that perceived social support from friends and family should be considered the first source of social support for university students with depressive symptoms due to the close proximity, especially during the difficult period of the pandemic.

Furthermore, perceived social support from significant other was found to be the greatest for non-depressed university students ($M=5.61$, $SD=2.87$) compared to friends and family. This indicates that most non-depressed university students perceived significantly higher social support from their significant other which led to their positive psychological well-being. Even though Ioannou et al [17] did not suggest that perceived social support from significant others predicts depressive symptoms ($b=-0.080$, $p=0.238$), the current study of current study reported opposite findings ($p<0.023$) that was consistent with another past study [19]. Aydin et al [19] argued that perceived social support from significant others had a significant effect ($p=0.025$) on nursing undergraduate students because of their longer time spent with significant others). The present research found that perceived social

support from significant others among depressed peers was significantly lower (M = 2.87, SD = 1.49) compared to their non-depressed peers (M = 5.6, SD = 1.12). The low score could be explained by factors such as social isolation, absence of significant other, loss of significant other, and lack of physical and emotional intimacy with significant other due to the pandemic [19].

In Malaysia, professional psychological therapy services are primarily available to private university students, while government universities provide counseling services that may not adequately address severe mental health issues. As a result, some students may need to turn to costly private professional services as an alternative. Thus, more peer support and online psychoeducation on support therapy should be offered because social support from friends, family, and significant others would often come cost-free [7]. The present research suggests strong evidence that the negative impact of the COVID-19 pandemic on the severity of depressive symptoms and psychological well-being among university students could be buffered with the protective effect of perceived social support.

Unlike the past study [17] that reported similar findings on the role of perceived social support on psychological well-being had an overrepresentation of female university students as sample data (78% of females), the current research recruited a more representative sample of university students with 48.59% males and 50.41% of females university students. The present study did not explore the effect of gender on the level of perceived social support and psychological well-being of university students with significant depressive symptoms because past researches [17,20] reported no significant difference between males and females on these variables. However, it would be beneficial to study if perceived social support differed between males and females with depressive symptoms.

The current research was conducted using online self-reported questionnaires and the possibility of participants making response bias might concern the quality of the research results. However, the biases have been managed by using a questionnaire with high reliability and validity. For instance, the reverse scoring included in the PWB scale would challenge the participants to read through the questions carefully before they chose their responses [13,14].

Past studies [3,4] revealed that university students who resided in urban areas were more likely to experience depressive symptoms due to stressful environments. The present research did not identify the location of participants even though it was found that the majority of the university students were represented by populations whose household income was under the category of B40 (Bottom 40). Hence, it would be valuable for future research to include a demographic characteristic of urbanization as one criterion to assess the severity of depressive symptoms, perceived social support, and psychological well-being of university students residing in urban and rural areas.

On the other hand, Ramli et al [18] indicated that university students classified as the B40 population faced difficulties with online academic learning due to limitations of internet access in rural areas. Although internet access could be a challenge for these university students, Ramli et al [18] discussed that academicians and lecturers had been developing different teaching methods such as engaging in frequent messages and phone calls for effective online learning. Even though most university students are returning to physical classes after the pandemic, Ramli et al [18] highlighted that the personal attention and communication provided by lecturers were the most important factors that helped university students feel supported. Hence, the role of perceived social support emphasized in the current study could be supported as an effective intervention for reducing depressive symptoms and improving the psychological well-being of university students during the endemic or any future pandemics.

Even though perceived social support should be highlighted and promoted because of its approachability as a psychological resource during the COVID-19 pandemic, it would be beneficial for future research to study the pathways of how perceived social support was accounted for the university students' psychological well-being. Wilson et al [21] emphasized that perceived social support was a catalyst for promoting psychological well-being, but the pathways manifested by perceived social support should be explored in order to discover its bidirectional relations with other constructs. Similar research should be replicated to explore how pathways such as mindfulness, savoring, self-compassion, and other constructs could have a significant association with perceived social support. Future research on the topic would help the mental health community to understand better the multiple factors that contribute to the positive association of perceived social support and psychological

well-being for university students who experience significant depressive symptoms.

CONCLUSION

The present study found a prevalence rate of 50.41% of university students who experience depressive symptoms during the COVID-19 pandemic in Malaysia. The statistical analysis indicated that there is a strong positive correlation between perceived social support and psychological well-being among university students with significant depressive symptoms. In addition, the present research reported that university students with significant depressive symptoms had significantly lower perceived social support and reduced psychological well-being than their non-depressed peers.

In comparison with other psychological resources such as seeking professional mental health services, perceived social support is considered more accessible and could be provided at a low tangible cost. In order to mitigate the severity of depressive symptoms and increase the psychological well-being of university students, the current research suggests that perceived social support should be promoted as effective prevention and intervention.

Future research should be conducted based on the recommendations discussed so that university students in Malaysia could have better access to a variety of psychological resources, especially during a difficult period like the pandemic.

References

1. Islam MA, Barna SD, Raihan H, Khan MNA, Hossain MT. Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. PLoS One. 2020 Aug 26;15(8):e0238162. doi: 10.1371/journal.pone.0238162
2. Obi SN, Bewei EC. Mindfulness, school connectedness, perceived social support and psychological well-being of University Students in Ibadan, Nigeria. IFE Psychol. 2020;28(1).
3. Nahas ARMF, Elkalmi RM, Al-Shami AM, Elsayed TM. Prevalence of depression among health sciences students: Findings from a public university in Malaysia. J Pharm Bioallied Sci. 2019;11(2):170. doi: 10.4103/JPBS.JPBS_263_18
4. Rudenstine S, McNeal K, Schulder T, Ettman CK, Hernandez M, Gvozdieva K, et al. Depression and Anxiety During the COVID-19 Pandemic in an Urban, Low-Income Public University Sample. J Trauma Stress. 2021 Feb 12;34(1):12–22. doi: 10.1002/jts.22600
5. Yu M, Tian F, Cui Q, Wu H. Prevalence and its associated factors of depressive symptoms among Chinese college students during the COVID-19 pandemic. BMC Psychiatry. 2021 Dec 29;21(1):66. doi: 10.1186/s12888-021-03066-9
6. Debowska A, Horeczy B, Boduszek D, Dolinski D. A repeated cross-sectional survey assessing university students' stress, depression, anxiety, and suicidality in the early stages of the COVID-19 pandemic in Poland. Psychol Med. 2022 Nov 2;52(15):3744–7. doi: 10.1017/S003329172000392X
7. Villani L, Pastorino R, Molinari E, Anelli F, Ricciardi W, Graffigna G, et al. Impact of the COVID-19 pandemic on psychological well-being of students in an Italian university: a web-based cross-sectional survey. Global Health. 2021 Dec 6;17(1):39. doi: 10.1186/s12992-021-00680-w
8. Greyl, Arora T, Thomas J, Saneh A, Tohme P, Abi-Habib R. The role of perceived social support on depression and sleep during the COVID-19 pandemic. Psychiatry Res. 2020 Nov;293:113452. doi: 10.1016/j.psychres.2020.113452
9. Alsubaie MM, Stain HJ, Webster LAD, Wadman R. The role of sources of social support on depression and quality of life for university students. Int J Adolesc Youth. 2019 Oct 2;24(4):484–96. doi: 10.1080/02673843.2019.1568887
10. Mohamed NF, Govindasamy P, Rahmatullah B, Purnama S. Emotional Intelligence Online Learning and its Impact on University Students' Mental Health: A Quasi-Experimental Investigation. Pertanika J Soc Sci Humanit. 2022 Jun 15;30(2):665–80. doi: 10.47836/pjssh.30.2.13
11. Wan Mahmud WMR, Awang A, Herman I, Mohamed MN. Analysis of the Psychometric Properties of the Malay Version of Beck Depression Inventory II (BDI-II) Among Postpartum Women in Kedah, North West of Peninsular Malaysia. Malays J Med Sci. 2004 Jul;11(2):19–25.
12. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The Multidimensional Scale of Perceived Social Support. J Pers Assess. 1988 Mar;52(1):30–41. doi: 10.1207/s15327752jpa5201_2

13. Ryff CD, Keyes CL. The structure of psychological well-being revisited. J Pers Soc Psychol. 1995;69(4):719–27. doi: 10.1037/0022-3514.69.4.719
14. Ryff CD, Almeida DM, Ayanian JZ, Carr DS, Cleary PD, Coe C, et al. National Survey of Midlife Development in the United States (MIDUS II), 2004-2006: Documentation of Psychosocial Constructs and Composite Variables in MIDUS II Project 1. Inter-university Consortium for Political and Social Research [distributor]; 2010.
15. Arslan G, Yıldırım M, Zangeneh M. Coronavirus Anxiety and Psychological Adjustment in College Students: Exploring the Role of College Belongingness and Social Media Addiction. Int J Ment Health Addict. 2022 Jun 21;20(3):1546–59. doi: 10.1007/s11469-020-00460-4
16. Leong Bin Abdullah MFI, Mansor NS, Mohamad MA, Teoh SH. Quality of life and associated factors among university students during the COVID-19 pandemic: a cross-sectional study. BMJ Open. 2021 Oct 7;11(10):e048446. doi: 10.1136/bmjopen-2020-048446
17. Ioannou M, Kassianos AP, Symeou M. Coping With Depressive Symptoms in Young Adults: Perceived Social Support Protects Against Depressive Symptoms Only Under Moderate Levels of Stress. Front Psychol. 2019 Jan 14;9. doi: 10.3389/fpsyg.2018.02780
18. Ramli MF, Majid M, Badyalina B. Impeding Factors Towards the Effectiveness of Online Learning During Covid-19 Pandemic among Social Sciences Students. Int J Learn Dev. 2020 Nov 6;10(4):37–49. doi: 10.5296/ijld.v10i4.17921
19. Aydın A, Kahraman N, Hiçdurmaz D. Determining the levels of perceived social support and psychological well being of nursing students. J Psychiatr Nurs. 2017; doi: 10.14744/phd.2017.95967
20. Kalpana Rani E. Perceived Social Support and Psychological Well-Being: Testing the Unique Association and Gender Differences among Young Working Adults. Int J Indian Psychol. 2016 Mar 25;3(2). doi: 10.25215/0302.065
21. Wilson JM, Weiss A, Shook NJ. Mindfulness, self-compassion, and savoring: Factors that explain the relation between perceived social support and well-being. Pers Individ Dif. 2020 Jan;152:109568. doi: 10.1016/j.paid.2019.109568

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

HEALTH EMPLOYEES' PERCEPTIONS OF THEIR WORKING CONDITIONS

Intisar A. Malik[1], Sherzad A. Shabu[2], Abubakir M. Saleh[2,3], Nazar P. Shabila[4]*

1. Ministry of Health, Erbil, Kurdistan Region, Iraq
2. Department of Community Medicine, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq
3. Department of Nursing, Faculty of Nursing, Tishk International University, Erbil, Iraq
4. Department of Medical Laboratory Sciences, Catholic University in Erbil, Erbil, Kurdistan Region, Iraq.

Correspondence: abubakirms@gmail.com

ABSTRACT

BACKGROUND:

Employees require an appropriate working environment that helps them work without problems limiting their performance.

OBJECTIVE:

This study aimed to assess the perspectives of the employees at the Ministry of Health in the Iraqi Kurdistan Region regarding their work environment and satisfaction with the various aspects of work.

METHODS:

This self-administered questionnaire survey involved 109 employees from the Ministry of Health in Erbil, Iraqi Kurdistan Region. A questionnaire containing different questions about the work environment and work satisfaction was used to assess employees' perspectives about their working environment.

RESULTS:

The participants thought that the sense of preserving public money and materials and feeling responsible among employees is low. The employees were not much satisfied with the relations between managers and employees. Most participants thought that improving the financial situation would affect the employees' capacity (96.3%) and that implementing modern systems, equipment, and programs would improve protection (84.4%). Most participants were satisfied with their workplace (71.6%) and thought their education was relevant to their work (73.4%). They emphasized the importance of making employees feel responsible, providing training courses, and improving the services and work facilities to improve the working conditions.

CONCLUSION:

Low work awareness and commitment exist among employees. The working environment was an important factor in the job satisfaction of employees.

KEYWORDS

Work responsibilities, employee rights, work environment, satisfaction.

INTRODUCTION

Employees are essential factors in attaining the mission and vision of any organization. Employees need to meet the performance criteria established by the employers to maintain work quality. Employees require an appropriate working environment that enables working without problems limiting their performance [1].

Job satisfaction involves an orientation of employees' emotions towards their role in the workplace. It is an essential factor for motivating and encouraging employees and enhancing work performance [2]. Job satisfaction is a combined set of physiological, psychological, and environmental conditions that make an employee content or pleased with the job. According to Herzberg's two-factor or motivation-hygiene theory, some specific factors in the workplace are responsible for work satisfaction, and a separate set of factors are responsible for work dissatisfaction. These two sets of factors act independently of each other. Herzberg's two-factor theory explains the association between job satisfaction and job dissatisfaction among employees in the working environment[3,4]. Examples of the hygiene issues that decrease employees' dissatisfaction with the work environment include salary and supervision. On the other hand, examples of the primary motivators that make workers more productive, creative, and committed include recognition, achievement, responsibility, and advancement [5]. Factors that determine job satisfaction include task variety, workload, career perspectives, and working conditions [6]. The employees' role in the workplace is important due to their impact on the various elements of the work organization [7]. The role of the employee is a significant source of a worker's identity, meaning, and life satisfaction [8].

Herzberg's theory might offer a reasonable starting point, as providing an environment that encourages job satisfaction will develop productive, motivated, and fulfilled employees [9]. However, employees have different needs, expectations, and backgrounds, so there might not be one right way to manage them. Hence, Herzberg's theory has been criticized for its non-conclusiveness, subjective and biased methodology, and primary emphasis on job enrichment [10,11].

The different content theories of motivation and work satisfaction provide several definitions for explaining the meanings and sources of different motivation factors. For example, Herzberg's two-factor theory shares a clear relationship with McClelland's need for achievement theory and Maslow's hierarchy of needs theory regarding the similarity between higher-level needs and motivators and the respective similarity between lower-order needs and hygiene issues [10,12]. The lower-order needs should be met before higher-order needs to achieve motivation. Moreover, Herzberg's hygiene issues must be obtained to avoid job dissatisfaction. The Maslow's higher order needs result in motivating employees and are considered intrinsic type and are similar to the motivational factors of Herzberg that are likewise intrinsic. On the other hand, the needs of McClelland's theory are of three main types, namely, the need for power, the need for achievement, and the need for affiliation [10,13].

If the employees are unhappy with their work assignments and working conditions, they might feel they do not belong to the organization. When the employees are dissatisfied, they will not perform up to their potential or expectations, and thus the organizations cannot afford them. If they are fired, the organization will need to bear additional costs for recruiting new employees [14,15]. It is helpful for organizations to provide a flexible working environment where employees feel that their opinions are considered and are part of the working organization [16]. Employee morale needs to be high because it can be revealed in their performance. Low morale will give the employees little motivation and effort to improve [17].

Employers have an important role in shaping and developing adequate career satisfaction [18]. Employers need to develop meaningful work environments to increase motivation for work, increase job satisfaction, reduce employee turnover, and enhance productivity [8]. Research has shown a positive association between the environment of work and the fundamental side of job satisfaction. The working environment includes the two broader dimensions of the work and the context. The work dimension includes several characteristics of the job, including the way the work is conducted and accomplished, control of the job-related activities, the sense of achievement, and variation in the tasks and task values. The context dimension of job satisfaction includes the physical and social work conditions [19-21].

Many organizations neglect the working environment leading to adverse consequences on the employees' performance. The work environment includes job security,

the safety of employees, the motivation for better performance, recognition of good performance, relations with other workers, and involvement in decision-making [22]. The current economic crises in the Iraqi Kurdistan Region and the significant cuts and delays in the payments of public sector employees might have negatively affected the work commitment of the employees. Moreover, no research has studied the perspectives of public sector employees regarding their rights and work responsibilities. This study aimed to assess the employees' perspectives at the Ministry of Health in the Iraqi Kurdistan Region regarding their work environment and satisfaction with the various aspects of the work.

METHODS

DESIGN AND SETTING

We conducted a self-administered questionnaire survey of the employees in the Ministry of Health in the Iraqi Kurdistan Region. The study was conducted from February to July 2017.

A theoretical framework guided this study based on Herzberg's two-factor or motivation-hygiene theory, in which motivation factors improve job satisfaction. On the other hand, a lack of hygiene factors spawns job dissatisfaction. These factors work independently of each other. Generally, the factors that encourage job satisfaction relate to self-actualization and self-growth. The primary motivators considered for this study included responsibility, recognition, performance and achievement, and opportunities for advancement. In contrast, the main hygiene factors included salary, working conditions, and relationships with colleagues and supervisors.

PARTICIPANTS

All the 120 employees working at the main building of the Ministry of Health in the Iraqi Kurdistan Region were invited to participate in the study. As all the employees were invited, there was no need to sample size calculation or random sample selection. Of the 120 employees, 109 (90.8%) completed the survey. The staff at the high management level, like advisors, directors general, directors, and those with temporary or daily contracts, were excluded from the study.

Of the 109 employees who responded to the questionnaire survey, 51.4% were male, and 48.6% were female. Most participants were college graduates (47.7%), followed by institute graduates (20.2%). Most participants had one to six years of work experience (61.5%), followed by six to 16 years of work experience (24.8%). Details of the characteristics of the study participants are shown in Table 1.

TABLE 1: CHARACTERISTICS OF THE STUDY PARTICIPANTS (N=109)

Characteristics	No.	%
Gender		
Male	56	51.4
Female	53	48.6
Education		
Primary school	11	10.1
Intermediate school	10	9.2
Secondary school	11	10.1
Institutes (2 years post-secondary)	22	20.2
College	52	47.7
Higher education (master degree)	3	2.8
Work experience (years)		
1 to 6	67	61.5
6 to 16	27	24.8
16 and more	15	13.8

SURVEY INSTRUMENT

A questionnaire was developed to assess employees' perspectives about their rights and responsibilities at work.

The first part of the questionnaire included information about the respondents' main demographic and work characteristics. The second part of the questionnaire included rating some aspects of commitment, transparency, protection of the public materials, and work relations on a 5-point scale from very low to very high. The third part of the questionnaire was about participants' agreement or disagreement with some sentences related to work environment and satisfaction. The fourth part of the questionnaire asked open questions about making employees feel responsible, what training is required and what type of services the employees need to improve their work.

DATA COLLECTION

The questionnaire was tested to assess the comprehensiveness, clarity, adequacy, and relevance of the questions. The questionnaire was directly provided to the employees. A brief description of the aim of the survey, the anonymity of the participants, and the clarification of the type of questions were provided. Written informed consent from the participants was obtained before data collection. The research ethics committee of the authors' institute approved the study protocol.

DATA ANALYSIS

Data were analyzed using the statistical package for social sciences (SPSS, version 20.0). The descriptive statistical analysis and presentation were applied. Due to the specific characteristics of the data and variables included in this study and the lack of specific data on the participants, analytical statistics and assessment of relationships between different variables and concepts were not applied.

RESULTS

The participants' main concern was about transparency in the work environment, with 45.9% thinking it was low or very low. The other important concerns were about relations between manager and staff (33% thinking it is low or very low) and work awareness and commitment (31.2% thinking it is low or very low). The work aspect with the least concern was preserving public money and materials, with 24.8% thinking it was low or very low. Details of the participants' perspectives on these aspects of work responsibilities and commitment are shown in Table 2.

TABLE 2: PARTICIPANTS' PERSPECTIVE OF WORK RESPONSIBILITIES AND COMMITMENT

Question	Very low		Low		Fair		High		Very high	
	No.	%	No.	%	No.	%	No.	%	No.	%
Work awareness and commitment	8	7.3	26	23.9	53	48.6	15	13.8	7	6.4
Preserve public money and materials and feeling responsible	9	8.3	18	16.5	53	48.6	15	13.8	14	12.8
Transparency in work environment	12	11.0	38	34.9	42	38.5	14	12.8	3	2.8
Relation between manager & staff	5	4.6	31	28.4	51	46.8	16	14.7	6	5.5

Regarding work environment and work satisfaction, the participants' main emphasis was on improving the financial situation (96.3%), providing continuing professional development training courses (89.9%), implementing modern systems, equipment, and programs (84.4%), and providing clearance when transferred to another workplace (79.8%). The participants also emphasized the need to be qualified to get the annual increase in salary (68.8%) and had concerns about using positions to get personal benefits (54.1%). They also emphasized that alert disciplines are not leading to delays in salary increase (57.8%) and the importance of avoiding presents and incentives from attendants (59.6%). Most participants were satisfied with the workplace (71.6%), the relevance of education to the type of work (73.4%), and the relevance of the services provided at the workplace (76.1%), as shown in Table 3.

TABLE 3: PERSPECTIVES OF EMPLOYEES ABOUT DIFFERENT ASPECTS OF WORK

Questions	Yes		No		Don't know	
	No.	%	No.	%	No.	%
Officials and employees use position to get personal benefits	59	54.1	15	13.8	35	32.1
Improving financial situation and incentives affect employee's capacity	105	96.3	4	3.7	0	0.0
Implementing modern system, equipment and programs make better protection	92	84.4	9	8.3	8	7.3
Is there a need for continuous activating practical training courses?	98	89.9	7	6.4	4	3.7
Are you satisfied with your workplace?	78	71.6	22	20.2	9	8.3
Is your education relevant to your work?	80	73.4	22	20.2	7	6.4
Should each employee qualify for an annual increase in the salary?	75	68.8	27	24.8	7	6.4
Alert discipline leads to delay in the salary increase	20	18.3	63	57.8	26	23.9
Can employee benefit from presents or incentive from attendants?	23	21.1	65	59.6	21	19.3
The employee has right to a three day holiday each month whether fixed or not	80	73.4	18	16.5	11	10.1
The employee needs to provide clearance when transferred to another workplace	87	79.8	14	12.8	8	7.3
The services provided at your workplace are relevant	83	76.1	19	17.4	7	6.4

Regarding how to make employees feel responsible, the participants emphasized the importance of educating the employees about this aspect from the first date of starting work, providing incentives for good work and discipline for neglect, and providing training and seminars to raise awareness of employees. The employees thought they needed training courses in administration, computer, languages, and communication skills. Regarding the type of services the employees need to improve their work, the participants suggested having transportation from home to work and providing computers and internet facilities.

DISCUSSION

The study revealed a lack of work awareness and commitment among employees. The participants thought that the sense of preserving public money and materials and the feeling of responsibility among employees was low. The employees were not much satisfied with the relations between managers and employees. Several factors within the working environment can influence job satisfaction, including the working hours, wages, the autonomy of employees, organizational structure, and communication [23]. In many organizations, employees might have problems with their supervisor forgetting the deserved respect. Also, supervisors might show tough behaviors toward employees, making them uncomfortable sharing innovative ideas [2,24]. The level of job satisfaction can be improved when appropriate attention is given to recognition, supervision, and interpersonal relationships [25]. Another factor that significantly influences work satisfaction is creativity at work, which is influenced by personal characteristics, the work environment, and the relationships with colleagues and superiors [26].

Most participants thought that improving the financial situation would affect the employees' capacity, and implementing modern systems, equipment, and programs would improve protection at work. Different variables, such as workload, stress, salary, and family conflicts related to the job, can lead an employee to dissatisfaction, resulting in a possible turnover. In the end, these independent

factors can have a negative impact on organizational performance [27].

Many participants were satisfied with their work and thought that their education was relevant to their work. Sometimes employees are not satisfied with their assigned tasks. They might not be confident about factors such as unsafe working conditions, limited rights, noncooperative co-workers, lack of respect from the supervisor, and non-involvement in the decision-making process. These factors make the employees feel detached from the organization [14]. Several psychosocial and work environment variables directly impact job satisfaction, where even a raise in rewards will not improve the employee's dissatisfaction level [28].

Few participants thought that alert discipline leads to delays in the salary increase. The need for continuous activation of the practical training course was recognized. The study revealed the importance of making employees feel responsible, providing training courses in different fields, and providing services and work facilities as contributing factors to improving working conditions. Many motivational factors can help employees find their worth concerning their value in the organization. These factors include the nature of work, the recognition and responsibility granted, the sense of achievement, and personal development opportunities [29]. Organizations must identify the employees' needs and satisfy them to ensure the effective achievement of their goals [30].

The study participants emphasized the importance of having an appropriate and motivating working environment. An appropriate working environment enhances employees' loyalty, increases commitment, and ensures efficiency and effectiveness. It also enhances productivity and might develop a sense of ownership among employees. Eventually, this will increase the effectiveness and reduce the lost cost from unsatisfied employees [2,31].

The factors recognized in this study and emphasized by the study participants can be classified under the main motivation and hygiene factors responsible for work satisfaction and dissatisfaction, as described in Herzberg's theory. Although our findings go in line with the Herzberg two-factor theory, the theory itself has several limitations. The theory has been criticized for being inconclusive as it is limited to some professions as some professionals might like responsibility and challenging jobs while the employees in general work are motivated by payment and other benefits. Therefore, the effect of the two-factor theory may be reversed on some other categories of people. The second limitation is that the primary emphasis of Herzberg's theory is on job enrichment and has completely ignored the workers' job satisfaction. It does not provide adequate importance to status, payment, or interpersonal relationships, which are usually considered great motivators. The third limitation is the subjectivity type of information or data and the potentially biased methodology. However, Herzberg's theory has been criticized for its non-conclusiveness, subjective and biased methodology, and primary emphasis on job enrichment [10,11].

Although we based our study on Herzberg's theory, recent research has recommended that organizations should aim to consider McClelland's theory in motivating their employees. The main reason for such a recommendation is that the theory looks so factual that it flawlessly fits into real-life situations because people need change through life experiences and cultural opinions [10].

This study has some limitations. This study only included one work setting at the ministerial level. Employees at other settings and the directorates or institutes levels might have completely different perspectives and concerns. We did not include a sample size calculation and random selection of the study sample. The two limitations above might affect the representativeness and generalizability of our findings. Due to the specific characteristics of the data and variables included in this study and the lack of specific data on the participants' variables, analytical statistics, and assessment of relationships between different variables and concepts were not applied. Another limitation of this study is the lack of a clear conceptual base and a theoretical framework for the stud, with a poor empirical analysis required for explorative testing of the model. This study was indirectly based on one particular model and framework, Herzberg's two-factor or motivation-hygiene theory. This study did not develop its explorative model or theoretical framework.

Further studies need to consider samples from other settings and institutions. As work performance was not well defined and conceptualized in this study, further studies should also include other working conditions and work satisfaction variables, including performance elements such as competence, work process, and tasks.

CONCLUSION

Low work awareness and commitment existed among employees. The working environment was an important factor in the job satisfaction of employees. Inappropriate working conditions limit the opportunities to render the capabilities of employees to achieve their full potential. Employers must realize the importance of an appropriate working environment. It is important to make employees participate actively in the decision-making process, provide flexible working hours, provide less workload, apply a teamwork approach, and ensure supportive management to affect the employees' performance positively. This can increase job satisfaction and promote work commitment, motivation, and productivity. Further studies should also assess job profiles and link them with the related knowledge, skills, and competencies.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

FUNDING

No funding was received.

AUTHOR'S CONTRIBUTIONS

IAM and NPS designed the study. IAM and SAS collected data. AMS and NPS interpreted the results, prepared all tables and figures, wrote the manuscript. All authors reviewed it before submission.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethical Committee of Hawler Medical University. Informed consent was obtained from all participants after explaining all the details of the study to them. All methods were performed in accordance with the relevant guidelines and regulations.

References

1. Hafeez I, Yingjun Z, Hafeez S, Mansoor R, Rehman KU. Impact of workplace environment on employee performance: mediating role of employee health. Business, Management and Economics Engineering. 2019;17(2):173-93.
2. Raziq A, Maulabakhsh R. Impact of working environment on job satisfaction. Procedia Econ Financ. 2015; 23(2015):717-25.
3. Alrawahi S, Sellgren SF, Altouby S, Alwahaibi N, Brommels M. The application of Herzberg's two-factor theory of motivation to job satisfaction in clinical laboratories in Omani hospitals. Heliyon. 2020; 6(9):e04829.
4. Lee B, Lee C, Choi I, Kim J. Analyzing determinants of job satisfaction based on two-factor theory. Sustainability. 2022; 14(19):12557.
5. Holston-Okae BL, Mushi RJ. Employee turnover in the hospitality industry using Herzberg's two-factor motivation-hygiene theory. Int. J Acad Res Bus Soc Sci. 2018;8(1):218-48.
6. Steyn R, Vawda N. Job characteristics: their relationship to job satisfaction, stress and depression. J Psychol Afr. 2014; 24(3):281-4.
7. Aziri B. Job satisfaction: a literature review. Manag Res Pract. 2011;3(4):77-86.
8. Unanue W, Gómez ME, Cortez D, Oyanedel JC, Mendiburo-Seguel A. Revisiting the link between job satisfaction and life satisfaction: The role of basic psychological needs. Front Psychol. 2017 May 9;8:680.
9. Shaikh SH, Shaikh H, Shaikh S. The impact of job satisfaction and job dissatisfaction on Herzberg theory: A case study of Meezan Bank Limited and National Bank Limited. Int J Bus Soc Sci. 2019; 10(6):143-7.
10. Osemeke M, Adegboyega S. Critical review and comparism between Maslow, Herzberg and McClelland's theory of needs. Funai Journal of Accounting, Business and Finance. 2017;1(1):161-73.
11. Sinha K. Herzberg's Motivation-Hygiene Theory: Factors and critical analysis. [updated 2018; cited 2022 Mar 4]. Available from: https://www.yourarticlelibrary.com/motivation/theories-motivation/herzbergs-motivation-hygiene-theory-factors-and-critical-analysis/63879.
12. Kitsios F, Kamariotou M. Job satisfaction behind motivation: An empirical study in public health workers. Heliyon. 2021; 7(4):e06857.
13. Sinha DK. McClelland's Need for Achievement Theory. [updated 2015; cited 2022 Mar 4]. Available from: http://www.yourarticlelibrary.com/entrepreneurship/motivation-entrepreneurship/mcclellands-need-forachievement-theory/40683/.
14. Massoudi AH, Hamdi SS. The Consequence of work environment on Employees Productivity. IOSR-JBM. 2017;19(01):35-42.
15. Zhang X, Kaiser M, Nie P, Sousa-Poza A. Why are Chinese workers so unhappy? A comparative cross-national analysis of job satisfaction, job expectations, and job attributes. PLoS ONE. 2019; 14(9):e0222715.
16. Davidescu AA, Apostu SA, Paul A, Casuneanu I. Work flexibility, job satisfaction, and job performance among Romanian employees—Implications for sustainable

human resource management. Sustainability. 2020;12(15):6086.
17. Iverson RD, Zatzick CD. The effects of downsizing on labor productivity: The value of showing consideration for employees' morale and welfare in high-performance work systems. Hum Resour Manage. 2011;50:29-44.
18. Boštjančič E, Petrovčič A. Exploring the relationship between job satisfaction, work engagement and career satisfaction: The study from public university. Hum Syst Manag. 2019;38(4):411-22.
19. Donley J. The impact of work environment on job satisfaction: Pre-COVID research to inform the future. Nurse Lead. 2021;19(6):585-9.
20. Karaferis D, Aletras V, Niakas D. Determining dimensions of job satisfaction in healthcare using factor analysis. BMC Psychol. 2022; 10(1):240.
21. Bakotić D. Relationship between job satisfaction and organisational performance. Economic Research-Ekonomska Istraživanja. 2016;29(1):118-30.
22. Dobre OI. Employee motivation and organizational performance. Review of Applied Socio-economic Research. 2013;5(1).
23. Lane K, Esser J, Holte B, Anne MM. A study of nurse faculty job satisfaction in community colleges in Florida. Teach Learn Nurs. 2010;5(1):16-26.
24. Bos-Nehles AC, Veenendaal AA. Perceptions of HR practices and innovative work behavior: the moderating effect of an innovative climate. Int J Hum Resour Manag. 2019;30(18):2661-83.
25. Nguyen PN, Nguyen LL, Le DN. The impact of extrinsic work factors on job satisfaction and organizational commitment at higher education institutions in Vietnam. J Asian Finance Econ Bus. 2021;8(8):259-70.
26. Oven A, Domajnko B. Job satisfaction and creativity at work among occupational therapy practitioners: A mixed-methods study. Work. 2021;69(4):1351-62.
27. Tariq M, Ramzan M, Riaz A. The impact of employee turnover on the efficiency of the organization. Interdisciplinary Journal of Contemporary Research in Business. 2013:4(9):700-11.
28. Sell L, Bryan C. Job satisfaction, work environment, and rewards: Motivational theory revisited. Labour. 2011;25(1):1-23.
29. Baah K, Amoako GK. Application of Frederick Herzberg's Two-Factor theory in assessing and understanding employee motivation at work: a Ghanaian perspective. Eur J Bus Manag. 2011;3(9):1-8.
30. Dobre OI. Employee motivation and organizational performance. Review of Applied Socio-Economic Research. 2013;5(1):53-60.
31. Rahman KU, Akhter W, Khan SU. Factors affecting employee job satisfaction: A comparative study of conventional and Islamic insurance. Cogent Bus Manag. 2017;4(1):1273082.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

HEALTH INSURANCE AND HUMANOID ROBOT-AGENTS: A CASE STUDY

Ashu Tiwari

University of Petroleum & Energy Studies Dehradun, India

Correspondence: ashu.tewari25@gmail.com

ABSTRACT

The Sustainable Development Goal (SDG) Target 3.8 has emphasized the persistence of health risks as a major challenge for emerging and developing countries. This challenge necessitates the achievement of Universal Health Coverage (UHC) by enhancing the infrastructure of the public sector. However, relying solely on public sector healthcare may not be sufficient to meet the needs of large populations, particularly in underdeveloped regions. Consequently, private sector healthcare solutions have emerged to fill service gaps, but they remain unaffordable for many low-income individuals. To the end, Health insurance can play a crucial role in making these services more accessible and affordable, but it faces several challenges including poor accessibility, low awareness, lack of skilled workforce, and corruption.

The integration of Artificial Intelligence (AI) and Machine Learning (ML) technologies can offer solutions to these challenges. However, the adoption of technology in the insurance domain poses behavioral challenges that must be identified and addressed. This is particularly important in developing and emerging countries where markets are still underdeveloped, and information asymmetries are high. This study examines some of these challenges by studying people's attitude towards humanoid agents. For this study a case study approach has ben used. Overall, addressing the challenges of health insurance and incorporating advanced technologies can provide a vital safety net against health risks to people.

KEYWORDS

health expenditure, rising inflation, robot advisors, health insurance value chain.

INTRODUCTION

After COVID-19, spending on health-related products has significantly increased [1]. Reports show that the global spending on health in 2020 was $USD9 trillion, which represented 10.8% of the global gross domestic product (GDP) [22]. For lower and middle-income group countries, this figure is even higher [22]. This unusual increase in health spending during the pandemic reinforces the need to focus on the macroeconomic uncertainty that arises due to health risks. Health financing is a crucial policy area that is often underutilized despite the abundance of literature available. Among the different options available for health financing, insurance products and services have garnered attention, and governments have been promoting them. However, the high cost of health insurance remains a significant challenge that limits the effectiveness of these products for the public.

Studies have identified market inefficiencies as the main cause of high health insurance costs, which stem from inadequate information exchange [5,2,7,9]. To capture the customer information, the products may be made or updated several times in response to changes in the risk profile of the insured. However, to control costs, risk profiling of individuals remains static most of the time, in the sense that firms take data only at the time of underwriting the health insurance product [2, 3]. But this, in turn, increases the claim ratio, and the overall cost of health insurance products goes up [1, 4, 5]. Furthermore, this mechanism does not enable consumers to fully decipher the information pertaining to the product.

Similarly, there are several other instances of trade-offs between cost and value due to inadequate information exchange between buyer and seller. Therefore, health insurers must ascertain how to deliver both value and quality. To do so, firms have been employing advance IT-enabled solutions and employing them at various stages of the insurance value chain [6–8]. The level of technology integration is rising every year. McKinsey & Company predicts that by 2025, 25% of insurance activities will be automated through AI and machine learning [3, 4, 7]. They claim that evolving technologies are transforming the health insurance industry on several fronts, starting from demonstrating the complex terms and conditions to insurance clients to collecting the real time data on risk behaviour of individuals [5]. Moreover, in recent few years, several AI driven apps such as chat-bots, instant call patch for tele-medicals, video-based verification in regional languages, personalized customer care services have grabbed significant portions of insurance business operations [11].

Despite favorable industry reports , some studies express reluctance and highlight the lack of human touch associated with these technologies. However, recent developments such as the creation of Chat-GPT - an AI-based program designed to simulate human-like conversation - challenge this argument to a great extent. In light of these developments, we are interested in exploring the feasibility of humanoid insurance agents, which are physical robots designed to interact with customers in person. While there has been some discussion of this concept in the existing literature, little attention has been given to its potential application in the health insurance domain [5, 9]

The health insurance industry is a highly knowledge-intensive field, requiring agents to invest significant amounts of time and effort to gain a thorough understanding of the complex products they offer. These products involve the integration of information from three distinct fields: medicine, finance, and law, making it a challenging area to master. Therefore, leveraging robotic technologies to simplify and integrate information can enhance the provision of customized services, which is crucial in facilitating the sale of health insurance products. The role of such technologies becomes even more critical in light of the intricate nature of these products, market imperfection, and low affordability of people after the recent pandemic [6,10]. In the insurance domain, most of market imperfection arises when there is an asymmetry of information between the sellers and buyers of a product, meaning that one party has access to more or better information about the product than the other. The role of insurance agents is critical in bridging the information gap. However, in developing and emerging countries, the shortage of trained agents poses a significant challenge, as it hampers a firms ability to perform this crucial function effectively. Moreover, these countries face poor demand for health insurance products. This creates two-way pressure on firms [16, 7].

In this regard, the closest industry from which insurers can learn is the healthcare industry. Hospitals, in particular, have long struggled with the challenge of finding good doctors. To address this issue, the healthcare industry has increasingly turned to devices equipped with Artificial Intelligence (AI) to improve the quality of health care [11].

Overall, AI technologies have the potential to bring significant benefits to society and can be leveraged in various ways to improve people's lives. However, implementing new technologies can be challenging and sometimes riskier. Therefore, it is important to exercise due care. To address this issue, the current study employs technology diffusion theory [21] and aims to understand how people would respond to a hypothetical scenario in which firms adopt humanoid agents to minimize the information gap in the health insurance domain, replacing traditional agents. Technology diffusion theory provides a framework for examining the various factors that influence technology adoption and diffusion in any organization and society. These include relative advantage of new technology over existing ones, its compatibility with existing systems, its complexity, the level of trialability and observability, and the behavioral and social norms and

values of the society organization and its members [4, 5]. However, in the current work, we are interested in identifying behavioral and social norms.

RESEARCH GAP AND THE STUDY QUESTION:

Previously, several authors have explored the feasibility of integrating Information and Communication Technology (ICT) enabled devices in the insurance industry from the different theoretical perspectives. Some of them highlight the contradictory behaviour of ICT adopters and insurance consumers towards risk aversion deters the feasibility of ICT-enabled in insurance domain in general [9, 12].

There are also studies that have focused on cognitive ability of these machines to carry out business processes, replacing manual activity [14]. Nevertheless, none of these studies have examined behavioral aspects I.e., people's attitudes towards robotic technology for reducing information asymmetry in health insurance. Therefore, we conducted in-depth surveys to investigate how people perceive the integration of robot agents in the health insurance value chain. Firstly, we have sought to understand people's perspectives regarding the use of robot agents in health insurance. In doing so, we explored two sub-questions:

(1) What attitudes do people have towards humanoid robots in health insurance?

(2) What benefits can a humanoid robot have over a traditional agent in health insurance value chain according to the people?

RESEARCH METHODOLOGY

The study was conducted using a standard and systematic approach appropriate for qualitative research. A detailed overview of the data collected and the procedures employed for data analysis is provided.

Designing the Questionnaire: A semi-structured interview questionnaire was utilized to collect data for a study on the integration of advanced technologies in insurance services. The questionnaire was developed based on concepts presented in existing literature and refined through preliminary interactions with senior employee's insurance and insurance research organization. During this, we followed standard protocol discussed in existing literature [23]. The interview questions focused on the benefits and drawbacks of advanced technology integration, including during after-service support and complaints, as well as changes in satisfaction, perception, and value creation. Initially, the questions were deliberately broad and simple, with a gradual narrowing of focus as the study progressed. Later on, very specific questions were also asked to understand the possible fears, biases, satisfaction, benefits, and perception in the context of healthcare insurance.

BACKGROUND INFORMATION ABOUT PARTICIPANTS:

In our study sample, there are 40% women and the rest (60%) are men. The age group of participants ranges between 20 to 50 years (20-30 years=40%, 30-40 years=35% and the remainder (25%) belongs to the 40-50 years age group). In terms of education, 69.9% of this population has completed higher education, 20.1% has completed middle education, and 10% has completed lower education. For this study sample 29.7% have met humanoid robots whereas, 70.3% have at least heard or read about them.

PROCEDURE OF DATA COLLECTION:

This study utilized convenience sampling to identify our subjects of this study. However, we have also incorporated snowball sampling on occasion to increase the sample size. The population of interest for our research are individuals associated with the health insurance industry. To gain a more comprehensive understanding of the topic, our sample includes consumers, mid-career sales managers with 6 to 8 years of experience, and agents with more than ten years of experience.

Data has been collected through a three-stage process, with each stage defined by the level of involvement of the subjects with the researcher (see Table 1). In the first stage, the researcher has explained the purpose of the study and asked intended questions. This stage is labeled as such because the subjects are not entirely open during the initial interaction. However, with the help of senior staff members and persuasion, the subjects give responses despite some visible resistance. The researcher continues to contact them but avoids interview sessions to minimize the risk of influencing the subjects. After two weeks, the researcher approaches the subjects for the second round of interviews and find that they are more open to answering the study questions. To gain further insights, the researcher approaches the subjects for a third round of interviews. In the third round, the subjects are found to be more involved, and many have conducted their own research on the topic. Thus, the researcher has conducted interviews with the same respondents in all three stages, focusing on

ifferent dimensions with more in-depth discussions in each setting.

TABLE 1: TOTAL NUMBER OF STAGES AND TOTAL NUMBER OF INTERVIEW UNDER EACH STAGE

Stage	No. of Interviewees	No. of Interviews	Focus of Discussion
I	8	12	Possibility of robots working as a health insurance agents.
II	8	10	Advantages & Disadvantages
III	7	11	Limitation
Total	23	33	

Source: Author

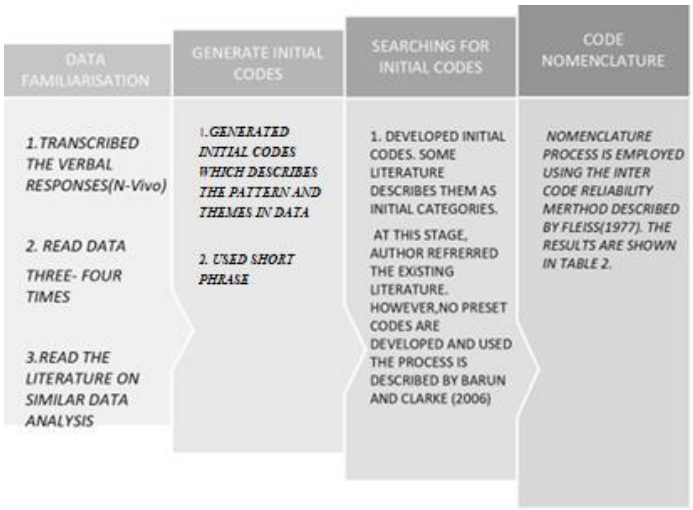
In this work, the researcher follows the protocols of in-depth interview. While in survey, the researcher creates a list of questions before hand, and prompt questions. In the interview, the researcher lets natural conversations emerge based on the prompt statements. However, the researcher sometimes intervenes to redirect the conversation back to the topic at hand. In the current discussion, the researcher tries to capture all the possible factors that can impact feasibility of robots as health insurance agent in reducing the information gap. Therefore, in-depth interviews have been very useful in current scenario. In order to ensure validity, researcher has conducted interview of same people in three different stages with same subject. To do so she keeps the gap of two weeks between the two interviews. After three rounds of interviews, the researcher observes the consistency and maturity in the information. Therefore, author stops the interview. In accordance with the guidelines of Guba and Lincoln [19], the researcher places emphasis on ensuring trustworthiness throughout the analysis of the interview data. As outlined by Guba and Lincoln, trustworthiness comprises four key concepts: credibility, confirmability, transferability, and dependability. These concepts are essential for establishing the validity and reliability of the research findings. Paper has utilized self-correcting methods to improve the study. In order to establish credibility, current study depends on triangulation, and peer debriefing process. Since the topic of discussion in current work is quite futuristic, and much work is yet to be done in this field. Therefore, for the review and literature gap, current study relies on the industry reports and peer debriefing. To overcome researcher's bias, author has used the method of audit trail in the following way. As an initial point, we record the response of each participant and then try to identify initial code and thereafter, second order variables. This process helps in reducing biases as researcher. For qualitative transferability, we have searched some of the similar fields where related innovations are being studied such as medical science, insurance and banking. We find that studies are showing similar result in those fields as well. For example, in healthcare sector, robots are applied with great efficiency however similar problems are seen there as well [23].

The author took help from other researchers for interpretation of participants results. In doing so, the senior administrators of the healthcare organization (All Indian Institute of Medical Sciences, India) were approach for ethical clearance. However, the author was suggested that such ethical clearance is not required as the current study attempts to capture the 'perpetual data' and does not involve any clinical interventions or patient-interactions.

DATA ANALYSIS AND THEME GENERATION:

At the beginning of the analysis, the author utilized N-vivo software to generate initial codes. Due to space constraints, the original responses from the subjects are not included in the paper. However, Figure 1 briefly outlines the data analysis process. The basic codes and broad themes are summarized in Table 2.

FIGURE 1. THIS FIGURE DEMONSTRATES THE PROCESS EMPLOYED FOR DATA ANALYSIS.



STEPS FOR DATA ANALYSIS

TABLE 2: GENERATING THEMES FROM CODES

List of Basic Codes	Themes and percentage of agreement among coders (66.70 %)	Themes and percentage of agreement among coders (67.40%)	Themes & Elements under it
• Information Storage • Random Question • Meticulous Underwriting • Agent converts leads into sales • Part time agents • Full time agents • Particular to details • Empathy • Situational decisions • Sympathy	Human Elements	Machine Elements	Human Elements Emotional Quotient • Empathy • Sympathy • Trust • Long Acquaintance Intellectual Quotient • Situational Judgement • Random Answer • Covert leads into sales • Manipulation Machine Elements • Information Storage • Meticulous Underwriting • Non-manipulative behaviour
	Situational Decision Sympathy Empathy Particular to non-mechanism details Random Answers Full time agents and details Converts leads into sales	Meticulous Underwriting Information storage Part time/ non serious agents	
• Information Storage • Random Question • Underwriting • Sales • Part time agents • Full time agents • Particular to non- automated details • Empathy	Human Elements	Machine Elements	
	Empathy Sympathy Performing Sales Situational Decisions Full time agent	Underwriting Information Storage Part time agents	

• Situational decisions • Sympathy			• Training Need Others • Positioning
• Training • Human Reflection • Erroneous decisions • Large information storage • Trust • Agent's reputation • Long term relationship	Human Element Long term relationship with clients Trust Agents Reputation	Machine Elements Training Human Reflection Less prone to errors large storage capacity	
• Random queries • Personality • Manipulations • Personality • Emotions • Influence • Manipulation • Trust	Human Element Manipulative Personality Trust Random Decisions	Machine Elements Non manipulative Trust that information is correct	
• Emotional element • Reliability • Risky decisions • Trust • Long-time acquaintance • Advice from known one • Intermediary • Direct Sales • Lack of situational judgement • Lack of emotional • element	Human Element Long-time acquaintance Reliability to understand emotional needs of customers. Role of intermediary lawyer	Machine Element Lack of situational judgement Lack of emotional element	
• Manipulative	Human Element	Machine Element	

• Convincing • Information • Storage • Capacity • Emotional intelligence customization of services	• Information	• Emotional • Intelligence	
• Positioning of insurance agents and robotics agents is not the same • Emotions	Human Element	Machine Element	
		• Emotions customization of services	

FINDINGS

Lack of emotional traits such as empathy, kindness and emotional intelligence limit the feasibility of robot agents in the health insurance domain. In general, insurance agents regularly make visits to their clients and better understands the fears and need of their consumer. Therefore, people give more value to long term association over the in-depth product knowledge. Our analysis has also revealed that insurance agents sometimes offer personal favors that are not directly related to insurance sales. These indirect favors can help to facilitate the sales process. However, contrary to this, robots cannot offer such benefits to their consumers. As a result, they cannot match human agents in terms of emotional intelligence. However, robots have an advantage in information exchange due to their capacity to store and process large volumes of data with higher accuracy, aided by AI and ML technologies. They are particularly suitable for tasks that involve screening, validating, and verifying customer information, as well as underwriting policies. This is because robots cannot manipulate information to close sales, which ensures their reliability and accuracy in these specific tasks. While they are not capable of generating new leads or closing sales, insurance managers believe that they could potentially replace part-time agents who have been known to engage in poor policy underwriting practices.

Respondents believe that insurance sales do not occur in automated setting as many a times, people ask the questions that are not directly associated with sales. However, these questions are important for building the trust. Agents can manage such queries but, robots are less likely to handle such random questions.

In summary, traits of agents and robot advisors are partially overlapping. In many ways, these traits are crucial to facilitate the health insurance sales. Therefore, managers and consumers believe that robot advisors can improve the efficiency of health insurance value chain by reducing the problem of adverse selection.

RESULT & DISCUSSION

The study results identify that people believe that both traditional agents and robot agents possess unique traits that are essential for facilitating insurance sales in different ways. While traditional agents may have limitations in processing information from multiple fields, robots lack emotional traits.

such as empathy and building long-term trust that are essential in the health insurance domain. However, these non-overlapping human traits are vital for making insurance sales more efficient. Combining robots with human agents can help improve sales ratios and reduce information gaps. We have summarized this in Figure 2. Similar discussions have been observed in previous studies on the use of robotic advisors in the banking and healthcare industries [11, 16, 20].

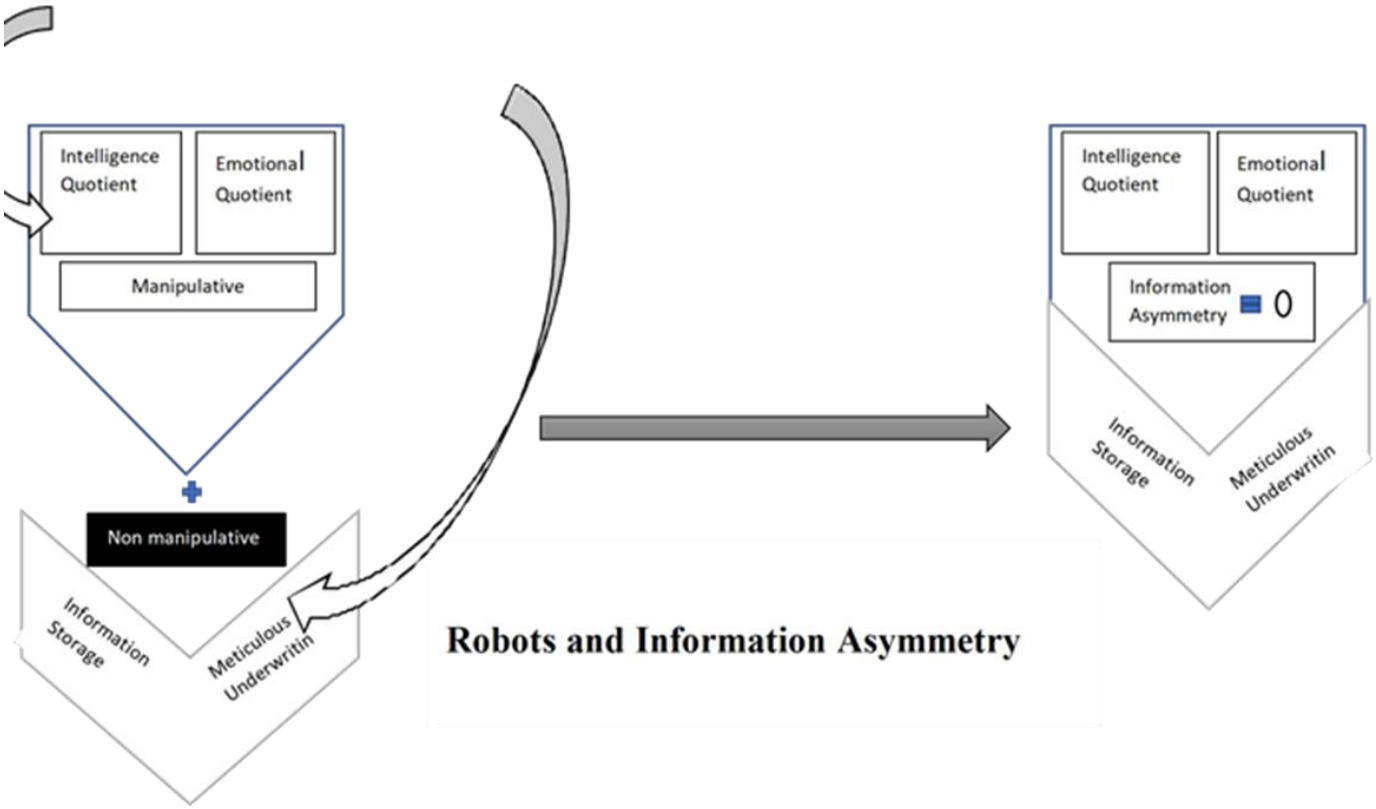
IMPLICATION FOR THEORY:

In a groundbreaking study [17], the author posits that the absence of adequate information in the market leads to the displacement of high-quality products by inferior ones. With the advent of ICT, scholars like [3] and [5] have argued that this technology can significantly mitigate the information asymmetry present in financial markets, allowing superior products to maintain their market share. However, integrating technology in any industry poses numerous challenges, many of which may be behavioral in nature. As a result, several studies [6, 8, 12] have argued that while technology can improve information flow, it may also have adverse effects on certain aspects of the industry. This paper explores people's attitudes towards humanoid agents, within the context of the technology diffusion theory. Our findings suggest that consumer behavior is also a factor that can impede technology adoption, thus expanding the technology diffusion theory in a unique way [21].

IMPLICATION FOR PRACTICE:

The present paper highlights how technology can be leveraged to address these challenges. It is important to note, however, that the implementation of technology must be done correctly and carefully to achieve desirable outcomes. The paper focuses on the potential of robot agents in resolving these issues and finds that these agents are not suitable for working in isolation. Instead, they should be used in conjunction with human agents for optimal results. Consequently, managers can leverage the study's findings and implement robotic technology solutions to reduce information gaps and costs in their organizations.

FIGURE 2: THIS FIGURE DESCRIBES HOW BLEND OF MACHINE AND HUMAN TRAITS REDUCE INFORMATION ASYMMETRY



IMPLICATION FOR POLICY:

All over the world policymakers are facing the challenges of poor universal health coverage due to rising inflation and recent setback of Covid -19. In this regard, the findings of this papers contribute quite practically. Policymakers can further promote robotic technologies to improve the market mechanism in health insurance sector. Additionally, these technologies can also overcome the language barriers using the robot agents/ advisors and can make the health insurance solutions more informed.

CONCLUSION

In health insurance value chain, there is an urgent need to introduce AI and ML based capabilities to increase accessibility, reduce cost, and enrich existing customer experience. Previously studies have supported that robot can assist insurance sale. But the question remained unexplored was in what way? We have answered it in this paper by exploring the feasibility of robotic technology and found that more than anything, correct position of these capabilities is important. When we talk about the "correct position" of these humanoid agent, we are referring to their utility in relation to the specific needs and requirements of the industry. In this work, we have proposed a solution where robotic advisor work in association with exiting agents can reduce the information asymmetry and promote sales of health insurance products. This work presents solutions based on survey to support the utility of humanoid agents in health insurance domain. Implementing this approach would allow firms to meet their sales targets while maintaining standard claim ratios. Consumers would benefit from customized solutions without incurring extra costs. Theoretically, it extends study [18] argument of reducing the information gaps using ICT based solutions. The findings of this study also support the argument of the technology diffusion theory, which states that the successful adoption of technology depends on its compatibility with existing social settings and systems.

The limitation of current study is that we have collected data from limited number of employees, agents, and consumers only. However, this study has tried to overcome this limitation by supporting the findings with with the existing literature. In future, empirical work can further strengthen the findings of this study.

Reference

1. D. H. Peters, A. Garg, G. Bloom, D. G. Walker, W. R. Brieger, and M. Hafizur Rahman, "Poverty and access to health care in developing countries," Annals of the New York Academy of Sciences, vol. 1136. Blackwell Publishing Inc., pp. 161–171, 2008. doi: 10.1196/annals.1425.011.
2. Wagstaff, A., et.al., , "Global monitoring report on financial protection in health 2021," Geneva, Switzerland: World Health Organization,,2021,pp.1-65, Dec.15,2021.,https://www.who.int/publications/i/item/9789240040953
3. S. Kwon and E. Kim, "Sustainable Health Financing for COVID-19 Preparedness and Response in Asia and the Pacific," Asian Economic Policy Review, vol. 17, no. 1. John Wiley and Sons Inc, pp. 140–156, Jan. 01, 2022. doi: 10.1111/aepr.12360.
4. Coleman M.S., et. al., Care Without Coverage: Too Little, Too Late. Washington (DC): National Academies Press (US).,, 2002. doi: 10.17226/10367.
5. A. Pnevmatikakis, S. Kanavos, G. Matikas, K. Kostopoulou, A. Cesario, and S. Kyriazakos, "Risk assessment for personalized health insurance based on real-world data," Risks, vol. 9, no. 3, pp. 1–15, Mar. 2021, doi: 10.3390/risks9030046.
6. A. Tiwari, A. Patro, and I. Shaikh, "The moderating role of risk aversion on adoption of IT and mobile platforms on P&C insurance demand: Evidence from developing countries," Journal of Electronic Commerce in Organizations, vol. 17, no. 4, pp. 1–15, Oct. 2019, doi: 10.4018/JECO.2019100101.
7. A. Tiwari, A. Patro, and I. Shaikh, "Information Communication Technology-Enabled Platforms and P&C Insurance Consumption: Evidence from Emerging & Developing Economies," 2019, [Online]. Available:https://www.researchgate.net/publication/330822713
8. D. Sharma, J. Gassenheimer, and B. Alford, "Internet channel and cannibalization: An empirical assessment of sales agents' perspective," Journal of Personal Selling and Sales Management, vol. 30, no. 3, pp. 209–221, Jul. 2010, doi: 10.2753/PSS0885-3134300302.
9. A. Tiwari, A. Patro, and I. Shaikh, "The moderating role of risk aversion on adoption of IT and mobile platforms on P&C insurance demand: Evidence from developing countries," Journal of Electronic Commerce in Organizations, vol. 17, no. 4, pp. 1–15, Oct. 2019, doi: 10.4018/JECO.2019100101.
10. S. Johansson and U. Vogelgesang, "AUTOMATING THE INSURANCE INDUSTRY A more digital world will place a

premium on some skills while reducing the need for others," 2016.
11. F. Jiang et al., "Artificial intelligence in healthcare: Past, present and future," Stroke and Vascular Neurology, vol. 2, no. 4. BMJ Publishing Group, pp. 230–243, Dec. 01, 2017. doi: 10.1136/svn-2017-000101.
12. Nitto H, Taniyama D., and Inagaki H. "Current Status of Social Acceptance of Robots and Artificial Intelligence II Differences in Attitudes toward and Acceptance of Robots in Japan" Nomura Research Institute,Ltd, 2017;https://www.nri.com/-/media/Corporate/en/Files/PDF/knowledge/report/cc/papers/2017/np2017211.pdf
13. Asongu S, Le Roux S, Nwachukwu J, Pyke C. Reducing Information Asymmetry with ICT: A critical review of loan price and quantity effects in Africa. International Journal of Managerial Finance. 2019 Mar 7, doi: 10.1108/IJMF-01-2018-0027.
14. A. Bertolini et al., "On Robots and Insurance," Int J Soc Robot, vol. 8, no. 3, pp. 381–391, Jun. 2016, doi: 10.1007/s12369-016-0345-z.
15. G. Rasmussen and T. van Leeuwen, "Special issue: The human touch – Analyzing online and offline shopping," Discourse and Communication, vol. 16, no. 2. SAGE Publications Ltd, pp. 149–159, Apr. 01, 2022. doi: 10.1177/17504813211043600.
16. S. Vellakkal, "Adverse Selection and Private Health Insurance Coverage in India A Rational Behaviour Model of Insurance Agents under Asymmetric Information," 2009. [Online]. Available: http://ssrn.com/abstract=2049311iihttps://ssrn.com/abstract=2049311 Electroniccopyavailableat:http://ssrn.com/abstract=2049311
17. G. A. Akerlof, "The market for 'lemons': Quality uncertainty and the market mechanism," in Decision Science, Taylor and Francis, 2017, pp. 261–273. doi: 10.1017/cbo9780511609381.002.
18. A. Nicolet et al., "Exploring Patient Multimorbidity and Complexity Using Health Insurance Claims Data:A Cluster Analysis Approach," JMIR Med Inform, vol. 10, no. 4, Apr. 2022, doi: 10.2196/34274.
19. J. A. Guba and Y. S. Lincoln,"Naturalistic inquiry," Sage Publications, Beverly Hills, CA, 1985.
20. K. Chen, "Financial innovation and technology firms: A smart new world with machines," in International Symposia in Economic Theory and Econometrics, vol. 25, Emerald Group Publishing Ltd., 2018, pp. 279–292. doi: 10.1108/S1571-038620180000025012.
21. Rogers, Everett M. Diffusion of innovations. Simon and Schuster, 2010.
22. Yamamoto N., Essential Nutrition Actions: Mainstreaming Nutrition through the Life Course (2nd ed.). Geneva: World Health Organization, (2021). Available:https://apps.who.int/iris/bitstream/handle/10665/365133/9789240064911-eng.pdf.
23. Yoon YE, Lee HH, Kim KH, Park SY, Moon HS, Lee SR, Hong YK, Park DS, Kim DK. Focal therapy versus robot-assisted partial nephrectomy in the management of clinical T1 renal masses: a systematic review and meta-analysis. Medicine. 2018 Nov;97(45).

ACHSM Asia-Pacific Journal of Health Management shape

RESEARCH ARTICLE

MENTAL WELLBEING AND RECREATIONAL SPORTS – TWO TOGETHER FOR A HEALTHY WIN - IMPLICATIONS FOR HIGHER EDUCATION INSTITUTIONS

Aparna Pandey, Anjali Chopra, Shailaja Karve*

K J Somaiya Institute of Management, Somaiya Vidyavihar University, Mumbai, India

Correspondence: aparna.pandey@somaiya.edu

ABSTRACT

The current research highlights how recreational sports enhance student wellbeing and promote physical and mental health through positive social bonding. The Indian social fabric is culturally and traditionally more interconnected as Indians thrive on social networks and engage in several festivals, celebrations, and get-togethers across the year. Therefore, the pandemic and ensuing lockdown created a vacuum. The study explored how students at higher education institutes (HEIs) engaged in Recreational Sports during the lockdown and its role in increasing social bonds, experiencing a feeling of association, positive emotions, relaxing the mind, and promoting overall wellbeing. Further, the present study identifies factors that influence the intention to continue engaging in recreation sports on an ongoing basis (a behaviour that was picked up during the pandemic to cope with lockdown and isolation). The current need is to understand how learning and developing behavioural competencies can be encouraged through active learning in open spaces to overcome social isolation as all types of physical-sports activities favor psychological wellbeing. The present study uses the TPB (Theory of Planned Behavior) framework to identify factors that influence the intention to continue engaging in recreation sports on an ongoing basis. Social contact time, with many shared experiences, has multiple benefits. It not only helps in stress release but also motivates and provides comfort in the company of friends and colleagues. Therein lies the importance and relevance of Outdoor Behavioral Experiential Learning (OBEL) and recreational sports.

KEYWORDS

mental wellbeing, recreational sports, open spaces, higher education

INTRODUCTION

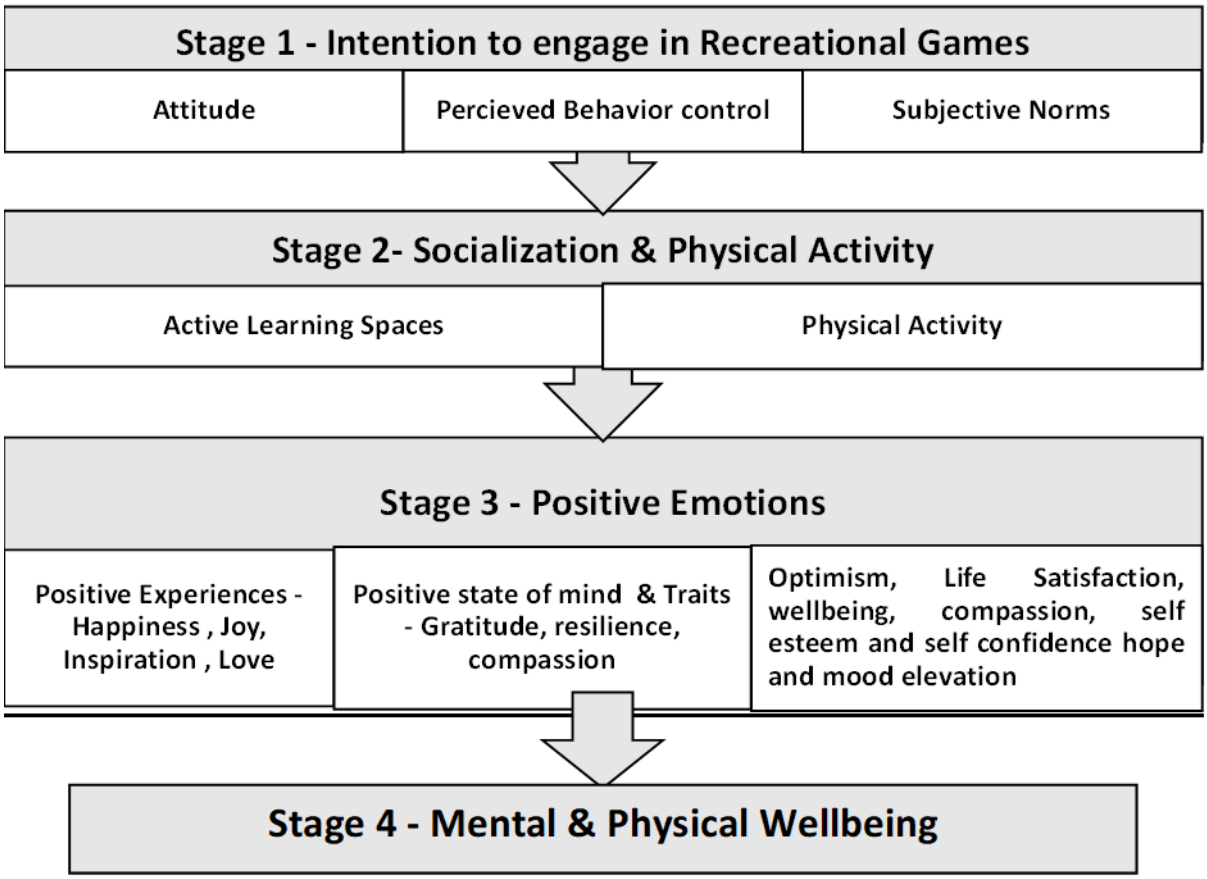
During COVID-19, students in higher education faced unprecedented challenges in the teaching-learning space and were forced to adapt to new learning environments and mediums while encountering uncertain career prospects. The Indian Psychiatry Society survey (2020) [1] reported a 20% increase in the number of people suffering from poor mental health. The COVID-19 pandemic posed a global health crisis and adversely affected both physical and mental health.

The culturally and traditionally interconnected Indian social fabric was shaken as the pandemic and ensuing lockdown created a vacuum. The study explored how students at higher education institutes (HEIs) engaged in Recreational Sports during the lockdown, benefits achieved and factors influencing the intention to continue engaging in recreation sports on an ongoing basis (*a behaviour that was picked up during the pandemic to cope with lockdown and isolation*).

The pandemic brought the importance of social interaction and bonding to the forefront as the imposed restrictions had a profound effect on all aspects of social life [2]. Research [3] found that 24.9% of college students suffered anxiety as daily life was impacted (social distancing), academic activities were curtailed, and uncertain economic prospects seemed imminent which led to increased use of antidepressants, screen fatigue, cultivating new hobbies within the confines of their premises [4] and needed urgent attention. The current need is to understand how learning and developing behavioural competencies can be encouraged through active learning in open spaces to overcome social isolation. All types of physical sports activities, regardless of environment, favor positive psychological wellbeing and management of emotions [5, 6, 7].

Theory of Planned Behavior (TPB) [8], predicts and explains a wide range of behaviors and intentions - *attitude, perceived behavioral control, and subjective norm*. These three constructs explain the individual's intention to engage in a specific behaviour and further state three underlying beliefs. Behavioral beliefs (consequences of a behavior) explain attitude; normative beliefs (how people important to the person want the person to behave) explain subjective norm; and control beliefs (factors that facilitate or impede a behavior) explain perceived behavioral control [9]. According to the TBP framework [9], the stronger the intention, the higher the prospect of performing an action. The TPB framework helps to examine intention to participate in sporting activities [10,11]. The present study uses the TPB framework to identify factors that influence the intention to continue engaging in recreation sports on an ongoing basis.

FIGURE 1- PROPOSED MODEL BY AUTHORS



METHODS

The research methodology consisted of qualitative research followed by quantitative research. Qualitative research was conducted among 10 participants. Inputs from the qualitative research were used to design the questionnaire. A total of 220 participants from India completed the online survey, which was administered during the second wave of COVID-19 (June – August 2021). Participants were in the age group 21-25 years; were students pursuing their higher education across India; 67% were males and 33% were females.

MEASURES AND HYPOTHESIS

The study examines aspects of recreation games played by students of higher education institutions. The variables based on the theory of planned behaviour included attitude, perceived behavioural control, and subjective norms. Recreation games are played for different reasons like social interaction, and for fun and enjoyment. Recreation games also provide personal challenge and sense of accomplishment. Many people play recreation games to compete and improve their performance. Higher education institutions consist of students who compete at various levels like in case study competitions, live projects, job placements. Students display competitive behaviour on various occasions both inside the classroom and outside. Hence the authors decided to include the social interaction and challenging aspect of recreation games as effects of playing recreation game. The outcome variable for the study was the intention to continue playing recreation games, consisting of three variables: Sense *of belonging, feeling cared for, and I am a better practitioner*. 13 items were measured, 3 items of subjective norms [9], 3 items of perceived behavioural control, and 4 items of attitude plus intention to continue playing (3 items), using a 5-point Likert scale with 1 = strongly disagree and 5 = strongly agree.

The research attempted to answer the following questions:

- What were the recreation games played by students during the pandemic and reasons for playing them?
- What were the benefits of playing recreation games?
- What are the drivers of intention to continue playing recreation games?

The hypothesis for the research was as follows:

H1: *Positive attitude towards recreation games has a positive influence on the intention to continue playing recreation games*

H2*: Subjective norms has a positive influence on the intention to continue playing recreation games*

H3: *Perceived behavioural control has a negative influence on the intention to continue playing recreation games*

DESIGN AND PROCEDURE

Qualitative research was conducted among 10 students. Since qualitative research does not have any specific rule or criteria [12] regarding adequate sample size, a sample size of 10 was considered appropriate. The information gathered focused on types of recreation games played, reasons for playing them, advantages of recreation games, intention to continue playing recreation games and details on the three constructs – attitude, subjective norms and perceived behaviour control. The questionnaire was designed and tested on a small sample post qualitative research to check for inaccuracies, language issues, understanding of variables, etc. Pilot surveys typically follow a subjective criterion on sample size due to a lack of available guidelines [13], hence the pilot survey was administered among 10 target respondents. The questionnaire was modified based on the feedback given during the pilot survey and administered in an online format.

DATA ANALYSIS

The data was checked for missing information and inconsistencies. The final reusable sample size was 220 after cleaning the data. Statistical Package for Social Science (SPSS Version 24) was used for univariate analysis and AMOS 23 was used for Confirmatory Factor Analysis and Structural Equation modelling.

QUALITATIVE RESEARCH

Qualitative research findings revealed that ball sports were the most popular recreation game, followed by walking and cycling. Some of the reasons why ball sports were popular were – easy availability of ball, can be played alone, stress buster, refreshes the mind etc. Respondents also indicated creative ways of playing ball games – for example using a bucket as a basket, dining table used for indoor table tennis, indoor football etc. It should be noted that the sample consisted of higher proportion of males in the qualitative research and quantitative research (approximately 66%) which could also explain the higher preference for ball games.

Ball games were primarily played for fun as stress busters, helped in social and team interactions, reduced boredom. Even within the confines of homes wherever possible, they were played against walls, in limited spaces with much improvisation. Respondents stated that recreation sports do not require serious investment in infrastructure, goods, or coaches. While the opening of campuses was met with a lot of enthusiasm, it also led to anxiety among respondents. One of the main concerns voiced was sitting in classrooms without breaks. The pandemic, while stressful, had allowed students to learn and walk around the room simultaneously, indulging in frequent recreation games. One of the suggestions is utilizing open spaces as stress busters during

breaks and before and after class hours to enable bonding, engagement, and break from lectures. Below is a summary of the qualitative research in Table 1.

TABLE 1 - IMPACT AND COPING METHODS DURING LOCKDOWN

Themes	Impact	Coping Methods and Experiences	Resultant Emotions and Mental state
Increased Family bonding and security	Initially when the lockdown took place, it was fun to bond with family	In the first phase of lockdown, played table tennis on my dining table; all clubs were closed, I felt better playing with my father	Positive mental state, no insecurity
Isolation	There was fatigue with uncertainty, no meeting friends, and online lectures	When I go out for jogging even with a mask, I feel free	Mood elevation
Lack of Entertainment and socializing	It was very tough not to meet friends for banter and to simply hang around	We even play squash inside our home. A separate area has been made for it. Garage was used to play games	Acceptance and optimistic outlook. Innovative options
Loneliness	Parents working all day in their rooms.	I have hung a cricket ball in a corridor inside my house. I practice cricket strokes with a soft ball	Ideation, Innovation, and experimentation
Frustration	I felt caged and trapped	When I hit ball against wall it gives a feeling of release of stress…	Engagement, energy, and positivity
Increased Restrictions	I felt confined and claustrophobic, I would eat my food during lectures, locked in one room all by myself	It is barely 15 minutes, but hitting a ball against a wall helps me de-stress.	Engagement and energy
Apprehension and fear of future	How will I sit in classroom, tied down to a desk?	I am used to walking around listening to online classes and bouncing ball on wall and also eating snacks sometimes	Distraction to avoid negativity and frustration

QUANTITATIVE RESEARCH

Descriptive analysis of the key variables is presented in Table 2, summarizing various aspects of recreation games, like types of recreation games preferred, amount of time spent per day, reasons for playing, challenges with offline classes and suggestions for offline classroom learning. It is interesting to note that ball games emerged as the most popular recreation game given its versatility and ease of use. As already mentioned, the higher percentage of males (67%) is also a contributing factor to ball games being preferred. A higher proportion of female students preferred staircase climbing and Yoga. Irrespective of gender, almost 40% of the respondents sampled played any form of recreation games for about half an hour daily, and the significant reasons were to beat boredom (68%); entertainment (65%), and a sense of achievement (23%). Low preference for achievement indicates that the pandemic had taken a toll causing intense fatigue, and the reason for playing recreation game was for de-stressing rather than competing. Participants were tilted toward playing in a group (64%) as opposed to playing it individually (36%). Most participants were excited to meet their classmates during offline classes (65%), but one

primary concern was whether they would be able to sit in classes in one place without breaks (73%). As students come back to campus in large numbers, instructors and college authorities need to keep in mind that the earlier traditional way of teaching non-stop for 60 minutes or 90 minutes to a packed class may create huge dissonance. Designing pedagogy with activities, allowing students to step out of the classes, short frequent breaks, redesigning classes, corridors, and walkways to accommodate recreation games etc. would help students de-stress.

The mean scores of the 13 items of theory of planned behaviour are summarized in Table 3. Participants showed high level of agreement on attitude towards recreation games, were neutral towards perceived behavioural control and showed some disagreement on subjective norms. The intention to continue playing recreation games was due to feeling cared for (4.25) followed by sense of belonging (3.76) and was lower for being a better practitioner (3).

TABLE 2 - SUMMARY OF PREFERENCE TOWARDS RECREATION GAMES

Questions	Items	Percentage (%)
Type of Recreation Game preferred	Ball Games (against wall, modified table tennis, bucket and ball, tapping etc.)	70%
	Walking (staircase climbing)	50%
	Running (included indoor running and corridor running during lockdown)	23%
	Yoga	33%
	Cycling	30%
Amount of Time spent per day	Half an hour	40%
	15-20 minutes	34%
	1 hour	22%
	> 1 hour	8%
Play preference	In a group	64%
	Alone	36%
Reasons for playing	To beat boredom	68%
	Entertainment	65%
	Health	62%
	Companionship	44%
	Self-Development	36%
	Achievement	23%
Feelings towards offline classes	Excited to meet classmates	65%
	Peer learning will be higher	54%
	Instructor can understand our doubts better	52%
	Can absorb better what is being taught	47%
Challenges of Offline classes	Not used to sitting at one place for too long	73%
	Classes without breaks	64%
	Feeling cooped up in classroom	44%
	Dealing with hunger pangs	38%
Suggestions to improve classroom experience	More activities during classes	62%
	Breaks in between classes	53%
	Unstructured classes – not confined to classroom only	46%

TABLE 3 – MEAN RATING, SUB SCALES THEORY OF PLANNED BEHAVIOUR

Construct	Item	Mean Rating (5-point scale, 5= strongly agree)
Positive Attitude	RG make me feel happy	4.32
	RG make me feel relaxed	3.81
	RG make me feel energetic	3.86
	RG make me feel competitive	3.75
Subjective Norms	Friends motivate me to play RG	2.59
	I play RG that others play	3
	I am updated with various RG that are trending	2.26
Perceived Behavioural Control	RG require huge investment of time	3.64
	RG require regular practice	3.42
	RG require investment in additional gears and equipment	3
Intention to continue playing recreation games	I intend to continue playing RG due to a sense of belonging	3.76
	I intend to continue playing RG because I feel cared for	4.25
	I intend to continue playing RG because I feel I will become a better practitioner	3.06

Note: Recreation Games is denoted as RG

A confirmatory factor analysis (CFA) was conducted to test four underlying latent constructs, positive attitude, subjective norms, perceived behavioural control, and intention to continue playing recreation games. Attitude, perceived behaviour control, and subjective norms (from the theory of planned behaviour) were exogenous constructs, while the intention to continue playing was an endogenous construct. The initial CFA model which had 4 variables for Attitude, 3 variables for perceived behaviour control and 3 variables for subjective norms and 3 variables for intention to continue recreation games (I feel sense of belonging, I feel cared for, I will be a better practitioner) had average fit, with CFI=0.85 and RMSEA value being 0.11. After dropping 2 items (one from Attitude – recreation games make me feel competitive and one from Intention - I intent to continue playing recreation games since I will be a better practitioner from the endogenous construct intention to continue playing), the final CFA model revealed a satisfactory overall fit (Hair,1998) with following indices ($\chi 2/df$ = 2.80; $\chi 2/df$ <= 2.0 (or 3.0 or even 5.0) considered acceptable, CFI= 0.89, CFI>0.9 considered average, >0.95 considered good, GFI = 0.89; GFI >0.90 considered good, RMSEA = 0.08; RMSEA <=0.08 considered good). A structural equation model was then run on the final CFA model, with the three exogenous constructs - Positive attitude towards recreation games, perceived behavioural control, and subjective norms and one endogenous construct -intent to continue playing recreation games.

With reference to Figure 2 and Table 4, the regression weights reveal the following.

1. Positive Attitude → Intention to continue playing recreation games (std. regression weight = 0.79, significance***)
2. Perceived Behavioural Control → Intention to continue playing recreation games (std. regression weight = -0.18, significance 0.005)
3. Subjective Norm → Intention to continue playing recreation games (std. regression weight = 0.04, significance 0.943)

The SEM revealed that positive attitude towards recreation games and perceived behavioural control were significant factors influencing intention to continue playing, while subjective norms is insignificant. In other words, the role of peers is insignificant, perhaps since recreation games were picked up during the pandemic as a solitary sport for entertainment; however, feeling relaxed and happy and not requiring investment in time and equipment for recreation games is a driver for continuation. (Note – PBC

was reverse coded, hence the regression estimate is negative). The overall R square for the model was 66%.

FIGURE 2 – STRUCTURAL EQUATION MODELLING AMOS OUTPUT

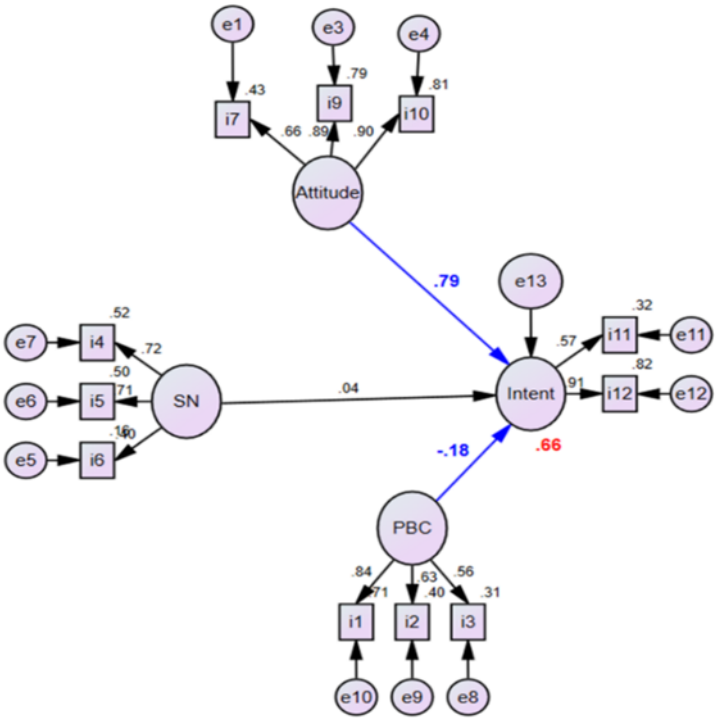


TABLE 4 – STANDARDIZED REGRESSION WEIGHTS

Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
Intent <--- Attitude	1.062	.174	6.085	***	
Intent <--- SN	-.006	.080	-.072	.943	
Intent <--- PBC	-.261	.093	-2.813	.005	

RESULTS

The results stress the importance of recreational sports as even a quick 15-20 min break from classes to stretch (yoga), play ball sports, go for long walks, jog would help to de-clutter the mind and take a break from digital mediums. The need of the hour is to reimagine our classrooms and learning inside closed doors and shift to open movement, walks, and discussions in the long corridors, encouraging case discussions in open spaces. As the education spurs on creative thinking and out-of-box ideation where maybe a jog around the track and return to discuss a case, 15 min fuse-ball, open chess boards etc. will give a more active response and therefore satisfaction. Here mental wellbeing is addressed differently by recreational sports being used to relax the mind.

The role of games in higher education has gained importance over the years. Games played in classroom increases motivation among students and helps in teamwork and collaboration. However, most higher education institutions rely on simulation through games as a medium of instruction. While these are good, often this is restricted to one or two sessions in an entire trimester. While technical skills can be taught through structured pedagogy and assignments, soft skills like creativity, innovation, teamwork require a different approach.

Reductions in stress biomarkers [14, 15] are witnessed when there is contact with nature and natural outdoor settings. Studies document positive impacts of students' physical activity [16, 17] and motivational benefits of teacher-led education outside the classroom [18, 19] and of garden-based learning [20].

PRACTICAL AND MANAGERIAL IMPLICATIONS

The researchers did not come across studies focusing on the connect between recreation games, mental wellbeing, and open learning spaces. This study tries to emphasize the role of recreation games beyond classrooms in fostering cohesiveness, team spirit and inculcating an open inclusive mind-set with a willingness to explore possibilities. Higher education institutions need to focus on infrastructure development beyond smart classrooms, innovation labs, etc., to create open spaces amenable to recreation games and redesign curriculum to include games as part of the education journey. Open spaces like amphitheaters, long open corridors, sit-outs under trees etc., in the campus are mostly utilised by student groups without faculty intervention. Concerted efforts can be made to plan courses which can be delivered in unstructured environment beyond classrooms, indoor games to help learning or/and Outdoor Behavioral Experiential Learning (OBEL) in the form of games or adventure activities or trek etc. could contribute tremendously. Outdoor learning offers students benefits like enhanced engagement, stress reduction besides, physical and psychological wellbeing [21], increased student retention [22, 23], and other benefits associated with exposure to green spaces and wildlife, including physical activity, stress relief, and the rejuvenation of attention [24, 15]. Ancient Indian ways of imparting education through Gurukuls, Rabindranath Tagore's Shantiniketan approach, and modern classrooms with dramatics, theatre, and role-playing are robust examples.

Online learning platforms that saw a surge of student sign-ups e.g, Coursera, Udemy, Upgrad . fall short on social interaction, peer learning, experiential and active learning [25]. Social contact time with many shared experiences has multiple benefits as, it not only helps in stress release but motivates and provides comfort in the company of friends and colleagues and therein lies the importance and relevance of OBEL and recreational sports.

LIMITATIONS

The major limitation of the study is its limitation in understanding the comparative difference in the respondent sample when they play/study indoors versus their mood elevation and stress management when the open active learning spaces are there, and they engage in recreational sports.

CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

ETHICS CLEARANCE

The adult age in India is 18 years for casting the ballot and the respondents of the study belonged to the age group 21 years to 25 Years which falls in the adult category. The respondents of the study willingly participated in the research study as adults. They were given an option of opting out if they desired to do so.

References

1. Grover, S; Sahoo, S; Mehra, A; Avasthi, ; Tripathi, A; Subramanyan, A; Pattojoshi, A; Rao, G. P; Saha, G; Mishra, K. K.; Chakraborty, K; Rao, N P.; Vaishnav, M; Singh, O P; Dalal, P. K.; Chadda, R K.; Gupta, R; Gautam, S; Sarkar, S; Sathyanarayana R T. S.; Kumar, V; Janardran R Y. C. Psychological impact of COVID-19 lockdown, Indian Journal of Psychiatry: Jul–Aug 2020 - Volume 62 - Issue 4 - p 354-362 doi: 10.4103/psychiatry.IndianJPsychiatry_427_20
2. Holmes E. A., O'Connor R. C., Perry V. H., Tracey I., Wessely S., Arseneault L., Ballard C., Christensen H., Silver R. C., Everall I., Ford T., John A., Kabir T., King K., Madan I., Michie S., Przybylski A. K., Shafran R., Sweeney A., Bullmore E. Multidisciplinary research priorities for the COVID-19 pandemic: A call for action for mental health science. Lancet Psychiatry. 2020. 7(6), 547–560. 10.1016/S2215-0366(20)30168-
3. Cao W., Fang Z., Hou G., Han M., Xu X., Dong J., Zheng J. The psychological impact of the COVID-19 epidemic on college students in China. Psychiatry Research. 2020. 287, Article 112934. 10.1016/j.psychres.2020.112934
4. Awasthi P, Spending late night hours on OTT and social media, risk factor for depression: Study, The Hindu Businessline. 2021. February 19 https://www.thehindubusinessline.com/news/science/spending-late-night-hours-on-ott-and-social-media-risk-factor-for-depression-study/article33879596.ece
5. Lawton, E., Brymer, E., Clough, P., Denovan, A. The relationship between the physical activity environment, nature relatedness, anxiety, and the

psychological wellbeing benefits of regular exercisers. Front. Psychol.2017. 8:1058. doi: 10.3389/fpsyg.2017.01058

6. Kerr, J. H., Kuk, G. The effects of low and high intensity exercise on emotions, stress and effort. Psychol. Sport Exerc. 2001. 2. 173–186. doi: 10.1016/ s1469-0292(00)00021-2
7. Biddle, S. J. H. "Exercise, emotions and mental health," in Emotions in Sport, ed. Y. L. Hann (Champaign, IL: Human Kinetics). 2001. 267–292. doi: 10.5040/ 9781492596233.ch-012
8. Ajzen I. From Intentions to Actions: A Theory of Planned Behavior. In: Kuhl J., Beckmann J. (eds) Action Control. SSSP Springer Series in Social Psychology. 1985. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-69746-3_2
9. Ajzen, I. The theory of planned behavior. Organ. Behav. Hum. Decis. Process. 1991.50, 179–211.
10. Papaioannou, A., Theodorakis, Y. A test of three models for the prediction of intention for participation in physical education lessons. International Journal of Sport Psychology.1996. 2: 383-399.
11. Theodorakis, Y. Planned behavior, attitude strength, role identity, and the prediction of behavior. The Sport Psychologist.1994. 8: 149-165
12. Kindsiko E, Poltimäe H. The Poor and Embarrassing Cousin to the Gentrified Quantitative Academics: What Determines the Sample Size in Qualitative Interview-Based Organization Studies? Forum Qualitative Sozialforschung. 2019. 20(3), DOI:10.17169/fqs-20.3.3200
13. Naumann, E., Giel, K. Customer satisfaction measurement and management: using the voice of the customer.1995. Cincinnati, Ohio: Thomson Executive Press.
14. Park, B. J., Tsunetsugu, Y., Kasetani, T., Kagawa, T., Miyazaki, Y. The physiological effects of Shinrin-yoku (taking in the forest atmosphere or forest bathing): evidence from field experiments in 24 forests across Japan. Environ. Health Prev. Med.2010. 15, 18–26. doi: 10.1007/s12199-009-0086-9
15. Kuo, F. E. How might contact with nature promote human health? Promising mechanisms and a possible central pathway. Front. Psychol.2015. 6:1093. doi: 10.3389/fpsyg.2015.01093
16. Mahar, M. T. Impact of short bouts of physical activity on attention-to-task in elementary school children. Prev. Med.2011. 52, S60–S64. doi: 10.1016/j.ypmed.2011.01.026
17. Kvalø, S. E., Bru, E., Brønnick, K.,Dyrstad, S. M. Does increased physical activity in school affect children's executive function and aerobic fitness? Scand. J. Med. Sci. Sports. 2017. 27. 1833–1841. doi: 10.1111/sms.12856
18. Dettweiler, U., Ünlü, A., Lauterbach, G., Becker, C.,Gschrey, B. Investigating the motivational behavior of pupils during outdoor science teaching within self-determination theory. Front. Psychol.2015. 6:125. doi: 10.3389/fpsyg.2015.00125
19. Becker, C., Lauterbach, G., Spengler, S., Dettweiler, U., Mess, F. Effects of regular classes in outdoor education settings: a systematic review on students' learning, social, and health dimensions. Int. J. Environ. Res. Public Health .2017.14:485. doi: 10.3390/ijerph14050485
20. Skinner, E. A., Chi, U., Wallet J W. Intrinsic motivation and engagement as "Active Ingredients" in garden-based education: examining models and measures derived from self-determination theory. J. Environ. Educ.2012. 43, 16–36. doi: 10.1080/00958964.2011.596856
21. Caulfield J, Los Angeles County issues design guidelines for extending PreK-12 learning to the outdoors, Building Design and Construction. 2021, June 20. https://www.bdcnetwork.com/los-angeles-county-issues-design-guidelines-extending-prek-12-learning-outdoors
22. Fägerstam, E., Blom, J. Learning biology and mathematics outdoors: effects and attitudes in a Swedish high school context. J. Adventure Educ. Outdoor Leadersh. 2012.13, 56–75. doi: 10.1080/14729679.2011.647432
23. Lieberman, G. A., Hoody, L. L. Closing the achievement gap. Educ. Leadership. .1998. 58, 1–16.
24. Chawla, L. Benefits of nature contact for children. J. Plan. Lit. 2015. 30, 433–452. doi: 10.1177/0885412215595441
25. Hurrelmann, K., Bauer, U. Das Modell des produktiv realitätsverarbeitenden Subjekts [The model of the subject productively processing reality]. In K. Hurrelmann, U. Bauer, M. Grundmann, & S. Walper (Eds.), Handbuch Sozialisationsforschung [Handbook of socialisation research] 2015. 8th Entirely Rev. ed., pp. 144–161. Weinheim, Germany: Beltz.

Asia Pacific Journal of Health Management

Volume 18 Issue 1 2023

The Journal of ACHSM & SHAPE

CONFERENCE ARTICLES

Selected papers from

The 2nd International Healthcare Management Conference

Editorial Facilitator: Professor Prema Basargekar
Somaiya Vidyavihar University, Mumbai, India

ACHSM | Australasian College of Health Service Management

ACHSM Asia-Pacific Journal of Health Management

CONFERENCE ARTICLE

HOW SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS AFFECT HEALTH LITERACY? ASSESSMENT OF HEALTH LITERACY LEVEL IN DIFFERENT SOCIOECONOMIC CLASSES IN INDIA

Prema Basargekar, Chandan Singhavi, Trisha Sinkar, Meenu Goel*

K J Somaiya Institute of Management, Mumbai, India

Correspondence: prema@somaiya.edu

ABSTRACT

OBJECTIVE:

The objective of the study is to assess the impact of socioeconomic status based on gender, age group, education, and income level of people on the level of health literacy.

DESIGN AND SETTING:

The study uses the primary data of 380 respondents belonging to various socio-economic classes. It is a cross-sectional study.

RESULTS:

The study shows that the level of health literacy is significantly affected by the educational and income level of the respondents. Health literacy is also uniquely affected by age groups. Few of the nine parameters of health literacy are affected positively in rising age groups and few are affected negatively by rising age-group. The study finds that health literacy is not affected by gender differences.

CONCLUSION:

Health literacy plays a vital role in building the health status of people and helping the effective utilization of healthcare services. It is found that level of health literacy is affected by the socio-economic status of the people. It is the need of the hour to build health literacy in the weaker section of society with the help of policy tools.

2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability

KEYWORDS

Health literacy, Health Literacy Questionnaire, HLQ, Socio-economic parameters.

INTRODUCTION

Health literacy can be defined as the capacity to acquire, understand and use information in ways that promote and maintain good health. [1] Health literacy plays a very crucial role in creating awareness about how to manage your health and use the healthcare system for accessing

good health. It is associated with direct as well as indirect health outcomes. Understanding the level of health literacy existing in various socio-economic strata in India is vitally important to make the health system more robust and supportive to provide access to healthcare services to marginalized segments of the community. The success of public healthcare policies depends on building the health literacy of those for whom the policies are designed to make them aware of these policies and take benefit of the same.

Health literacy represents the cognitive and social skills that determine the motivation and ability of individuals to gain access to, understand, and use information in ways that promote and maintain good health[1]. Low health literacy is often linked with poor socio-economic circumstances. [2] Research shows that there is a positive outcome between health literacy and health outcomes of the people. [3] It also leads to the active participation of people in having better control over their health. [4] Health literacy is also positively associated with preventive healthcare as it leads to better health habits and helps people to navigate the healthcare system more effectively. [5] It is also seen that higher health literacy leads to higher hospital visits and a higher level of vaccination. [6] Low health literacy may cause a higher disparity in health status and health outcomes which is prevailing due to racial, socioeconomic, and cultural barriers. [7] It may also lead to lower oral health [8] as well as unhealthy health behaviors. [9] It is seen that low health literacy among women affects their ability to navigate the healthcare system which gives them lower access to preventive healthcare leading to a lower ability to care for their children. [10] It is also observed that improvement in health literacy through educational programs such as the dissemination of information through booklets and videos improves the health behavior of patients with chronic diseases and leads to better health outcomes. [11]

The research shows that critical health literacy required for navigating the health system is affected by socio-economic status and demographic features. [12] It was found in asthma patients that racial and ethnic minority populations had a significantly lower level of health literacy which affected their disease control, quality of life, and emergency visits to the hospital in a negative way. [13] The relationship between formal education and health literacy is found to be positive. Educated people are more likely to make better use of healthcare services and effectively manage health emergencies. Education also has a long-term impact on increasing or reducing health inequities. [14] Health literacy is also associated with age. In Iran, it was found that the level of health literacy of elderly populations was lower which was reflected in their lower health status and lower utilization of healthcare services. [15] It can be seen that less educated, poor, minority, and elderly populations are likely to have low health literacy on various accounts such as less access to the internet, less access to communicate with healthcare professionals, lack of trust between the patients and healthcare professionals due to differences in socio-economic background, and higher frequency of change in healthcare providers. [16]

Bridging the gap in health literacy requires strategic communication. It can be through integrated marketing communication, education, and building social capital [17] The existing research also suggests that health literacy should be incorporated in school, nursing, and medical education [10], and health literature should be made available in the easier-to-understand language. [16]

Relatively very few studies are made on developing countries like India. Most of them measure technical or disease-related practices of the patients and most of them show a very low level of health literacy. [18] One study shows a very strong positive relationship between maternal health literacy and child nutritional status. [19] One study observes that the health literacy score is very low in India, and it is relatively higher among those who have family physicians to take care of day-to-day healthcare needs. The study also mentions that more than 50 percent of the sample studied of the patients attending tertiary care in hospitals in South India had below-average health literacy. [20] In another study, more than 60 percent of the sample population was found to have low dental literacy. [21]

Existing research mentions that health literacy in India is still at a primary level of acquiring knowledge at the individual level and has not improved to a secondary or tertiary level of acquiring the skill to manage individual health and influencing others to adopt healthy behavior. [22] The existing research throws light on the importance of health literacy in bringing out better health results and a few of the antecedents which impact health literacy. Though there are a few similar studies made in other countries, there is no such study made in India. The Indian health system is unique in its vast scale and diversity. India is the second most populous country in the world. India spends 3.2% of its GDP on public healthcare. The health structure is overburdened due to the prevalence of high disease burden and scarcity

of skilled manpower and other amenities. It has a mixed healthcare delivery system where public healthcare predominantly exists in rural India and caters for primary healthcare. Seventy percent of the market share of the hospital market is controlled by the private sector which prominently exists in urban areas. Along with health inequity in rural and urban India, there is also a high level of variation in health status across the states. Hence this type of study will be useful for academicians as well as for policymakers.

OBJECTIVE:

The purpose of this study is to find out the impact of socio-economic and demographic factors on the level of health literacy in India.

METHODS:

It is a cross-sectional study of 380 respondents across various socio-economic classes from India. The data collection was done during September 2021 to March 2022. It used the Health Literacy Questionnaire (HLQ) developed by Swinburne University, Australia which is approved by World Health Organization. This scale is already used in many countries and cross-cultural validity is already established[2]. The sample size selected is more than 10 times the number of variables[3]. The study used a convenient sampling technique. The reliability of the internal consistency of scale was found out to be 0.92 (Cronbach Alpha). The HLQ instrument assesses health literacy on nine parameters such as 1) Feel understood and supported by healthcare providers, 2) Have sufficient information to manage my health, 3) Actively managing health, 4) Have social support for health, 5) Appraise health information, 6) Ability to actively engage with healthcare workers, 7) Ability to navigate the healthcare system, 8) Ability to find out good health information and 9) Ability to understand health information well enough to know what to do. These nine parameters try to test the perception of the respondents related to what extent they feel equipped to understand and manage the healthcare system and feel supported by the environment. The study used SPSS software (version 20) to do the statistical analysis and draw conclusions.

RESULTS:

DESCRIPTIVE ANALYSIS:

Table 1 gives the demographic profile of the respondents.

TABLE 1: DEMOGRAPHIC PROFILE OF THE RESPONDENTS:

Sr No	Parameter	Categories	Frequency	Percent
1	Gender	Male	191	50.3
		Female	189	49.7
2	Age Group	up to 30 Years	109	28.7
		31 to 50 years	180	47.4
		51 Years and above	86	22.6
		Not reported	5	1.3
4	Education	Up to secondary school education	120	31.6
		Matriculation and undergraduate	72	18.9
		Graduation and post-graduation	188	49.5
5	Income Groups	Up to Rs, 1,00,000 per annum	193	50.8
		Rs. 1,00,001 to 5,00,000 per annum	69	18.2
		Rs. 5,00,001 to Rs, 10,00,000 per annum	48	12.6
		Rs. 10,00,001 and above per annum	66	17.4
		Not reported	4	1.1

[1]https://www.who.int/healthpromotion/about/HPR%20Glossary%201998.pdf

[2]https://healthliteracy.bu.edu/hlq

[3]Nunnally, J. Psychometric Theory (2nd Ed.). New York: McGraw-Hill. Parry, C., & McArdle, J. (1991). An applied comparison of methods for least-squares factor analysis of dichotomous variables. Applied Psychological Measurement, 15(1), 35- 46.Bit eium reperum volesto earum quae nonseca borepero mint assequaerios vento beaquatates et, sint hil etur se

Table 1 reveals that more than 50% are male respondents. The majority of the respondents belong to the middle age group of 31 to 50 years followed by the younger age group. Nearly 50% are graduates or post-graduates. Nearly 51% of the respondents earn a yearly income of up to India Rs. 1,00,000.

INFERENTIAL ANALYSIS:

The research question is "How is health literacy affected by socioeconomic and demographic factors such as gender, age-group, educational level and income-groups?" The data collected was found to be normally distributed. The study uses independent sample T-test and ANOVA to come to conclusions.

TABLE 2: RELATIONSHIP BETWEEN SOCIOECONOMIC AND DEMOGRAPHIC FACTORS AND HEALTH LITERACY:

Sr No	Parameters	Gender	Mean	Education	Mean	Age group	Mean	Income group	Mean
1	Feeling understood and supported by healthcare providers	Male	2.95	Up to the Secondary level	2.91	Up to 30 years	2.84	Up to Rs. 1 lakh	2.95
		Female	2.94	SSC, HSC, Undergraduate	3.12	31 to 50 years	2.96	Rs. 1 to Rs 5 Lakh	2.96
				Graduate and Postgraduate	2.91	51 and above	3.06	Rs. 5 Lakh & above	2.94
2	Having sufficient information to manage my health	Male	2.43	Up to the Secondary level	1.83	Up to 30 years	2.60	Up to Rs. 1 lakh	2.07
		Female	2.31	SSC, HSC, Undergraduate	2.37	31 to 50 years	2.33	Rs. 1 to Rs 5 Lakh	2.64
				Graduate and Postgraduate	2.72	51 and above	2.14	Rs. 5 Lakh & above	2.69
3	Actively managing my health	Male	2.30	Up to the Secondary level	1.61	Up to 30 years	2.58	Up to Rs. 1 lakh	1.86
		Female	2.22	SSC, HSC, Undergraduate	2.12	31 to 50 years	2.19	Rs. 1 to Rs 5 Lakh	2.61
				Graduate and Postgraduate	2.73	51 and above	1.97	Rs. 5 Lakh & above	2.71

4	Social support for health	Male	3.13	Up to the Secondary level	3.16	Up to 30 years	3.04	Up to Rs. 1 lakh	3.13
		Female	3.16	SSC, HSC, Undergraduate	3.26	31 to 50 years	3.17	Rs. 1 to Rs 5 Lakh	3.18
				Graduate and Postgraduate	3.09	51 and above	3.22	Rs. 5 Lakh & above	3.14
5	Appraisal of health information	Male	2.59	Up to the Secondary level	1.99	Up to 30 years	2.77	Up to Rs. 1 lakh	2.19
		Female	2.46	SSC, HSC, Undergraduate	2.41	31 to 50 years	2.46	Rs. 1 to Rs 5 Lakh	2.88
				Graduate and Postgraduate	2.91	51 and above	2.29	Rs. 5 Lakh & above	2.85
6	Ability to actively engage with healthcare workers	Male	3.47	Up to the Secondary level	3.09	Up to 30 years	3.44	Up to Rs. 1 lakh	3.28
		Female	3.39	SSC, HSC, Undergraduate	3.58	31 to 50 years	3.41	Rs. 1 to Rs 5 Lakh	3.62
				Graduate and Postgraduate	3.59	51 and above	3.47	Rs. 5 Lakh & above	3.57
7	Navigating the healthcare system	Male	3.14	Up to the Secondary level	2.46	Up to 30 years	3.22	Up to Rs. 1 lakh	2.71
		Female	2.97	SSC, HSC, Undergraduate	3.10	31 to 50 years	3.01	Rs. 1 to Rs 5 Lakh	3.48
				Graduate and Postgraduate	3.42	51 and above	2.93	Rs. 5 Lakh & above	3.37
8	Ability to find good health information	Male	3.07	Up to the Secondary level	3.09	Up to 30 years	3.22	Up to Rs. 1 lakh	2.58

		Female	2.89	SSC, HSC, Undergraduate	3.58	31 to 50 years	2.92	Rs. 1 to Rs 5 Lakh	3.43
				Graduate and Postgraduate	3.59	51 and above	2.76	Rs. 5 Lakh & above	3.36
9	Understand health information enough to know what to do	Male	3.10	Up to the Secondary level	2.15	Up to 30 years	3.38	Up to Rs. 1 lakh	2.56
		Female	2.96	SSC, HSC, Undergraduate	3.05	31 to 50 years	2.97	Rs. 1 to Rs 5 Lakh	3.56
				Graduate and Postgraduate	3.59	51 and above	2.68	Rs. 5 Lakh & above	3.48

THE RESEARCH FINDINGS ARE AS FOLLOWS:

1. There is no statistical difference between the level of health literacy between males and females.
2. The statistical difference in educational categories is significant for all the nine parameters of health literacy. The mean is rising along with educational level on all the nine parameters.
3. The age-group has a unique relationship with health literacy. The statistical difference as per the age-group is significant for all the parameters except 'The ability to actively engage with healthcare workers'. The mean value is rising along with age groups for two parameters such as i) feeling understood and supported by healthcare workers and ii) social support for health. The mean value is declining with age groups for all the remaining six parameters where the statistical difference is significant.
4. The statistical difference as per income category is found to be significant in eight parameters except 'feeling understood and supported by healthcare providers'.

DISCUSSION:

The present study finds a positive relationship between educational level and health literacy. The finding is in concurrence with the existing literature. The study adds a new dimension related to age-group. It finds that aged population find the healthcare system more supportive and also perceive that they have social support in case of emergencies. On all other parameters such as seeking and appraising health information, navigating health system, etc. the younger population has a more positive perception. The study proves that with higher income, people are getting more resources to access health information, appraise it and navigate the health system in a better way.

CONCLUSIONS:

Health literacy plays an important role in building public health. The present study identifies the role of socio-economic and demographic factors in building it. These factors need to be taken into consideration in planning and designing health policies. The study suggests that more focus on education and policy initiatives to assist elderly population in accessing the information and navigating the health system can bring out positive result.

The study contributes to the literature by helping in understanding how socio-economic and demographic factors affect health literacy in a developing country like India. The limitation of the study is that it pertains to one

state of Maharashtra in India. The conclusions may not directly apply to other states.

RECOMMENDATIONS:

The study has theoretical as well as managerial implications. As the existing research observes there is a very limited study made on health literacy in the Indian context. Hence it adds to the theory of understanding the level of health literacy in the Indian context. The Indian government is gearing up for providing Universal Health Access and making huge investments in public healthcare. It is meant to improve access to healthcare services for the weaker and marginalized sector and to improve the status of public health. Building health literacy through effective communication and awareness programs is the cornerstone for its success.

It is recommended that policymakers should give enough attention to building the health literacy of marginalized sectors to make effective utilization of the health system. It can be done in various ways such as the creation and dissemination of health information in vernacular languages and with videos showcasing promoting healthy habits or helping people understand the early symptoms of any disease and encouraging them to avail health facilities; empowering ground-level health workers to undertake community level training programs to build health literacy, etc. to name a few.

The future research scope will be on understanding how health literacy affects health behavior and identifying innovative ways to improve health literacy for the marginalized population having low educational levels.

References:

1. Nutbeam, D. The evolving concept of health literacy. Social Science & Medicine. 2008 October; 67, 2072-2078.
2. Nutbeam, D. Defining and measuring health literacy: What can we learn from literacy studies? Int J Public Health. 2009 July, 54:303-305. https://doi.org/10.1007/s00038-009-0050-x
3. Schillinger, D. Grumbach, K. Piette, J. Wang, F. Osmond, D. Daher, C. et al. Association of Health Literacy with Diabetes Outcomes; JAMA. 2002 July,288(4), 475-481. DOI: 10.1001/jama.288.4.475
4. Kickbushc, IS. Health literacy: addressing the health and education divide. Health Promotion International. 2001. 16(3), 289-297. http://dx.doi.org/10.1093/heapro/16.3.289
5. Tze G.H, Hosseinzadeh, H., Rahman B., Sheikh, M. Health Literacy and health-promoting behaviors among Australian-Singaporean Communities living in Sydney metropolitan area; Proceedings of Singapore Healthcare, 2018; 27 (2), 125-131. https://doi.org/10.1177%2F2010105817741906
6. Howard, D.H., Sentell, T. & Gazmararian, J.A. Impact of health literacy on socioeconomic and racial differences in health in an elderly population; J Gen Intern Med. 2006; 1, 857–861. doi: 10.1111/j.1525-1497.2006.00530.x
7. Sentell, T., Baker, K., Onaka, A. and Braun, K. Low Health Literacy and Poor Health Status in Asian Americans and Pacific Islanders in Hawai'i; Journal of Health Communication, 2011;16:279-294. DOI: 10.1080/10810730.2011.604390
8. M D'Cruz, A., Shankar, M. Health literacy among Indian adults seeking dental care; Dental Research Journal (Isfahan), 2013 Jan-Feb 10(1), 20–24. DOI: 10.4103/1735-3327.111760
9. Kesavan, R., Prabhakar, R., Chaly, P., Saravanan, N. and Mary, A. Assessment of Oral Health Literacy and its Relationship with Oral Health Related Behaviour and Socioeconomic Status Among Students of a University in Chennai City; Biomedical & Pharmacology Journal, 2019 June, Vol. 12(2),739-746.
10. Shieh, C., Halstead, J. Understanding the Impact of Health Literacy on Women's Health. Journal of Obstetric, Gynecology & Neonatal Nursing. 2009 Sept-Oct; 601-612. https://doi.org/10.1111/j.1552-6909.2009.01059.x
11. Eckman, M., Wise, R., Leonard, A., Dixon, E, Burrows, C., Warm, E. Impact of health literacy on outcomes and effectiveness of an educational intervention in patients with chronic diseases. Patient Education and Counseling. 2012 May; 87, 143-151. https://doi.org/10.1016/j.pec.2011.07.020
12. Furuya, Y., Kondo, N., Yamagata, Z. and Hashimoto, H. Health literacy, socioeconomic status and self-rated health in Japan; Health Promotion International. 2013; Vol. 30 No. 3. DOI: 10.1093/heapro/dat071
13. Curtis, L., Michael, M.S., Wolf, S. The Impact of Health Literacy and Socioeconomic Status on Asthma Disparities. Journal of Asthma. 2012; 49, 2, 178-183 https://doi.org/10.3109/02770903.2011.648297
14. Jansen, T., Rademakers, J., Waverijn, G., Verheij, R., Osborne, R. and Heijmans, M. The role of health literacy in explaining the association between educational attainment and the use of out-of-hours primary care

services in chronically ill people: a survey study; BMC Health Research, 2018 May; 18: 394.

15. Javadzade, F., Sharifirad, G., Radjati, F., Mostafavi, F., Reisi, M., Hasanzade, A. et al. Relationship between health literacy, health status, and healthy behaviors among older adults in Isfahan, Iran. Journal of Education and Health Promotion. 2012 Aug; 1(1):31. DOI: 10.4103/2277-9531.100160
16. Egbert, N., Nanna, K. M. Health Literacy: Challenges and Strategies. The Online Journal of Issues in Nursing. 2009 September; 14, No.3. https://doi.org/10.3912/OJIN.Vol14No03Man01
17. Ratzan, S. Health literacy: Communication for the public good. Health Promotion International. 2001; 16-2; 207-214.
18. Barve, S.S, Joshi, S. A Literature Review of Measurement of Health Literacy in India. Indian Journal of Public Health Research & Development. 2019, May; 10-5, 724-729.
19. Johri, M., Subramanian, SV., Kone, G. K., Dudeja, S., Chandra, D., Minoyan, N., Sylvestre, M., Pahwa, S. Maternal Health Literacy Is associated with Early Childhood Nutritional Status in India. The Journal of Nutrition. 2016 July; 146-7, 1402-1410. https://doi.org/10.3945/jn.115.226290
20. Rathnakar, U P, Belman, M., Kamath, Unnikrishnan, Shenoy K, & Udupa, A.L. Evaluation of health literacy status among patients in a tertiary care hospital in coastal Karnataka, India. Journal of clinical and diagnostic research: JCDR, 2013 November; 7(11), 2551–2554. https://doi.org/10.7860/JCDR/2013/6120.3608
21. D'Cruz, A.M. & Aradhya, M. R. S. Health literacy among Indian adults seeking dental care. Dental Research Journal. 2013 January, Vol 10, Issue 1, 20-24.
22. Barve, S., & Joshi, S. Literature Review of Health literacy in India. Indian Journal of Public Health Research & Development. 2019 May; Vol.10, No. 5, 725-729. http://dx.doi.org/10.5958/0976-5506.2019.01097.0

ACHSM Asia-Pacific Journal of Health Management shape

CONFERENCE ARTICLE

INNOVATIONS IN THE INDIAN HEALTHCARE INDUSTRY TO BRAVE THE VUCA TIMES

Jaya Mathew, Neha Gupta, Jennifer Jagose*

K.J. Somaiya Institute of Management, Somaiya Vidyavihar University, Mumbai, India

Correspondence: jayamathew@somaiya.edu

ABSTRACT

Volatility, Uncertainty, Complexity, Ambiguity—in a VUCA world the moment of surprise is everywhere, making things extremely unpredictable and planning and strategizing far more challenging. The healthcare industry is witnessing seismic shifts as medicine becomes more personalised, health data becomes valuable, and data sharing becomes essential, demanding the healthcare sector to re-strategise.

This research aims to understand the various innovations and change-management techniques based on technology that have been adopted by healthcare industries in today's VUCA world while exploring the innovations needed to drive the Indian healthcare sector in the years to come. Thus, it examines and highlight the implications of the rising emphasis being placed on innovations in the healthcare industry - helping the sector to re-strategise and face the changes in today's VUCA world with greater clarity. This paper is also designed to call attention to and discuss contemporary perspectives taken by top healthcare organisations in India before and during the COVID-19 pandemic.

This research is based on secondary data, including intensive analysis of research papers, media articles and grey literature reports, along with examining the recent innovations undertaken by the top healthcare companies and hospitals in India. The findings suggest that moving away from a supply-driven healthcare system toward a patient-centred system is necessary, and therefore organisations in India have to embrace innovation, agility, and adaptability in unison to brave the VUCA times.

2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability

KEYWORDS

Innovation, VUCA World, Technology, Indian Healthcare industry.

INTRODUCTION

To thrive in a Volatility, Uncertainty, Complexity, Ambiguity (VUCA) healthcare world (can be used to characterise this kind of environment that the world is facing today. [1]), a growth mindset is needed consisting of new regulations, new products, new paradigms and new technology. The feeling of certainty, stability, and familiarity that individuals and industries were accustomed to, has been replaced with a state of upheaval.

Since the healthcare industry is also operating in a VUCA environment, it is also increasingly facing challenges in its daily operations. These challenges include an abysmal healthcare delivery, depleting margins, lack of access to high-quality healthcare, difficulties in managing processes, growing healthcare costs, lack of accountability and the human power crisis. All these challenges act as a driving force in the healthcare sector, forcing it to re-strategise. [2]

The healthcare sector is presently adopting new strategies centred on technology-enabled treatment to increase patient experience, raise quality, and lower costs. This is enabled by leveraging Augmented Reality (AR), which uses digital visual components, music, or other sensory cues, to create an improved representation of the actual world transmitted through technology. While Virtual Reality (VR) involves the use of computer technology to create a virtual environment that can be explored in 360 degrees and may resemble or be entirely unrelated to the actual world. Artificial Intelligence (AI) uses systems or robots that mimic human intellect to carry out tasks. The integration of such technologies in the healthcare industry has led doctors and nurses to feel like they are in a room with an actual patient. [3]

Other than AI, various innovative technologies are also being utilised in Machine Learning. Coupling image processing with Machine Learning (ML) is an application of AI allowing systems to learn from past performances and make inferences about future performances without explicit programming. ML aims to create computer systems that can independently access and utilise data to acquire knowledge. Implementing ML will help drive the shift towards superior metrics and smoother processes beneficial in visual-heavy fields like dermatology, pathology, ophthalmology, and radiology. [4]

Due to the COVID-19 pandemic, home-based care for convenience and flexibility was implemented to cope with the rise in on-demand virtual urgent care and remote patient monitoring, that act as an alternative to lower acuity emergency department visits and after-hours consultations [5].

Apparently, the Innovation Matrix, which is a visualisation model that depicts different aspects of innovation to help develop a new product or service, is being adopted in the Indian healthcare industry. The innovation matrix needs to function in continuity, considering the existing business processes and updating them from time to time. [6]

Indeed, the healthcare industry has come up with changes to improve its systems and processes to serve patients better. In the following section, we will discuss some notable innovations adopted by the Indian healthcare industry both - pre and during COVID-19 to suit the evolving customer needs.

HEALTHCARE INNOVATIONS IN INDIA

The Indian healthcare industry comprises hospitals, pathology laboratories, the medical devices industry, telemedicine and medical tourism. India's healthcare industry has been growing at an average annual growth rate of 22% since 2016. [7] It is expected to reach $US372 billion in 2022, making healthcare one of the largest sectors of the Indian economy. It is the VUCA environment that helps focus on the characteristics of the transition period and the "new normal". [8] The onset of the COVID-19 pandemic and the ever-evolving and uncertain world has led to profound structural and sustained innovations. Although the adoption of home healthcare solutions in India is at a relatively nascent stage, it has tremendous potential for growth. The technology life cycle is motivated by the premise that evolutionary technological changes underlie the development of many new industries. Due to advancements in technology like artificial intelligence, robotics, and blockchain, healthcare companies get a competitive advantage in today's VUCA world. [9]

To study innovations in the Indian healthcare sector, the researchers analysed news articles, research papers and case studies on innovations in the Indian healthcare sector. However, there wasn't adequate literature regarding an exhaustive list of innovations adopted by different Indian healthcare companies. Hence this study is a compilation of the most notable innovations adopted. This study is confined to the top 10 Indian healthcare companies as they have been pioneers in adopting new technology while having the most notable innovative changes in recent times, along with heavily investing in their research and development teams. The Indian healthcare organisations under focus in the study are Apollo Hospitals, Fortis Hospitals, Dr Lal Path Labs, Narayana Hrudayalaya Ltd, Government Medical College in Kalamassery, Asian heart hospitals, Wockhardt, Aster DM Healthcare, Sahyadri Hospitals and Reliance Foundation hospitals. Healthcare is no longer focused on here and now but on the here, now and everywhere. Key aspects include:

1. Advancements in Robotics and 3D printing- At Apollo Speciality Hospital in Chennai, the most advanced CyberKnife Robotic Radio Surgery System was installed. [10] It's the world's first and only robotic radiosurgery device, designed to treat tumours with sub-millimetre precision anywhere in the body. Aster DM has brought breakthroughs, and advancements in healthcare, from Hospital Information Systems reshaping the way healthcare, is given to the Da Vinci Robotic Surgical System, allowing minimally invasive surgery with 3D vision. Aster DM has also taken centre stage in the healthcare industry to develop innovative solutions to the COVID-19 dilemma. [11] The DaVinci Si Surgical System with Simulator at Asian Heart Hospital is Mumbai's first Robotic Surgery option. With the newest technology and patient treatment and care advances, Asian Heart Hospitals is unquestionably leading the way in India's healthcare with the latest technologies and innovations in patient treatment and care. The DaVinci Si Surgical System with Simulator, which has been operating in Asian hospitals for months, is the world's most sophisticated Robotic Surgery tool. It is the first of its kind in Mumbai, Western India, and Asia-Pacific. [12] Facing an increased patient load and a simultaneous need to distance from patients physically, The Government Medical College in Kalamassery, Ernakulum turned to robots for assistance. Asimov's three-wheeled robot named 'KarmiBot' was deployed to sanitise premises using its ultraviolet radiation. It is used in hospitals' isolation wards to carry food and medicines for Covid patients. [13] Apollo Hospitals have also developed the world's first hospital-based 3D printing facility. 3D printing helps in saving and improving lives in unthinkable ways. 3D-printing labs manufacture customised, safer, and higher-performing products at a considerably lower cost. 3D printing helps clinicians better understand their patients and improve their comfort level with patients by providing 3D products designed specifically for their anatomy. [14] Program for Appropriate Technology in Health (PATH) is working closely with the Indian government to support all the above digitization efforts to develop feasible, long-term, patient-centric initiatives. [15]

2. Telehealth and COVID-19 support innovations - To deal with increased patient volumes, Apollo TeleHealth established Tele-Ophthalmology centres in 115 Community Health Centres around the state to provide state-of-the-art eye screening services. Apollo TeleHealth also supports India's Pan African e-Network Project and offers millions of patients worldwide the virtual consult service 'Ask Apollo'. [16] Aster DM Healthcare has also opened a COVID-19 Support Centre that is open 24 hours a day, seven days a week, for people throughout India. Aster DM made it easier for individuals to register and book appointments with healthcare experts on their website using social media and digital channels. Aster DM began investing in technologies like telemedicine, virtual healthcare consultations, digital symptom checks, and chatbots educated with advanced modelling. To complete the patient experience, it also evolved its telemedicine system with easy-to-use sensors at the patient end, an AI-based clinical decision support system, voice-to-text prescriptions, and a follow-up PHR service with diagnostics and medicines. Thus, AI is a big deal at Aster DM, from self-help/triage solutions to medical-grade symptom checkers and chatbots. [17] When the Covid outbreak happened in India, Fortis Healthcare was among the first hospital chains to introduce telemedicine services across 23 centres. Virtual connect and e-consultation helped clinicians stay in touch with patients and solve their problems effectively. [18] According to Vision 2020, PATH in India is exploring new methods to use technological and digital advances in India's primary healthcare facilities, both in urban and rural areas. This entails expanding the usage of telemedicine, creating cutting-edge techniques that can improve the quality of healthcare services, ease the workload of healthcare personnel, and ensure a more patient-centric approach helping patients receive accessible and quality care.

3. Internet Of Things, Analytics and Integrated Hospital Information Systems infrastructure -Wockhardt Hospitals created and implemented the Internet of things (IoT), which is easily connected with their primary Hospital Information System application. Due to this, Wockhardt could retain existing patients while engaging new patients through its Teleconsultation and Home Care application platforms. [19] Wockhardt hospitals' digitization leapfrogged to the point where most patient interactions with doctors and payments were handled online, enhancing convenience and assisting the hospitals in generating much-needed revenue during difficult times. [20] Dr Lal Path Labs created an e-MRF (Electronic Material Requisition Form) that instantly sends orders to the ERP and begins the packing and shipping process. Dr Lal Path Labs use the

Laboratory Information Management System (LIMS) to supplement its operations. It keeps track of specimens and workflows, aggregates data, and ensures that lab activities adhere to different standards and allows for real-time updates. The manual system lacked this intelligence for validating data, resulting in a lengthy procedure which is now done away with. [21] The NH-Atma software at Narayana Hrudayalaya will be the cornerstone for developing their digital infrastructure. NH-Atma is cloud-based, completely scalable, and compatible with the hospital's existing infrastructure. It will be able to spot issue areas before they become severe occurrences due to the advancements in AI and predictive analytics. [22] Narayana Hrudayalaya has also replicated the manual extracting data to the Structured query language (SQL), Server and Power BI. The Power BI dashboard helps provide real-time data of more than 3,000 doctors across 30 comparable parameters. One of their ongoing projects includes using AI to decipher X-Rays to point out any irregularities. These implementations have brought about efficiencies, cost savings, and better patient care. [23] Furthermore, their own data analytics software, NH-Medha, has shown to be an effective tool in assisting hospital managers in reducing expenses and physicians in making better clinical decisions. They created e-ICU cards to manage better an ICU patient's condition, which has significantly influenced care management for their ICU patients. Their tech-enabled e-ICU has resulted in better clinical results, shorter patient stays, and lower drug usage. [24] KareXpert is a Jio-backed SaaS-based digital healthcare platform that helps enhance patient care, save operational expenses, and boost income. [25] The KareXpert platform, a comprehensive suite of AI-enabled, cloud-native solutions for hospitals with mobile/web apps for all stakeholders and patients, has been chosen by Reliance Foundation hospitals. Advanced Health Management Information System (HIMS), Electronic Medical Record (EMR), pharmacy, linked ambulance, e-claim & insurance, inventory & SCM, queue management, Management Information System (MIS) reporting, Business Intelligence, and hospital branded mobile apps are among its integrated applications and vast solutions. [26] KareXpert aims for increased ease of access and sharing of information across providers, payers, and patients with its AI-ready healthcare data-house. [27] Sustainable integration of the health system continues to be the key goal of the healthcare driven non-governmental organization-PATH's efforts to incorporate technology into healthcare, which contribute to the development of a system that is firmly focused on the patient's needs.

4. Mobile applications, chatbots and accessible critical care services - The Relax Mommy programme at Sahyadri Hospital provides enrolled patients with the option of 4-5 home visits. Under this innovative programme, a certified expert nurse visits the patient's house with a point-of-care pregnancy solution. On the other hand, the expecting mother will receive a personalised app developed in collaboration with CareNX Innovations, an Indian Institute of Technology (IIT) Bombay startup. With real-time communication of test data to clinicians for fast decision-making, the portable diagnostic kit with this app will conduct 'doorstep' screening tests, identify difficulties early in pregnancy, and treat high-risk pregnancies. The Relax Mommy programme offers healthcare practitioners a one-of-a-kind chance to give pregnant women care, support, and information. This would not only allow for more quality time between doctors and patients, but it will also allow for a greater focus on high-risk management and general well-being. Sahyadri hospitals aim to provide specialised in-home, family-centred care in the future. [28] Dr Lal Path Labs gave their 800 on-the-ground phlebotomists a mobile app that was connected entirely with their customer-facing app and allowed patients to schedule home testing appointments. They established a chatbot on their website to make it easier for patients to acquire information about their results. The bot answered all report-related questions. This has allowed them to handle a large number of calls while still ensuring seamless operations. The eACCESS programme was developed by Apollo Hospitals to make critical care specialists available 24 hours a day, seven days a week to deliver high-quality treatment to ICU patients. Clinicians can connect to and monitor several ICUs from a central location using cutting-edge hardware and software. Hospitals with trouble managing ICU patients will benefit from this effort. [29] In 2022, with the help of the Ayushman Bharat Digital Mission (launched by the Prime Minister of India in 2021, to connect the digital health solutions of hospitals across the country). This is helping healthcare companies lay the groundwork for the nation's digital health ecosystem, helping the country move rapidly towards a more patient-centric healthcare system.

FINDINGS AND ANALYSIS

The healthcare sector in India is ever evolving. AI, AR, VR, ML, big data and robotics have paved the way for many innovations in the industry, with it being used for patient diagnosis, treatment and medical research. The interview with Mr. Madhur Verma- former CEO of Sahyadri hospitals Ltd. highlighted that, in order to cope with the increasing pressures posed by the COVID-19 pandemic, every hospital became very good at bed management, ensuring maximum bed utilisation and reducing the overall turnaround time of beds from 3-5 hours to less than an hour. Technology also played a significant role, with all hospitals adapting different innovations and technology to serve patients better. Patients switched to digital online payments rather than paying by cash, thus improving the overall efficiency of the payment systems. Furthermore, telehealth and telemedicine play a considerable role today. [30] Healthcare organisations quickly transformed their systems to launch teleconsultation services and offer doctor consultations via WhatsApp and video call.

The COVID-19 pandemic has accelerated the growth of telehealth, along with self-service and remote monitoring tools used by patients and healthcare professionals, to improve healthcare access, outcomes, and affordability. Telehealth and remote monitoring helped provide patients with round-the-clock medical services. Furthermore, mobile apps and chatbots helped healthcare organisations establish an excellent virtual connection with patients during the COVID-19 pandemic.

One common observation in all the successful healthcare organizations reported in this study was that they were change-seeking and disruptive- each adopting new technologies and innovations while leveraging change management effectively, as it is the need of the hour. Hospital information systems were redesigned into a completely electronic mode, making them more accessible and affordable. Advancements in 3D printing and robotics helped surgeons pre-planning operations, allowing for minimally invasive surgeries. A shift was observed from a supply-driven healthcare system toward a patient-centred system. New opportunities for healthcare players in the future will include developing tools to promote emergency medical care and the improvement of health infrastructure with technology-based optimization. [30]

While these new opportunities stand at the forefront of healthcare, it is necessary to dive deeper into the innovation matrix, pre-empting changes of the future while keeping in mind the need of the hour. This will allow for the effective vetting of ideas leading to educated decisions about how to proceed. This matrix assessment will help businesses look at innovations through the consumer lens and imbibe a continuous circularity into existing business processes. Thus, continuous innovations and change management techniques based on technology proactively minimize vulnerabilities and increase opportunities to take advantage of the ever-evolving VUCA world. Moreover, in the long run, sustaining and incorporating innovations will prevent healthcare organisations from going back to their base state of being-post a crisis and prepare the Indian healthcare industry to be agile and versatile to deal with all the sudden changes that come its way.

CONCLUSION

Indeed, the discussions around technology and innovations are highly relevant to understanding how the healthcare sector prioritises and redesigns its fundamental business practices in the VUCA world. The relationship between innovation and uncertain times in the Indian healthcare industry is theoretically and empirically robust. The best way for the Indian healthcare industry to cope with VUCA is to comprehend and embrace the change. Therefore, new challenges necessitate new and distinct technologies tailored to consumers' needs. Vision 2020 of the Indian healthcare industry along with the Ayushman Bharat Digital Mission that helps build the foundation required to enable the nation's integrated digital health system by focusing on the growing role of technology and innovations, help drive towards a patient-centred system.

Technology must be leveraged to transform VUCA issues into opportunities to play a transformative role in innovations. At the same time, healthcare expenditures must be increased, new healthcare management practices must be devised, and data security must be prioritised in the healthcare sector. This research has also helped highlight the path to be taken by the healthcare sector, which involves initially coming up with robust plans and mandates to deal with uncertainty, followed by leveraging technological advancements and integrating project partners into the system. Finally, organizations need

strong data-driven monitoring approaches to implement technologies and innovations smoothly.

References

1. Billones R. Thriving in a VUCA healthcare industry. (2020) 'https://journal.emwa.org/careers-in-medical-writing/thriving-and-not-just-surviving-in-a-vuca-healthcare-industry/' (Accessed 17/12/21)
2. Kasthuri A. Challenges to Healthcare in India - The Five A's. Indian J Community Med. 2018;43(3):141-3. 'https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6166510/' (Accessed 17/12/21)
3. Morgan B. Examples of healthcare innovation in the face of covid (2021) 'https://www.forbes.com/sites/blakemorgan/2021/02/01/10-examples-of-healthcare-innovation-in-the-face-of-covid/?sh=74317a31680d' (Accessed 17/12/21)
4. Konno M, Ishii H. AI for medical use (2019) 'https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6349441/' (Accessed 18/12/21)
5. Bestsennyy O et al. Telehealth a quarter trillion-dollar post covid-19 reality (2021) 'https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality' (Accessed 18/12/21)
6. Gons E. 'The innovation management matrix' (2020) 'https://togroundcontrol.com/blog/types-of-innovation-from-a-management-and-accounting-perspective/' (Accessed 18/12/21)
7. Sarwal R; Prasad U; Madangopal K; Kalal S; Kaur D; Kumar A; Regy P; Sharma J. Investment Opportunities in India's Healthcare Sector. NITI Aayog. March 2021. (Accessed 20/12/21)
8. Mack O, Khare A et al, 'Managing in a VUCA world', Springer Publication, pg 5-6. 2015 (Accessed 12/01/22)
9. Shane S. 'Handbook of technology and innovation management', Wiley Publications, pg 7. 2009 (Accessed 12/01/22)
10. Apollo Hospitals. Apollo Hospitals showcases its innovations at the World Innovation Summit for Health. (2020) 'https://www.apollohospitals.com/apollo-in-the-news/apollo-hospitals-showcases-its-innovations-at-the-world-innovation-summit/' (Accessed 12/02/22)
11. Biospectrum. Aster DM showcases healthcare future at Kerala Digital Summit (2018) https://www.biospectrumindia.com/news/74/10654/aster-dm-showcases-healthcare-future-at-kerala-digital-summit-2018.html (Accessed 20/12/21)
12. Asian Hospitals- Specialities | Robotic. (2019). http://www.asianhospitals.org/specialities/robotic-surgery.php (Accessed 20/12/21)
13. ViswaSanthi Foundation. Covid-19 response (2021) 'https://www.viswasanthifoundation.com/recent-activities/detail/covid-19-response' (Accessed 20/12/21)
14. Joseph A. A startup's tech innovation for Apollo Hospitals. (2021) https://www.fortuneindia.com/enterprise/a-startup-brings-tech-innovation-to-apollo-hospitals/105211 (Accessed 20/12/21)
15. Chopra R., Kaul V., 'Digitizing health in India for more effective and patient-centric care' (2022) 'https://www.path.org/articles/digitizing-health-india-more-effective-and-patient-centric-care/' (Accessed 08/11/22)
16. Apollo Telehealth. Innovative use of technology in healthcare. (2020) https://www.apollotelehealth.com/innovative-use-of-technology-in-healthcare/ (Accessed 20/12/21)
17. Aggarwal N et al. How Aster DM is using AI to amplify healthcare to combat Covid-19 (2020) https://cio.economictimes.indiatimes.com/news/next-gen-technologies/how-aster-dm-is-using-ai-to-amplify-healthcare-to-combat-covid-19/74839367 (Accessed 22/12/21)
18. Yadav M. Covid a game-changer for digital health in India. (2021) 'https://www.thehindubusinessline.com/companies/covid-a-game-changer-for-digital-health-in-india-ashutosh-raghuvanshi/article37034837.ece/amp/' (Accessed 22/12/21)
19. Network, e. Wockhardt Hospitals: Ensuring Fast & Easy Access to Healthcare Services. (2016). https://ehealth.eletsonline.com/2016/09/wockhardt-hospitals-ensuring-fast-easy-access-to-healthcare-services/ (Accessed 22/12/21)
20. Mittal S. Startups filled the gap in new IT paradigm during Covid: Wockhardt CIO. (2021) https://cio.economictimes.indiatimes.com/news/strategy-and-management/startups-filled-the-gap-in-new-it-paradigm-during-covid-wockhardt-cio/86358613 (Accessed 22/12/21)
21. Pahuja R. Dr Lal PathLabs streamlines critical processes by going digital (2019) https://cio.economictimes.indiatimes.com/news/strategy-and-management/dr-lal-pathlabs-streamlines-

critical-processes-by-going-digital/71411814 (Accessed 22/12/21)
22. Graboyes, R. Fortress and Frontier: The Narayana System and Innovations in Healthcare. (2021). https://www.discoursemagazine.com/culture-and-society/2021/06/04/fortress-and-frontier-the-narayana-system-and-innovations-in-healthcare/ (Accessed 22/12/21)
23. Microsoft stories India.Narayana health uses data analytics and AI to provide affordable high quality healthcare. (2019) 'https://news.microsoft.com/en-in/features/narayana-health-uses-data-analytics-and-ai-to-provide-affordable-high-quality-healthcare/' (Accessed 22/12/21)
24. The Economic Times. Latest speech by Chairman of Narayana Hrudayalaya. (2019)- https://economictimes.indiatimes.com/narayana-hrudayalaya-ltd/chairmanspeech/companyid-47955.cms (Accessed 22/12/21)
25. PharmaBiz. Reliance Jio-funded KareXpert lays out 5-year vision; plans to digitally transform 100,000 hospitals globally. (2021). http://pharmabiz.com/NewsDetails.aspx?aid=139758&sid=2 (Accessed 05/01/22)
26. Ganguly S. This Reliance-funded startup is aimed at digitally transforming one lakh hospitals by 2026. (2021) https://yourstory.com/2021/08/reliance-funded-startup-digitally-transforming-hospitals/amp (Accessed 05/01/22)
27. Healthcare Radius. KareXpert to provide digital healthcare services in India's top 100 cities (2021) https://www.healthcareradius.in/features/digital-healthcare/30060-karexpert-to-provide-digital-healthcare-services-in-indias-top-100-cities#:~:text=KareXpert%20is%20also%20the%20first,hospitals%20and%20revolutionise%20healthcare%20delivery.&text=With%20its%20AI%2Dready%20healthcare,among%20providers%2C%20payers%20and%20patients. (Accessed 05/01/22)
28. Punekar News. Sahyadri Hospital introduces 'Relax Mommy' pregnancy programme. (2019) https://www.punekarnews.in/sahyadri-hospitals-introduces-relax-mommy-pregnancy-programme/ (Accessed 05/01/22)
29. The Economic Times. Apollo Hospitals launches centre of excellence to boost critical care across India. (2021). https://economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/apollo-hospitals-launches-centre-of-excellence-to-boost-critical-care-across-india/articleshow/86812907.cms?from=mdr (Accessed 05/01/22)
30. Bestsennyy O et al. Telehealth a quarter trillion-dollar post covid-19 reality (2021) 'https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality' (Accessed 18/12/21)

ACHSM Asia-Pacific Journal of Health Management

CONFERENCE ARTICLE

THE USE OF DIGITAL HEALTHCARE SYSTEMS TO PREDICT DISEASES

*Janvee Garg *, Anil Kumar Singh*

FORE School of Management, New Delhi, India

Correspondence: janveegarg38@gmail.com

ABSTRACT

Smart health care depends heavily on a resilient and strong digital infrastructure. Telemedicine, Electronic Health Records (EHR), Fitness Trackers, Wearable Devices that monitor heart rate, steps, sleep cycles and many other digital health-related measures are already used as indicators of what a future system of health technology will look like. The purpose of this paper is to examine the existing research studies to determine if it is possible to forecast health based on the data available from such devices. Further, in the Indian context, where Unique Health ID (UHID) is already being implemented, this paper aims to extend the functionality of the UHID and analyze the viability of integrating the UHID with data sources for predicting health. Predicting and forecasting health will benefit all stakeholders in the healthcare ecosystem. Accurate disease forecasting models would be extremely helpful for epidemic and pandemic prevention and control. This research examines the potential for health forecasting and the challenges associated with its development.

2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability

KEYWORDS

health forecasting, predictive health analytics, UHID

INTRODUCTION

The backbone of today's health care system is a strong and resilient digital infrastructure. As electronic medical records become more prevalent, innovators will gain new insights into human health. As a result of big data, Machine Learning, Artificial Intelligence, and IoT software applications, predictive health analysis is now possible. We already see the beginnings of a future health technology system through telemedicine, electronic medical records, teleradiology, and fitness trackers monitoring heart rate, steps, sleep cycle, and many other digital health-related metrics.

A healthy life is what customers want, but the focus of healthcare is to treat illnesses rather than prevent them. [1] However, it is becoming increasingly common to see the industry shift away from the reactionary approach to treating illnesses towards a more proactive, preventative, and human-centered approach. [2, 3, 4, 5] In developed countries, a skewed age structure is expected to drive the dramatic increase in national healthcare costs down to predictive, preventive, participatory, and personalized healthcare. [2]

Despite looking at the literature and prior studies to identify a holistic approach to health forecasting, it has not been

attempted in any of the existing studies to our knowledge. We further identify the various components and potential data sources which can be integrated into the macro context to augment the preventive healthcare regime. We propose a conceptual blueprint as a tool wherein Unique Health ID (UHID) can be connected to multiple data sources, as well as to predictive health analytics, which can support a preventive healthcare management strategy. Finally, this paper discusses the broader gaps that practitioners should explore in this field.

RELATED WORK

A forecast is a prediction that is made by using a systematic process or intuition to acquire foreknowledge about future events. [6] A wide range of forecasting literature discusses two approaches, statistical and judgmental. [7, 8]

Health forecasting involves the prediction and forewarning of conditions or episodes of disease and facilitates public health planning and preventive medicine in populations. [9, 10] Soyiri and colleagues [11] mention in their study that health forecasting can be done using data from population health surveillance, such as demographic and health surveillance and epidemiological studies. As a result of a reliable health forecast, health services can be delivered more effectively,

(1) by improving preventive health care/services;
(2) by creating alerts for patient overflows (during peak healthcare demand); and
(3) by significantly lowering the cost of supplies and staff redundancy.

The impact of health forecasting on health conditions such as ischaemic heart disease [12], chronic obstructive pulmonary disease [13], diabetes incidence [14], and emergency department visits [15] has been studied in some previous studies. When explored, the earlier studies have focused on the predictions employed for the intended and actual hospital stay, vulnerable and susceptible to diseases and relapses, and complications.

Azari and colleagues [16] propose a multi-tiered data mining approach for predicting the length of stay at a hospital. Based on k-means clustering, the authors identified ten different classifiers and performed classification on groups of similar claims for the hospital stay. For varying levels of clustering, the authors evaluate and rank the classifiers using a combined measure of performance. When clustering is used as a precursor to forming the training set, better predictions are obtained than when non-clustering is used. Additionally, the authors found that the accuracy of the projection of individual patient length of stay was consistently higher than those reported in the literature. A total of five methodologies were proposed by Gustafson [17] to predict hospital length of stay. Two of these methodologies generated point estimates based on surgeons' subjective judgments, and the other three were Bayesian distribution estimators, which were developed based on empirical data and subjective assessments.

By reducing the need for radical treatments like surgery and chemotherapy, preventive healthcare programs can save lives and improve quality of life. There are several preventive services that are well-known, such as flu shots, blood tests, and mammograms. For over three decades, preventive healthcare programs have been recognized for their substantial savings in diagnostic and therapeutic costs and lower capital investments. [18] Women between 50 and 69 years can avoid up to 40% of breast cancer deaths by having regular mammograms. According to Gornick and colleagues [19], 36% of patients without screening mammograms are diagnosed with late-stage breast cancer, compared with 20% in the screening group. The ability to share healthcare data will make everyone smarter, for instance, by being better able to understand patterns and trends in public health and disease to improve the quality of care [20]; by providing better recommendations for exercise and physicians [21]; by planning services that maximize the limited national health service budgets for everyone's wellbeing. The raw data from multiple platforms can be blended together to form meaningful data, i.e., to analyze and predict diseases and illnesses in the future. [22]

Guo and colleagues [23] mention in their study that to accurately forecast the epidemic of HIV/AIDS in China, it is crucial that the HIV transmission dynamics are analyzed in high-risk populations, the number of HIV-infected individuals who are not identified, and newly acquired HIV-infected individuals should be estimated, and government prevention and control programs should be evaluated. In order to gauge the effectiveness of Chinese Government prevention and control programs, they calculated the number of unidentified and newly acquired HIV-infected individuals each year. In an analysis by [24], longitudinal data from a commonly worn commercial wearable device (Apple Watch) could assist in diagnosing and identifying symptoms of COVID-19. This metric predicts COVID-19

infection before nasal swab polymerase chain reaction testing. Therefore, HRV can be used to identify COVID-19 infection before polymerase chain reaction testing is performed.

The role of information in health care is well acknowledged. [25] Information and technology are becoming increasingly crucial in strategies for preventing, managing,

and predicting health problems. [4, 5, 25] Throughout the foreseeable future, the world of the economy is going through a dramatic and fundamental shift due to the digitization of health and patient data. A number of factors are driving this shift, such as the aging population, lifestyle changes, the proliferation of mobile devices and software applications, innovative treatments, and the increased focus on care quality and value. Ultimately, this will help promote clinical decision-making, improve healthcare delivery, management, and policy-making, analyze diseases, monitor adverse events, and optimize treatment of many illnesses. [26] With minimal performance degradation during prospective validation, Ren and colleagues [27] accurately predicted postoperative complications using automated real-time EHR data, with accuracy that matched surgeons' predictions and minimal performance degradation during prospective validation. Random forest architectures, which accurately represent complex nonlinear associations among features, were used to optimize the predictive performance. Mobile device applications were provided with model outputs to facilitate integration into clinical workflows. As far as their knowledge goes, this system is the only one that accurately and automatically acquires data and displays it on mobile devices in real time.

NATIONAL INITIATIVE - NDHE

A Committee constituted by the Indian Ministry of Health and Family Welfare identified the need to create a National Digital Health Ecosystem (NDHE) that is not a system but an ecosystem. [28] In addition to providing an architectural vision, the National Digital Health Blueprint (NDHB) also guides its implementation. To drive the implementation of the Blueprint and promote and facilitate the evolution of NDHE, the NDHB recognizes the need to establish a specialized organization, the National Digital Health Mission (NDHM). [28] As illustrated in Figure 1, they created a federated architecture which consists of five layers of architectural building blocks, a set of architectural principles, a federated architecture, privacy and consent management, national portability, an EHR, the application of standards and regulations, health analytics, and, above all, multiple access channels, such as call centers, the India Digital Health portal, and the MyHealth app. [28]

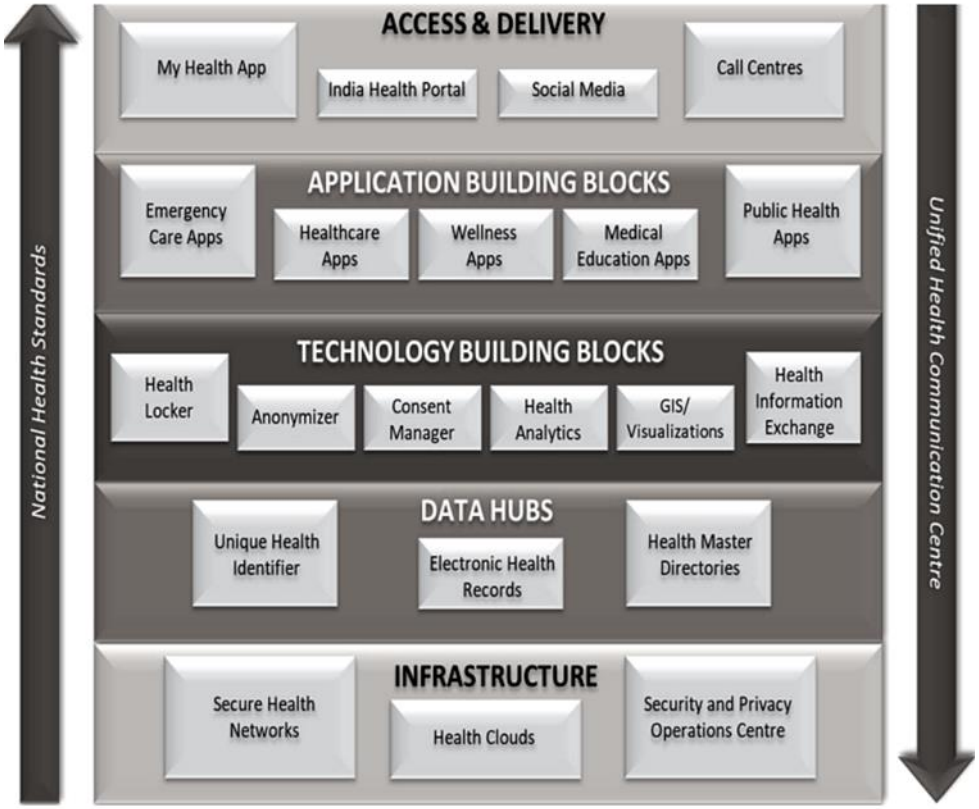
The federated architecture proposed by the Committee is characterized by the following features:

- The architecture consists of three levels: national, state, and regional, as well as facility-level.
- On each level, four layers of building blocks are designed, each representing a particular type of building block, such as Infrastructure, Data, Technology, and Application.
- Layers, levels, and building blocks are loosely coupled using standardized APIs and a 'Need to Connect' approach.
- Building blocks are designed with minimality at every level and layer.
- Data consistency, interoperability, and national portability can be ensured by developing, maintaining, and securing a minimal number of data building blocks.
- There is no national database of health records for citizens.

State health records are only maintained in the form of indexes, pointers, or links.

The Blueprint also mentions that Unique Health Identifiers (UHIDs) are required in the health domain to identify persons, authenticate them, and connect their medical records across multiple systems. The UHID contains demographic information such as name, father's/ mother's/spouse's name, date of birth/age, gender, mobile number, authentication route, email address, location, family ID, and photograph, following FHIR's person resource definition. UHIDs must be unique, and the algorithm that issues a UHID must attempt to return the same identifier for every individual. For designing the structure and processes related to UHID, existing multiple identifiers like Aadhaar, PAN cards, Ration Cards, and Electors Photo Identity Cards (EPICs) may be incorporated, subject to regulatory compliance. A standard for exchanging healthcare information electronically is Fast Healthcare Interoperability Resources (FHIR). [28] The adoption of FHIR ensures access, discoverability, understanding, and standardization of electronic health records to facilitate automated clinical decision support.

FIGURE 1: BUILDING BLOCKS OF NDHB



Source: Ministry of Health and Family Welfare. [28]

It is evident from the federated architecture proposed by the MoHFW, the components of the NDHB outlined above, and the extensive literature on illness prediction that the mainstream literature accepts the research area. As mentioned, the literature discussed above emphasizes the use of data and technology to predict one disease, whereas the Blueprint emphasizes the use of the Unique Health Identifier (UHID) as well as integrating healthcare as an ecosystem. The authors, through this research, however, propose the extended functionality of the healthcare ecosystem, such as UHID, and individual research on predicting specific diseases using the EHR and other medical information will be expanded and integrated, helping not only to indicate any particular disease but also to predict one's overall health.

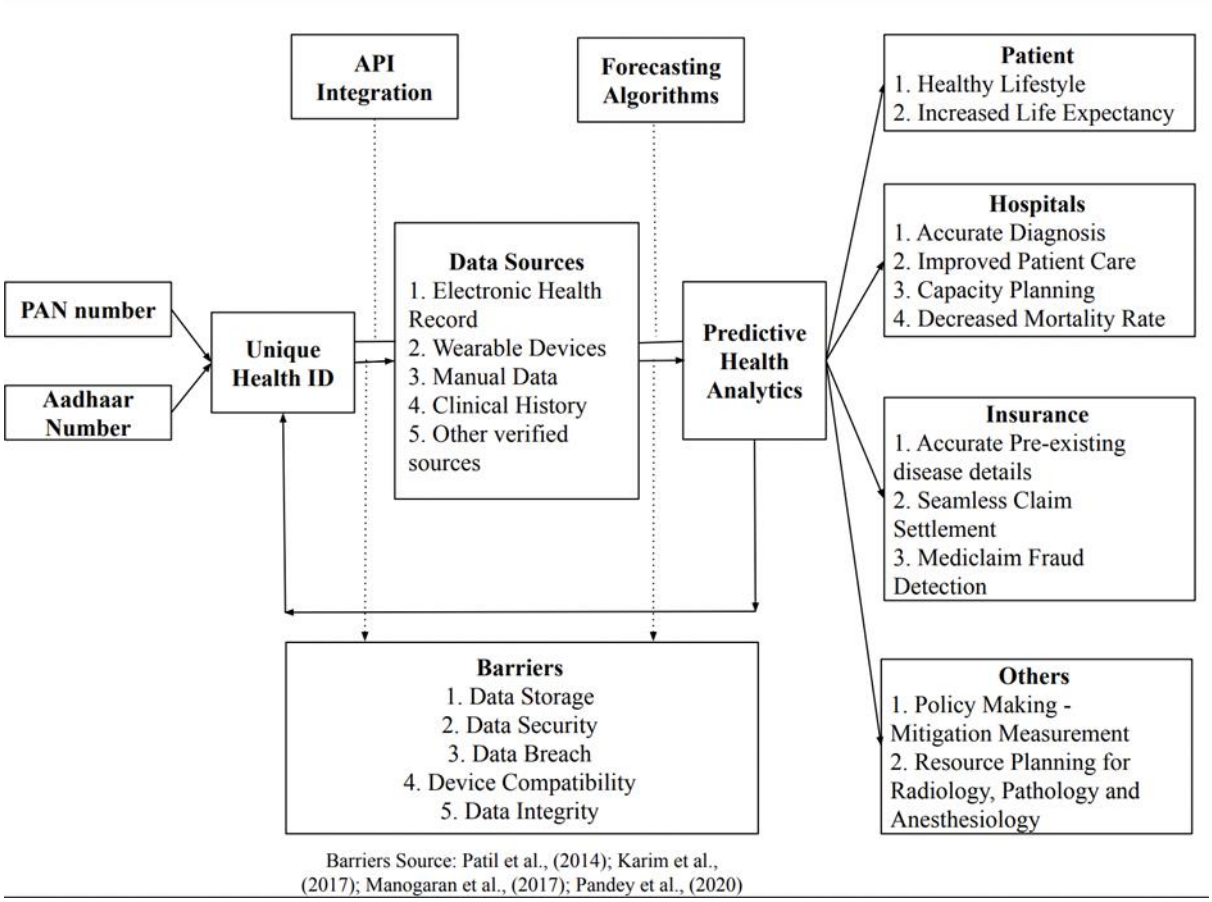
THE PROPOSED TOOL

To predict and prevent illnesses, improve patient care and treatment, and reduce disease burden by providing timely and assistive recommendations, the proposed healthcare tool integrates various types of EHR data, sensory data, and user input data throughout the day. Data from structured, unstructured, and graph types are integrated with the system to predict diseases. As illustrated in Figure 2, as a data source, the wearable device can provide the system with information about movements, heart rate, sleep rate, insomnia levels, blood oxygen, blood pressure, temperature, food intake, calories burnt, blood levels, and more. Environmental and behavioral factors also contribute to several diseases studied by epidemiology. To understand disease onset, development, and care in diverse populations, it is necessary to know how these factors interact. As a second source of data, the user is asked, individually with the help of their smartphone, about their current treatments, drugs, habits, daily meals, weight, height, previous diseases, existing diseases, genetic problems, food allergies, family histories of disorders, where they live, what is the most common disease in their area, and how they live their life. In combination with UHID, the above functionality will work as a unique health profile that can be accessed at any time by any stakeholder in the ecosystem. Using multiple machine learning algorithms, the health profile will be analyzed for predictive and prescriptive information. As a result, users can forecast their health status, resulting in a healthier lifestyle. Increased life expectancy is also a result of a healthier lifestyle. Healthier lifestyles are associated with lower risks of cancer, cardiovascular disease, diabetes, and mortality, along with longer life expectancies and fewer years living with these

diseases. [29] According to [29], promoting a healthy lifestyle will reduce healthcare costs reducing the risk of developing chronic diseases, such as cancer, cardiovascular disease, and diabetes, and by extending the life expectancy of disease-free patients.

According to Lutz and colleagues [30], infectious disease forecasts can be used for more than just communication in seasonal and emergencies. They also mention that the health care providers (including hospitals) could use forecasts to inform their treatment decisions (for example, antiviral treatment for influenza patients). The forecasts could also be used to guide the allocation and deployment of human resources and treatment inventory in preparation for surge capacity and hospital resource management.

FIGURE 2: BLUEPRINT OF THE PROPOSED TOOL



Source: Barriers [31, 32, 33, 34]

In order to validate the tool and get feedback, we discussed the proposed tool's functionality within our network. The following steps were used to explain the prototype of the tool to 32 participants based on the convenience of the authors.

1. KYC Verification for creating Unique Health ID
2. Sync existing data from all devices, i.e., health tracker apps, fitness tracking devices, oximeters, etc.
3. Manually add critical information, such as personal history, family history, previous reports, medicine allergies, food allergies, etc.
4. The user can move back and forth to edit and make changes as needed, e.g., Day wise changes in weight, sleep, water intake, food intake, heart rate, etc.

The tool would allow users to see what diseases they might face during their lifetime with a button click. The timelines will also be easier to predict for more informed users for example, weight gain within the next five years. When verbally discussed with 32 participants, the basic functionality described above was enthusiastically accepted. The literature suggests that this is feasible, even though respondents were unsure whether it would happen in practice. Moreover, respondents reported spending much time and money on their health after the pandemic. The tool would help them schedule preventative

appointments with their doctors, preventing diseases or making them easier to treat.

USE CASE

It was requested by the participants in our study that we describe how the usual use case would feel. Responding to which we believed that the readers would also have a similar concern. We describe in this section how the proposed tool can be useful and functional in two scenarios, one for a hospital visit and one for a private clinic visit.

Visiting a hospital:

In a Hospital Information System (HIS), every patient who has visited this specific hospital at least once has their personal and medical information stored in a central database. In the outpatient department, a patient presents their UHID when entering the hospital so the database can be updated with the date and reason for the visit. In addition, a check whether any new information stored in the cloud by private doctors or other hospitals will need to be updated offline in the patient's electronic medical record, which is maintained by the HIS. Afterward, the patient will be referred to a doctor who can address their problem. By using the HIS, the doctor can access the patient's current medical record during the consultation. Once the doctor has completed the consultation or clinical examination, the HIS will be updated with all documentation regarding the diagnosis and any suggested treatment.

Visiting a Private Doctor:

Similar to the previous scenario, if a patient visits a private doctor and the doctor has the necessary technical infrastructure (software and hardware), and the patient authorizes them, the doctor can retrieve and update the patient's medical records by entering the patient's PIN to access the information stored on their tool. With every new medical history that is saved in the tool, the date of the visit and medical identification number will be included.

DISCUSSION AND CONCLUSION

With a large number of hardware and software configurations available in the market, especially for the Android platform, app developers must produce a highly compatible app. Testing an app's compatibility can be performed on a subset of devices that adequately covers the characteristics of devices that users are likely to use. Being up to date on API building trends is key to developing a flawless integration module.

Due to the fact that APIs work in tandem with web-based programs, attacks are possible on these technologies. An unprotected or unencrypted database can be easily accessed. It is essential to consider potential security breaches when integrating APIs. In order to forecast health, it is necessary to update current information regularly using novel techniques and data while considering the principles of health forecasting. By using time series analysis or other probabilistic methods, health forecasting can exploit patterns in health data. Enhanced and improved health services can be achieved through health forecasting, but it also has a number of shortcomings due to its data sources, methods, and technologies. In order to facilitate the delivery of healthcare and health services, the proposed tool aims to stimulate further discussion on standardizing health forecasting approaches and methods. The integrity of data remains a critical concern for the healthcare industry as well. There are a number of potentially serious consequences that may result from data integrity breaches in healthcare institutions. In today's healthcare environment, cyberattacks are increasingly perceived as the gravest threat. The complexity of a healthcare institutions' organizational structures, as well as regulatory pressures, makes preserving data integrity a challenge.

The impact of such a tool on the quality and efficiency of health care services has not yet been evaluated in a large-scale implementation, but there are indications that it may have a substantial impact. In addition, it will enhance flexibility and interoperability and streamline the administrative and functional processes of healthcare organizations. In order for the medical record to be stored in the cloud, a standard structure for the medical record must be agreed upon and ensure compatibility between the various applications. The memory structure of the tool, both in terms of access attributes and size, must also follow predetermined guidelines. Pharmacy, pathology, medical insurance, and other health-related activities can easily be added to the proposed system.

MANAGERIAL IMPLICATIONS AND LIMITATIONS

Data accuracy remains the most critical aspect for this tool. Numerous fitness tracking watches and devices are already available for the general public. Most users, however, struggle with their accuracy. They often display different readings on the same device. Another concern is

the security of the data. In a world where cyber security issues and data leakage issues often arise, maintaining technical boundaries for such a product should be of paramount importance. Practitioners and managers working in this direction must also consider compatibility issues when integrating the tool with existing devices at this level. We also suggest that any cross-validation strategy should be evaluated case by case. Currently, there are no standard scales for validating a health forecast based on a particular forecasting horizon. In order to streamline and refine the process of validating health-forecasting models, further research is necessary. It requires extensive research and critical design thinking to understand how the predictive tool can accurately predict health and wellness; thus, results drawn from the study should be viewed with caution.

ACKNOWLEDGMENT:

The infrastructural support provided by the FORE School of Management, New Delhi, in completing this paper is gratefully acknowledged.

CONFLICT OF INTEREST:

No potential conflict of interest was reported by the authors.

References

1. Joiner KA, Lusch RF. Evolving to a new service-dominant logic for health care. Innovation and Entrepreneurship in Health. 2016 Jan 29;3(3):25-33.
2. Hood L, Flores M. A personal view on systems medicine and the emergence of proactive P4 medicine: predictive, preventive, personalized and participatory. New biotechnology. 2012 Sep 15;29(6):613-24.
3. Lee T, Porter M. The strategy that will fix healthcare. Boston: Harvard Business Review; 2013 Oct 10.
4. Reich KB. E-discovery in healthcare: 2010 and beyond. Annals Health L.. 2009;19:173.
5. Collins FS, Varmus H. A new initiative on precision medicine. New England journal of medicine. 2015 Feb 26;372(9):793-5.
6. Lewis JB, McGrath RJ, Seidel LF. Essentials of applied quantitative methods for health services managers. Jones & Bartlett Publishers; 2009 Dec 4.
7. Fildes R, Goodwin P, Lawrence M, Nikolopoulos K. Effective forecasting and judgmental adjustments: an empirical evaluation and strategies for improvement in supply-chain planning. International journal of forecasting. 2009 Jan 1;25(1):3-23.
8. Lawrence M, Goodwin P, O'Connor M, Önkal D. Judgmental forecasting: A review of progress over the last 25 years. International Journal of forecasting. 2006 Jan 1;22(3):493-518.
9. Rogers DP, Shapiro MA, Brunet G, Cohen JC, Connor SJ, Diallo AA, Elliott W, Haidong K, Hales S, Hemming D, Jeanne I. Health and climate–opportunities. Procedia Environmental Sciences. 2010 Jan 1;1:37-54.
10. Sekhri N, Chisholm R, Longhi A, Evans P, Rilling M, Wilson E, Madrid Y. Global Health Forecasting Working Group Background Paper.
11. Soyiri IN, Reidpath DD. An overview of health forecasting. Environmental health and preventive medicine. 2013 Jan;18(1):1-9.
12. McGregor GR, Watkin HA, Cox M. Relationships between the seasonality of temperature and ischaemic heart disease mortality: implications for climate based health forecasting. Climate Research. 2004 Jan 23;25(3):253-63.
13. Marno P, Bryden C, Bird W, Watkin HA. How different measures of cold weather affect chronic obstructive pulmonary disease (COPD) hospital admissions in London. European Respiratory Review. 2006 Dec 1;15(101):185-6.
14. Shi L, van Meijgaard J, Fielding J. Peer Reviewed: Forecasting Diabetes Prevalence in California: A Microsimulation. Preventing Chronic Disease. 2011 Jul;8(4).
15. Boyle J, Jessup M, Crilly J, Green D, Lind J, Wallis M, Miller P, Fitzgerald G. Predicting emergency department admissions. Emergency Medicine Journal. 2012 May 1;29(5):358-65.
16. Azari A, Janeja VP, Mohseni A. Healthcare data mining: predicting hospital length of stay (PHLOS). International Journal of Knowledge Discovery in Bioinformatics (IJKDB). 2012 Jul 1;3(3):44-66.
17. Gustafson DH. Length of stay: prediction and explanation. Health Services Research. 1968;3(1):12.
18. Walker WH. An approach to immunoassay. Clinical chemistry. 1977 Feb 1;23(2):384-402.
19. Gornick ME, Eggers PW, Riley GF. Associations of race, education, and patterns of preventive service use with stage of cancer at time of diagnosis. Health services research. 2004 Oct;39(5):1403-28.
20. Jothi N, Husain W. Data mining in healthcare–a review. Procedia computer science. 2015 Jan 1;72:306-13.
21. Zhang Y, Chen M, Huang D, Wu D, Li Y. iDoctor: Personalized and professionalized medical

recommendations based on hybrid matrix factorization. Future Generation Computer Systems. 2017 Jan 1;66:30-5.
22. Myers MF, Rogers DJ, Cox J, Flahault A, Hay SI. Forecasting disease risk for increased epidemic preparedness in public health. Advances in parasitology. 2000 Jan 1;47:309-30.
23. Guo Z, Xiao D, Xu S, He K. Analysis and forecast of the HIV/AIDS epidemic in Mainland China, 1985–2016. Journal of Public Health. 2020 Dec;42(4):e458-67.
24. Hirten RP, Danieletto M, Tomalin L, Choi KH, Zweig M, Golden E, Kaur S, Helmus D, Biello A, Pyzik R, Charney A. Use of physiological data from a wearable device to identify SARS-CoV-2 infection and symptoms and predict COVID-19 diagnosis: observational study. Journal of medical Internet research. 2021 Feb 22;23(2):e26107.
25. Pinho JC, Rodrigues AP, Dibb S. The role of corporate culture, market orientation and organisational commitment in organisational performance: the case of non-profit organisations. Journal of management development. 2014 Apr 8.
26. Raghupathi W, Raghupathi V. Big data analytics in healthcare: promise and potential. Health information science and systems. 2014 Dec;2(1):1-0.
27. Ren Y, Loftus TJ, Datta S, Ruppert MM, Guan Z, Miao S, Shickel B, Feng Z, Giordano C, Upchurch GR, Rashidi P. Performance of a Machine Learning Algorithm Using Electronic Health Record Data to Predict Postoperative Complications and Report on a Mobile Platform. JAMA Network Open. 2022 May 2;5(5):e2211973-.
28. Ministry of Health and Family Welfare. (2020, January 30). Final Report on National Digital Health Blueprint (NDHB) | Ministry of Health and Family Welfare | GOI. Ministry of Health and Family Welfare. Retrieved September 2, 2022, from https://main.mohfw.gov.in/newshighlights/final-report-national-digital-health-blueprint-ndhb
29. Li Y, Schoufour J, Wang DD, Dhana K, Pan A, Liu X, Song M, Liu G, Shin HJ, Sun Q, Al-Shaar L. Healthy lifestyle and life expectancy free of cancer, cardiovascular disease, and type 2 diabetes: prospective cohort study. bmj. 2020 Jan 8;368.
30. Lutz CS, Huynh MP, Schroeder M, Anyatonwu S, Dahlgren FS, Danyluk G, Fernandez D, Greene SK, Kipshidze N, Liu L, Mgbere O. Applying infectious disease forecasting to public health: a path forward using influenza forecasting examples. BMC Public Health. 2019 Dec;19(1):1-2.
31. Patil HK, Seshadri R. Big data security and privacy issues in healthcare. In2014 IEEE international congress on big data 2014 Jun 27 (pp. 762-765). IEEE.
32. Abouelmehdi K, Beni-Hssane A, Khaloufi H, Saadi M. Big data security and privacy in healthcare: A Review. Procedia Computer Science. 2017 Jan 1;113:73-80.
33. Manogaran G, Thota C, Lopez D, Sundarasekar R. Big data security intelligence for healthcare industry 4.0. InCybersecurity for industry 4.0 2017 (pp. 103-126). Springer, Cham.
34. Pandey AK, Khan AI, Abushark YB, Alam MM, Agrawal A, Kumar R, Khan RA. Key issues in healthcare data integrity: Analysis and recommendations. IEEE Access. 2020 Feb 27;8:40612-28.

ACHSM Asia-Pacific Journal of Health Management

CONFERENCE ARTICLE

DETERMINANTS OF DIGITAL HEALTH INFORMATION SEARCH (DHIS) BEHAVIOUR: EXTENDING UTAUT WITH HEALTHCARE BEHAVIOUR CONSTRUCTS

Surya Neeragatti, Ranjit Kumar Dehury, Nishchala Sripathi*

School of Management Studies, University of Hyderabad. Gachibowli, Hyderabad-500046, Telangana, India

Correspondence: neeragattisurya@gmail.com

ABSTRACT

INTRODUCTION:

As the availability of huge amounts of digital health information content increases, the popularity of Digital Health Information Search (DHIS) has increased. This paper explores the determinants that influence the intention to DHIS by the public by extending the UTAUT model with health behaviour constructs like health consciousness, attitude towards health information, and trust in DHI.

METHOD:

The instrument used in this study was created by adapting scales from previous studies. Survey forms were circulated through online platforms with the snowball sampling technique. With the 345 finalized sample, analysis was carried out, and structural equation modelling (SEM) is used for data analysis with the help of SPSS v.26 and AMOS v.26.

RESULTS:

Sample demographics show that 60% of the respondents have experience of 5 years in using smartphones, and 70% of respondents use the smartphone from 1 to 6 hours per day. We see that less time was spent on digital health information (DHI). For searching DHI, respondents use Google/other browsers and for sharing it, WhatsApp is the most used app. The reliability of scales was checked in SPSS, which resulted in Cronbach's alpha value greater than 0.7 for all scales. The hypothesis testing resulted in all the constructs showing a significant relationship. We see that performance expectancy, social influence, and trust in DHI showed a strong significant relation with the intention to DHIS.

CONCLUSION:

This study extends the literature in information systems adoption studies by adding a combination of the technology acceptance model with health constructs. Factors influencing the intention to DHIS are accessibility, influence from peers, and information reliability are more concerned. This study shows the importance and need for genuine DHI from valid healthcare providers, in which the creators of healthcare information, like government and private healthcare providers, have to be more conscious.

2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability

KEYWORDS

digital health information, UTAUT, health consciousness, trust, attitude, health behaviour.

INTRODUCTION

The use of the internet for various kinds of information searches has taken a great role in people's lives. Health is the most important factor during the pandemic, forcing many internet users to search for healthcare information online through different sources. The most important resources like digital technologies, internet availability, broadband connections, computers, and smartphones adoption to the public are creating the best sources for the digital health information [1]. The health information search in online has great attention during COVID-19COVID-19 and post COVID-19COVID-19, it continued with more effectiveness [2].

The ability and skill in finding and evaluating digital health information make it easier to maintain health individually and reduce the time of interaction with healthcare providers [3]. The interest for digital health information has increased with less efforts, minimum cost and time [4]. The Internet is a better source for searching and communicating health-related information like health issues and activities [5]

Healthcare providers started to provide digital health information available to the public through Facebook, YouTube, and websites [6], during COVID-19COVID-19 which played an essential role in the healthcare decisions of the public. Because of the developments in digital media, communication has increased the sharing of individual thoughts, images, videos, and emotions [7, 8, 9] has increased. People who have an active attitude and own involvement in their healthcare will effectively avoid diseases, maintain fitness, communicate with doctors, get the proper health guidance, and make the proper health decisions [10, 11]. There are different mentalities of people in different locations who are not equally copping with the technologies and their utilization, also they differ in their attitude towards their health and maintaining health activities [1]. So, in this context, we can observe different levels of adoption of digital health information search (DHIS). The data from internet searches says that people mostly searched about COVID-19COVID-19 symptoms, sanitisers, masks, and precautions during the COVID-19 pandemic [12, 13]. So, with this, we can conclude that digital health information search has taken a great leap during COVID-19 and post COVID-19.

Previous studies provided much information related to the adoption and usage behaviours of the health information, but there is no proper theoretical framework for it [14]. We have the technology adoption and theories that can help predict the DHIS behaviour. Unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. [15] is a technology acceptance theory that showed a unified theoretical framework for the Information Systems research. We combine the UTAUT with the Digital health information (DHI) research to get the systematic outcomes of determinants that influence the DHIS behaviour. The behaviour of DHIS must be equally studied with the technology acceptance behaviour. We explore the determents that influence the public DHIS behaviour and extend the UTAUT by adding Trust, health consciousness, and attitude towards health information (HI).

With this the objectives of this study are as follows:

1. To explore the theoretical outcomes of determinants affecting the DHIS behaviour
2. To examine the technology adoption model in the Healthcare communication research
3. To examine the health consciousness, trust, and attitude towards HI in DHIS behaviour

LITERATURE AND HYPOTHESIS DEVELOPMENT

PERFORMANCE EXPECTANCY (PE)

Performance expectancy is referred to as the public belief of utilizing a technology that can help his/her performance benefits [15]. Constructs, namely performance expectancy, have strongly proved that it is consistently the strongest predictor of behavioral intention [16]. The study of Hoque and Sorwar [17] on mHealth explained that performance expectancy has a positive effect on the behavior intention of the public on mHealth services [18, 19, 20].

H1. Performance expectancy is positively related to “intention to DHIS” (BI)

FACILITATING CONDITIONS (FC)

Facilitating conditions refer to how the individuals perceive that there should be some resources and skills to use the specific technology [15] earlier studies continuously refer that there should be both resources and skills for adopting the new technologies, especially in healthcare technologies like electronic medical technologies [21] and

healthcare information technologies [22]. Studies found a positive relationship between facilitating conditions and technology use [23]. Hence, we framed a hypothesis that:

H2: FC is positively related to the intention to DHIS

SOCIAL INFLUENCE (SI)

Social influence refers to the individual's perception that their peers like family members, friends, and colleagues believe that he/she should use the technologies [15], earlier studies examined the social factors that influence technology adoptions and resulted in significant relation between social influence and the adoption of technologies specifically health-related technologies like health app usage [18] and mHealth. [17]. We, therefore, propose that:

H3: Social influence is positively related to intention to DHIS

HEALTH CONSCIOUSNESS (HC)

The persons with more health concerns and those who can be able to maintain their own health are known to be Health conscious. It refers to the extent an individual is able to maintain his/her own health [5]. There are studies that included health consciousness as the additional determinant in different technology models like UTAUT [18] and TRAM. Damberg [18] and Chen and Lin, [24] found that technology adoption constructs show more significant results when combined with health consciousness. Earlier studies found that health value is significantly related to anxiety and attitudes toward individuals' health behaviors [25]. Therefore, we hypnotize that:

H4: Health consciousness is positively related to intention to DHIS

ATTITUDE TOWARD HEALTH INFORMATION (AT)

Attitude is the extent to which consumers have an opinion, either positive or negative about behavior in adopting or usage of IT tools [26]. Attitude has been used across prominent models of IS/IT adoption and these models suggest that an individual's adoption intention is determined by their attitude toward using the IT or any new tools [27]. The previous studies in the healthcare IT adoption, excluded this attitude as the main construct [28].

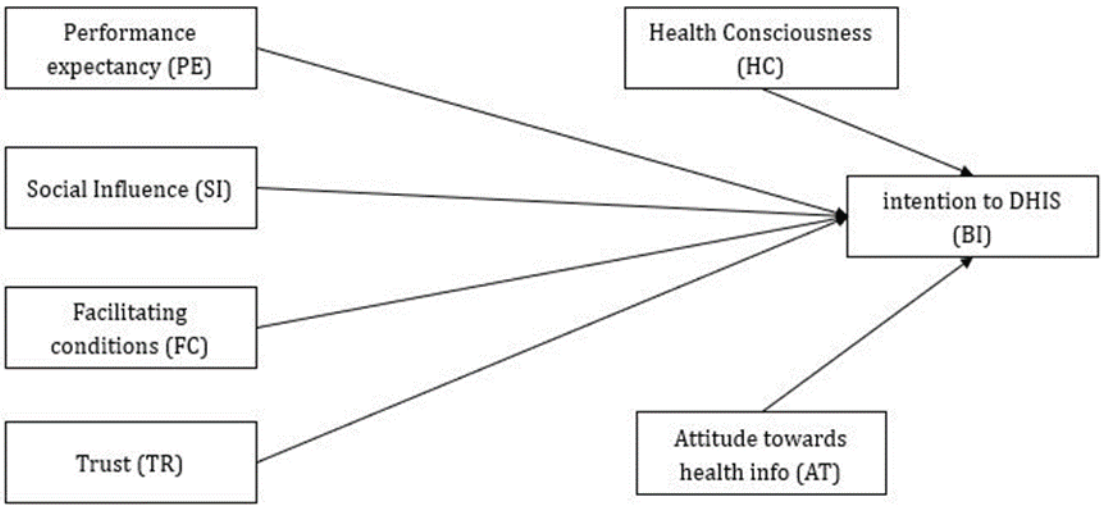
H5. Attitude towards health information will have a positive and significant influence on intention to DHIS

TRUST (TR)

Trust is the extent to which he/she is willing and confident in the tool and IT to be used; earlier studies exposed the role of trust in different concepts like banking and digital transactions [29]. As we know, health information is essential and trust in the health information which is shared and to be shared is more essential [30]. When the individual trusts the digital health information from providers, and if it is reliable from valid healthcare providers, they intend to search the health information digitally. Thus, we proposed the hypothesis:

H6. Trust is positively related to the intention to DHIS.

FIGURE 1: PROPOSED MODEL - VARIABLES RELATING TO INTENTION TO DHIS



RESEARCH METHODOLOGY

This empirical study is conducted with the primary data collected from the Indian population who search for healthcare information on the internet. We conducted an online survey with a questionnaire in Google Forms. We received 400 responses, from which 345 responses were finalized for the analysis. The discarded responses were with incomplete information of demographics and behaviour items. In the Investigation of UTAUT, SPSS (v. 26) is the most used software tool in the analysis process, different researchers also use AMOS (v. 26) Graph. Numerus of studies on the decision of sample size suggests that the size of the sample can range from 5 to 10 times of the items used in the study scale is suitable. With the hypothesis derived from literature a research model is proposed as set out in the Figure 1, which shows the relations between different variables and intention to DHIS.

This study conducted under the ethical standards of the institutional Ethics Committee (University of Hyderabad) (UH/IEC/2021/160) and informed consent was provided to the participants and the participation was made voluntary.

QUESTIONNAIRE DESIGN AND VARIABLE MEASUREMENTS

The instruments in this study were taken from previous studies to assure the validity of the outcomes. Items of the performance expectancy (PE), social influence (SI) and facilitating conditions was measured with items taken from Venkatesh et al. [15]. The health consciousness and attitude towards health information (AT) items were adapted from Dutta-Bergman [5], items that measure the trust (TR) are taken from Deng, Liu, & Hinz, [26]. Final questionnaire consisted of two parts. The first part is the information of respondent's demographics and their intentions towards the DHIS. The second part consists of the statements designed to validate the respondent's intentions on determinants of DHIS. Statements were measured on the five-point Likert scale, score ranging from 1 = "strongly disagree" to 5 = "strongly agree"

DATA ANALYSIS

Structural equation modelling (SEM) statistical technique was used to test the proposed model, SEM is the best suitable to test for UTAUT models as recommended by social science researchers. we used Kaiser-Meyer-Olkin (KMO) test to test the sample adequacy, and the result value we got was 0.854, indicates that the sample is adequate. We applied Harman's single factor technique in order to investigate the common method, according to the data, for a single factor, the total variation is 40%, which is below the threshold value of 50%. The variance inflation factor (VIF) value was noted below the 3.3 limit [31], indicating that common bias does not exist in this study.

RESULTS

DEMOGRAPHICS

For sample demographics, Table1 illustrate that 45.8% of the respondents were female and 54.2% were male, 44.1% of the respondents were in the age range from 22 to 25 years. We observed that 60% of the respondents have experience in using a smartphone for more than 5 years; time spent on smartphone was that 70% spend 1hour to 6 hours per day. When we asked respondents about their time spent on one DHIS, we see that 43% of the respondents spend 15 minutes and 33% spend 30 minutes on one DHI. As there are many sources to get DHI, we see that 50.7% of the respondents use the Google/other browser and 27.7% use YouTube for DHIS, and we see only 12.9% use healthcare apps for DHIS. When the respondents feel that the DHI is good for communicating, they use different sources to share it. 65% of respondents use WhatsApp to share health information with their friends or family members.

TABLE1: DEMOGRAPHIC INFORMATION

		Frequency	Percent
Gender	Female	158	45.8
	Male	187	54.2
Age (in years)	18 - 21	65	18.8
	22 - 25	152	44.1
	26 - 29	57	16.5

	30 - 33	35	10.1
	34 and above	36	10.4
Education	10 + 2	16	4.6
	Graduation	139	40.3
	Post-graduation	175	50.7
	Ph.D.	15	4.3
Experience in Phone usage	Less than 1year	6	1.7
	1year	12	3.5
	2years	26	7.5
	3years	28	8.1
	4years	66	19.1
	5years and more	207	60
Time Spend on one Health Information	15minutes	149	43.2
	30minutes	115	33.3
	1hour	45	13
	1 - 2hours	20	5.8
	3hours and more	16	4.6
Time spent on Phone per day	less than 1hour	18	5.2
	1 - 3hours	121	35.1
	4 - 6hours	121	35.1
	7 - 9hours	63	18.3
	10 - 12hours	20	5.8
	more than 12hours	2	0.6
Medium used to search HI	Google/another browser	298	50.70
	YouTube	163	27.70
	Facebook	43	7.30
	Any healthcare app	76	12.90
	Other (Instagram, Dailyhunt, Inshorts, local news apps, TOI)	8	1.40
Medium used to share HI	WhatsApp	311	65.10
	Text messages	58	12.10
	Social Media (FB Instagram Twitter etc.)	94	19.70
	Other (e-mails and WOM)	15	3.10

MEASUREMENT MODEL

Composite reliability (CR), Cronbach's alpha (α) and average variance extracted (AVE) tests were performed to assess the reliability and convergent validity. Every item had a loading of more than 0.7. [32]. All of the item loadings are listed in Table 2. The literature suggests that item loading between 0.6 and 0.7 is appropriate. Table 3 shows the reliability of the measurement items as determined by α, CR, and AVE at the construct levels. The results show that α and CR scores are higher than the proposed 0.70, and AVE values are higher than the 0.50 threshold, indicating that the acceptable convergent validity.

To test the discriminant validity in this study, we employed Heterotrait Monotrait ratio of correlations (HTMT). HTMT.85 is the best suitable test to indicate the issue of discriminant validity in the study context. [33], we did this test in AMOS v.26 software using the plugin "Master Validity Tool" [34]. HTMT values between every construct are below the threshold 0.85 as shown in Table 4, indicating that constructs in this study form the requisite discriminant validity.

TABLE 2: FACTOR LOADINGS FOR EACH ITEM OF THE VARIABLES

Item	Performance Expectancy	Social Influence	Health Consciousness	Facilitating conditions	Trust	Behavior Intention	Attitude
PE1	0.76						
PE2	0.827						
PE3	0.705						
SI1		0.845					
SI2		0.858					
SI3		0.887					
HC3			0.709				
HC2			0.812				
HC1			0.736				
FC1				0.672			
FC2				0.75			
FC3				0.772			
TR3					0.882		
TR2					0.883		
TR1					0.863		
BI1						0.838	
BI2						0.721	
BI3						0.82	
AT4							0.786
AT3							0.657
AT2							0.697
AT1							0.734
AT5							0.796
AT6							0.708

TABLE 3: CR, AVE AND SCALE RELIABILITY VALUES FOR THE MEASUREMENT MODEL

	CR	AVE	Scale Reliability (α)
PE	0.809	0.587	0.806
SI	0.898	0.746	0.898
HC	0.797	0.568	0.810
FC	0.776	0.536	0.778
TR	0.908	0.768	0.907
BI	0.837	0.632	0.835
AT	0.873	0.534	0.869

TABLE 4: HTMT ANALYSIS FOR THE DISCRIMINANT VALIDITY

	PE	SI	HC	FC	TR	BI	AT
PE							
SI	0.744						
HC	0.444	0.313					
FC	0.689	0.526	0.415				
TR	0.704	0.736	0.228	0.497			
BI	0.806	0.756	0.367	0.625	0.835		
AT	0.659	0.421	0.774	0.523	0.362	0.503	

STRUCTURAL MODEL

Before investigating the proposed hypotheses, the structural model fit indices were tested in AMOS (v.26) using the plugin "Model Fit Measures" [35]. Previous studies suggest a combination of comparative fit index (CFI) >0.95 and also standardized root mean square residual (SRMR) <0.08. To further solidify evidence, add the root-mean-square error of approximation (RMSEA) <0.06". The overall chi-square (CMIN) for the structural model was 477.295 with DF = 231 and CMIN /DF = 2.066. The (CFI) was 0.951 and the RMSEA was 0.056; these results shown in Table 5 provide strong evidence for proposed model's good fit.

The significance of the proposed hypothesis was tested in AMOS and shown in Figure 2 the results which are in Table 6 indicate the strong significant effect of performance expectancy, social influence and trust (TR) on intention to DHIS (*** p < 0.001), which supports Hypotheses H1, H3 and H6. Impact of facilitating conditions on intention to DHIS was significant as per the analysis (* p < 0.050) that supports Hypothesis H2. The health conciseness and attitude toward health information are significantly affects intention to DHIS (** p < 0.010), supporting hypotheses H4 and H5. This study shows that PI, FC, SI, HC, AT, TR are positively influencing the intention to DHIS.

TABLE 5: MODEL FIT MEASURES FOR THE STRUCTURAL MODEL

Measure	Estimate	Threshold	Interpretation
CMIN/DF	2.066	Between 1 and 3	Excellent
CFI	0.951	>0.95	Excellent
SRMR	0.053	<0.08	Excellent
RMSEA	0.056	<0.06	Excellent
PClose	0.092	>0.05	Excellent

FIGURE 2: STRUCTURAL MODEL WITH SIGNIFICANT VALUES

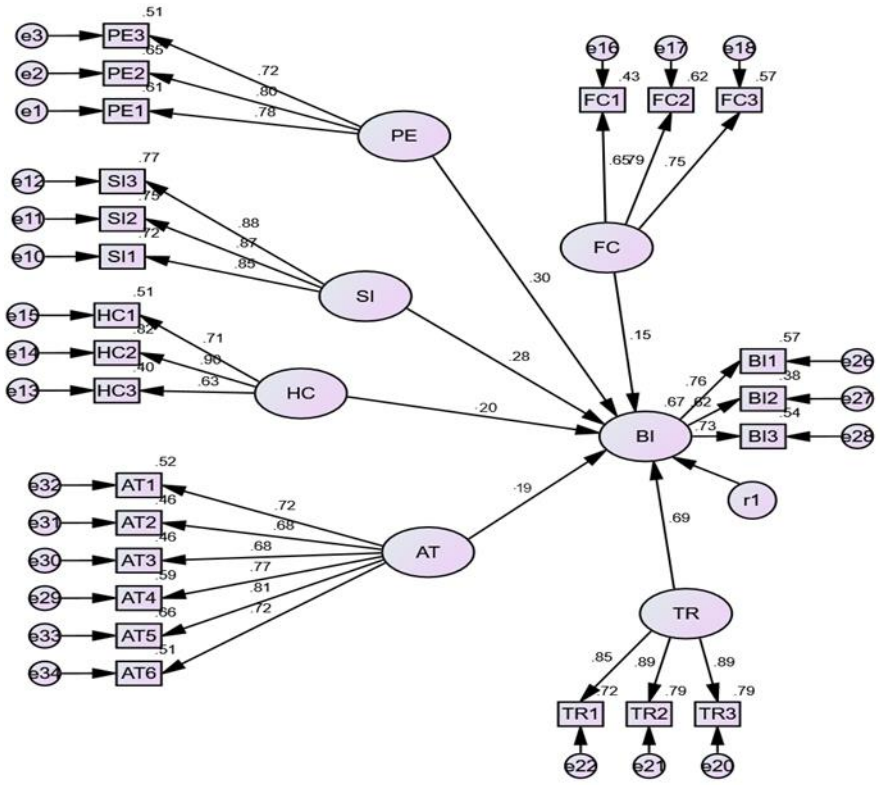


TABLE 6: HYPOTHESES SIGNIFICANT VALUES FOR PROOSED HYPOTHESES

			P	Significance
BI	<---	PE	.000	***
BI	<---	FC	.022	*
BI	<---	SI	.000	***

			P	Significance
BI	<---	HC	.009	**
BI	<---	AT	.009	**
BI	<---	TR	.000	***

*p<0.050 **p<0.010 ***p<0.001

DISCUSSION

The admiration of digital health information has increased because of the availability of the different and huge quantities of online information with less effort and minimum cost and time. Previous studies concentrated on collecting the information related to specific constructs [17], but we also incorporated the information about the mediums used for DHIS and DHI share in this study. As we see in the observations, many people are into the usage of smartphones and the internet for healthcare information. google/other browser is the medium used by most people to search for health information, and YouTube takes the next place. Healthcare apps users are very few in finding healthcare information. Most people are using WhatsApp to share the health information with their peers. The individual spends time on health information is very less, leading to incomplete knowledge of the health issues. As we see in previous studies, there are few studies that involved a technology acceptance model in health information studies [25]., There are very few studies that involved health-related constructs in the technology acceptance studies in healthcare [28].

In this study health consciousness, trust on DHI and attitude towards the DHI are showing statistically significant the same as the original constructs of UTAUT. While searching for DHI reliability and accessibility of the internet and the DHI playing the main role in DHIS intention, social influence is highly significant in relation to DHIS intention, which means family members or friends more influential people in searching for DHI. Individuals' health consciousness is driving them to search for health information on the internet and develop their knowledge of health issues. The positive or negative opinions on healthcare information and trust involved in the online health information develop the intention of DHIS. Limitations of this study was observed in two ways. The first one is the study consists more of young age respondents and future study can be done with dotage population also. The second is the selection of determinants can be increased towards usage of DHI. The study also suggests the extension with usage behavior of DHI and social media influence as determinants.

CONCLUSION

The first contribution of this study is to incorporate health-related constructs into the technology adoption model, which adds to the literature. This study gives a rich understanding of DHIS by knowing what sources are used to search and share DHI and how much time people spend on DHI.

This study suggests that healthcare app developers should increase the availability of health information in their healthcare apps. Individuals should also know more about any health issue and get valid and reliable information from trusted healthcare providers.

This study highlights the impact of health consciousness, attitude towards health information, and trust on DHIS behavior.

These findings accentuate the need for genuine digital health information that values the trust of the public and notifies digital health information creators like health experts and government health providers to consider the health behaviors of the public while creating the digital health information. This study suggests that researchers should adopt the health behavior constructs in their studies of healthcare technologies adoption. With the influence of family and friends, an individual shows interest in digital health information in learning about health issues and solutions. It is essential to check whether the provided health information is from reliable sources.

MANAGERIAL IMPLICATION

The study provides a direction for assessing human behavior regarding searching for healthcare information. Human behaviors are essential for designing health care

apps and information platforms, which need to be taken care of during the commissioning of any services relating to health care, particularly in the health information domain. The DHIS is the predominant issue for which managers have to focus more on advancing the dissemination of information on the digital platform, which must align with the health care needs of the people. Factors like trust and quality of information play an important role for the viewers; hence managers have to be conscious of these parameters to penetrate the market.

ACKNOWLEDGEMENTS:

Mr. Surya Neeragatti is the recipient of the Indian Council for Social Sciences Research (ICSSR) doctoral fellowship with grant no RFD/2021-22/SC/MGT/12/ dated 17th December, 2021. Dr. Ranjit Kumar Dehury acknowledges financial support to UoH-IoE by the University of Hyderabad through the Institute of Eminence Project, Ministry of Education (Government of India) grant no. (F11/9/2019-U3(A)). However, the grant agencies have no role in designing and conduct of the study by the researchers.

References

1. Magsamen-Conrad K, Dillon JM, Billotte Verhoff C, Faulkner SL. Online Health-Information Seeking Among Older Populations: Family Influences and the Role of the Medical Professional. Health Commun [Internet]. Routledge; 2019;34:859–71. Available from: https://doi.org/10.1080/10410236.2018.1439265
2. Norman CD, Skinner HA. eHEALS: The eHealth literacy scale. J Med Internet Res. 2006;8:1–7.
3. Maclas W, McMillan S. The return of the house call: The role of Internet-based interactivity in bringing health information home to older adults. Health Commun. 2008;23:34–44.
4. Peterson RA, Merino MC. Consumer Information Search Behavior and the Internet. Psychol Mark. 2003;20:99–121.
5. Dutta-Bergman MJ. Primary sources of health information: Comparisons in the domain of health attitudes, health cognitions, and health behaviors. Health Commun. 2004;16:273–88.
6. Marton C, Choo CW. A review of theoretical models of health information seeking on the web. J Doc. 2012;68:330–52.
7. Oberst U, Wegmann E, Stodt B, Brand M, Chamarro A. Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. J Adolesc. 2017;55:51–60.
8. Reddy M. Social Media: Internet Trends in India and Growth of Social Media in the Recent Times. Artic Int J Bus Adm Manag Res [Internet]. 2021; Available from: https://www.researchgate.net/publication/351587792
9. Magsamen-Conrad K, Hanasono L. Health communication in the context of aging : The development of an Intergenerational Communication Intervention to reduce biases and discrimination. Heal Commun Context aging. 2013;
10. Furutani K, Kobayashi T, Ura M. Effects of Internet use on self-efficacy: Perceived network-changing possibility as a mediator. AI Soc. 2009;23:251–63.
11. Lim S, Xue L, Yen CC, Chang L, Chan HC, Tai BC, et al. A study on Singaporean women's acceptance of using mobile phones to seek health information. Int J Med Inform [Internet]. Elsevier Ireland Ltd; 2011;80:e189–202. Available from: http://dx.doi.org/10.1016/j.ijmedinf.2011.08.007
12. Bento AI, Nguyen T, Wing C, Lozano-Rojas F, Ahn YY, Simon K. Evidence from internet search data shows information-seeking responses to news of local COVID-19-19 cases. Proc Natl Acad Sci U S A. 2020;117:11220–2.
13. Mohebi S, Parham M, Sharifirad G, Gharlipour Z. Social Support and Self - Care Behavior Study. 2018;1–6.
14. Watkins I, Kules B, Yuan X, Xie B. Heuristic Evaluation of Healthy Eating Apps for Older Adults. J Consum Health Internet. 2014;18:105–27.
15. Venkatesh V, Morris MG, Davis GB, Davis FD. User Acceptance of Information Technology: Toward a Unified View. MIS Q [Internet]. 2003;27:425–78. Available from: https://doi.org/10.2307/30036540
16. Venkatesh V, Xu X, Thong J. Journal of the AIS Association for Information Systems Unified Theory of Acceptance and Use of Technology: A Syn... J Assoc Inf Syst. 2016;17:328–76.
17. Hoque R, Sorwar G. Understanding factors influencing the adoption of mHealth by the elderly: An extension of the UTAUT model. Int J Med Inform [Internet]. Elsevier Ireland Ltd; 2017;101:75–84. Available from: http://dx.doi.org/10.1016/j.ijmedinf.2017.02.002
18. Damberg S. Predicting future use intention of fitness apps among fitness app users in the United Kingdom: the role of health consciousness. Int J Sport Mark Spons. 2021;
19. Jewer J. International Journal of Medical Informatics Patients ' intention to use online postings of ED wait times : A modified UTAUT model. Int J Med Inform. 2018;112:34–9.

20. Quaosar GMAA, Bao Y. Investigating Factors Affecting Elderly's Intention to Use m-Health Services: An Empirical Study. Telemed e-Health. 2018;24:309–14.
21. Jung EY, Kim JH, Chung KY, Park DK. Home health gateway based healthcare services through U-health platform. Wirel Pers Commun. 2013;73:207–18.
22. Kamalzadeh. Factors Determining Nurse Acceptance of Hospital Information Systems in the Medication Process. J Soft Comput Decis Support Syst. 2015;2:14–9.
23. Chau PYK, Hu PJH. Investigating healthcare professionals' decisions to accept telemedicine technology: An empirical test of competing theories. Inf Manag. 2002;39:297–311.
24. Chen MF, Lin NP. Incorporation of health consciousness into the technology readiness and acceptance model to predict app download and usage intentions. Internet Res. 2018;28:351–73.
25. Kim RM, Kaplan SM. The health information seeking and usage behavior intention of Chinese consumers through mobile phones. Inf Technol People [Internet]. 2005;18 No.3:280–99. Available from: http://dx.doi.org/10.1108/09593840510615888
26. Deng Z, Liu S, Hinz O. The health information seeking and usage behavior intention of Chinese consumers through mobile phones. Inf Technol People. 2015;28:405–23.
27. Todd, Peter A and Shirley Taylor (School of Business Queen's University Kingston O, Canada K7L3N6). Understanding Information Technology Usage : A Test of Competing Models Author (s): Shirley Taylor and Peter A . Todd Published by : INFORMS Stable URL : http://www.jstor.org/stable/23011007 . Understanding Models Usage : Inf Syst Res [Internet]. 1995;6:144–76. Available from: http://pubsonline.informs.org/doi/abs/10.1287/isre.6.2.144?journalCode=isre%5Cnhttp://www.researchgate.net/publication/220079739_Understanding_Information_Technology_Usage_A_Test_of_Competing_Models
28. Dwivedi YK, Rana NP, Jeyaraj A, Clement M, Williams MD. Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a Revised Theoretical Model. Inf Syst Front. Information Systems Frontiers; 2019;21:719–34.
29. Zhou X, Zhang R, Ho CK. Wireless information and power transfer: Architecture design and rate-energy tradeoff. IEEE Trans Commun. 2013;61:4754–67.
30. Harris PR, Sillence E, Briggs P. Perceived threat and corroboration: Key factors that improve a predictive model of trust in internet-based health information and advice. J Med Internet Res. 2011;13:1–13.
31. Kock N. Common Method Bias in PLS-SEM. Int J e-Collaboration. 2015;11:1–10.
32. Hair JF, Ringle CM, Sarstedt M. Partial Least Squares Structural Equation Modeling: Rigorous Applications, Better Results and Higher Acceptance. Long Range Plann. 2013;46:1–12.
33. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci. 2015;43:115–35.
34. Gaskin, J., James, M., and Lim J. "Master Validity Tool" [Internet]. AMOS Plugin; 2019. Available from: http://statwiki.kolobkreations.com/
35. Gaskin, J. & Lim J. "Model Fit Measures" [Internet]. AMOS Plugin; 2016. Available from: http://statwiki.kolobkreations.com/

ACHSM Asia-Pacific Journal of Health Management

CONFERENCE ARTICLE

MOTIVATIONS AND BARRIERS TO PURCHASE HEALTH INSURANCE: A QUALITATIVE STUDY

Vilasini Jadhav, Smita Ramakrishna*

K.J. Somaiya Institute of Management, Mumbai, India

Correspondence: vilasini@somaiya.edu

ABSTRACT

OBJECTIVE

The purpose of this study is to understand and explore the motivations and barriers faced by customers while purchasing health insurance.

DESIGN AND SETTING

An exploratory qualitative research design is applied to analyse the textual content of the depth interview data. The theory of Planned Behaviour (TPB) provides the theoretical backdrop in designing the codes for the themes.

RESULTS

The major factors which motivated the respondents to purchase health insurance policy include financial security, cashless transaction, taxation benefits, continuity benefits and helping in medical emergency. The significant barriers in the purchase of health insurance as identified by the participants include factors such as all ailments not covered, all facilities not covered, affordability, lack of awareness, lack of clarity and regarding the expense as an unnecessary expenditure.

CONCLUSION

The study uses the framework of TPB to ascertain the factors which contribute to the major themes during the course of content analysis. Our results indicate the factors which act as a motivation as well as the factors which act as barriers in the purchase of health insurance. A possible solution for such barriers is to widen the scope of financial literacy, to include the benefits of health insurance and make people aware of the details of such policies. Insurance companies should also try to reduce the premium charged.

2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability

KEYWORDS

health insurance, TPB, qualitative content analysis, depth interviews, motivations, barriers

INTRODUCTION

Over the last two decades, the Indian Insurance industry has enjoyed impressive growth, thus contributing significantly to the economy. The Indian Insurance sector has two main categories: Life Insurance and Non-Life

Insurance, and they are both regulated by IRDAI (Insurance Regulatory and Development Authority of India). Non-Life Insurance is also known as General Insurance, which includes Health Insurance.

The outbreak of the COVID-19 pandemic had a significant impact on the overall Indian Insurance sector and, more specifically, on Indian Health Insurance. While only 10 per cent of people considered health insurance necessary before the outbreak of Coronavirus in India, this has now increased to almost 70% who consider it essential to protect themselves from unforeseen events [1]. Medical emergencies experienced by the people during this pandemic highlighted the importance of having adequate insurance for the health and safety of their family.

A qualitative study undertaken in 2016 [2] revealed that the low uptake and the renewal of health insurance were a result of two broad factors, namely sociocultural and systemic factors. In a qualitative study by [3], affordability of healthcare premiums, social security against unexpected health issues and availability of free drugs were identified as key motivations. Long waiting lines at healthcare facilities and health insurance offices contributed to the barriers to health insurance subscription including perceived mediocre quality of drugs, and negative attitudes of employees at healthcare facilities and the insurance company.

A qualitative study undertaken in 2018 [4] found that Saudi Arabians were mostly dissatisfied with the availability of appointments, drugs and waiting times, as well as the quality of public sector healthcare services. Study results from [5] revealed that perceived usefulness and perceived risk were the key factors in determining attitudes towards the intention to purchase health insurance. According to [6] in their quantitative study, the results showed that perceived usefulness, insurance literacy, subjective norm, attitude towards health insurance, and perceived behavioural control had a significant positive influence on the intention to purchase health insurance. Table I presents the summary of factors and the respective authors from existing literature.

TABLE 1: FACTORS INFLUENCING HEALTH INSURANCE ACCORDING TO EXISTING LITERATURE

Factors/Authors	Fenny et al. [2]	Kumi-Kyereme et al. [3]	Al-Hanawi et al. [4]	Brahmana et al. [5]	Mamun et al. [6]
Sociocultural	√				
Systemic	√		√		
Social security		√			
Affordability of premiums	√	√			
Attitude		√		√	√
Perceived usefulness		√		√	√
Perceived risk				√	
Subjective norm					√
Perceived behavioural control					√

In one review by Ahlin etal [7], they emphasized the need for further research on the factors that influence citizens' decisions to enrol in, drop out of, or utilize the benefits of insurance programs. In the study by [8], they indicated that there is a need for improving awareness of various health insurance plans in India by issuing timely enrolment cards with all the necessary details, achieving universal enrolment, continuing and prompt renewal, and educating the vulnerable segments to ensure proper utilization among them. In the study by [9], it was found that performance, reputation, and positive affect were influential factors affecting customer retention.

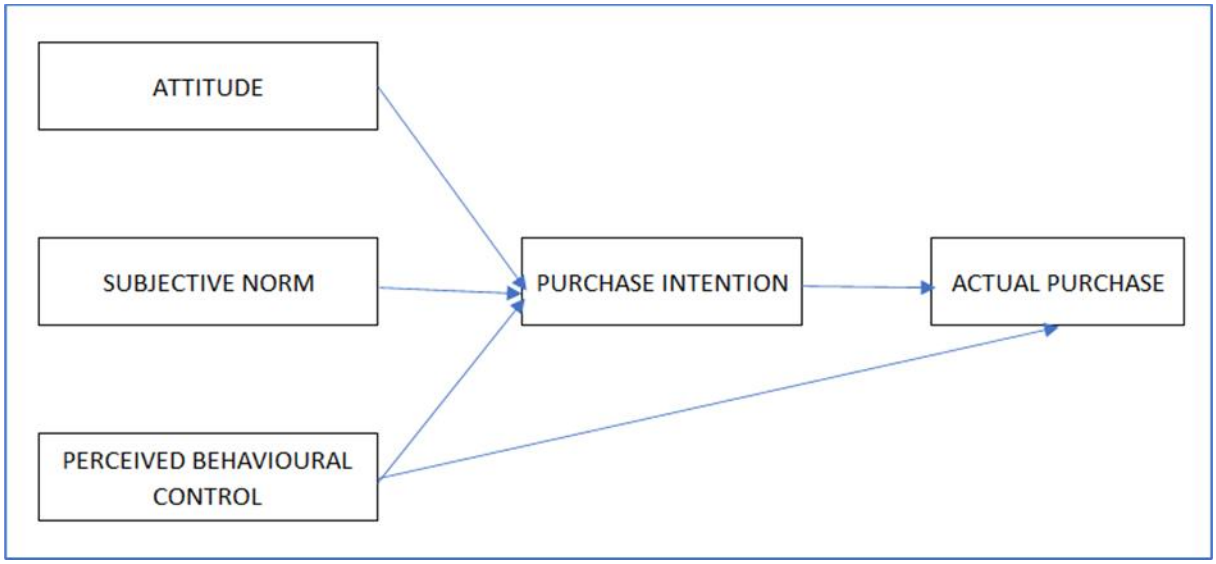
In reviewing the literature, it is evident that there are various factors influencing the purchase of health insurance. However, the existing literature in the area of health insurance purchase in India is scarce. A call for further research in the area of health insurance purchase in India has also been observed in the literature. Thus, the purpose of this study is to understand and explore the motivations

and barriers faced by customers while purchasing Health Insurance. This study attempts to contribute and extend to the literature in the area of health insurance purchase in India.

CONCEPTUAL FRAMEWORK

We used the Theory of Planned Behaviour (TPB) developed by Ajzen [10] as a conceptual framework for this study (Figure 1). The TPB is a well-validated psychological theory that links beliefs to behaviour and has been applied in the area of health insurance and various other contexts [3 10]. According to TPB, the central factor in the determination of actual purchase behaviour is purchase intention which is influenced by three antecedents namely: attitude, subjective norm and perceived behavioural control. In context to this study, attitude refers to a degree to which a person has a positive or negative assessment about purchasing health insurance; subjective norm refers to the perceived social pressure to purchase or not to purchase health insurance; and perceived behavioural control refers to perceived ease or difficulty in purchasing health insurance.

FIGURE 1: CONCEPTUAL FRAMEWORK



Source: Adapted from Ajzen [10]

METHODS

DESIGN

An exploratory qualitative research design was used to learn more about the motivations and barriers faced by respondents who had purchased health insurance. An analysis of the textual content of the depth interview data was conducted using qualitative content analysis. The theory of planned behaviour provided the theoretical backdrop for designing the codes for the themes.

DATA COLLECTION

A convenience sampling method was used to select the respondents from Mumbai, India, for the telephonic interviews. A structured interview guide with open-ended questions was used to effectively manage the data collection. The interviews were conducted in English and audio was recorded. As the data collection progressed, it was observed that information from the interviews was becoming repetitive. Therefore, interviewing was stopped after 18 respondents.

ETHICAL CONSIDERATION

Prior to the commencement of the interview, each respondent was briefed about the nature and purpose of the study. It was voluntary participation, and each respondent was informed that they might withdraw at any time or choose not to participate. After verbal consent from each respondent, an interview was conducted. All respondents were assured that the data would be strictly used for research purposes only and not for any other purpose.

DATA ANALYSIS

The audio recordings were transcribed in full using the services of a professional service provider. Coding was done following the TPB components and then categorised into themes. The frequency of similar items discussed by the respondents was one criterion. The other criteria were the

emphasis that the participants placed and the depth of their discussion for the issue that they considered significant. NVivo 10, a qualitative software analysis package was used for analysis.

SAMPLE CHARACTERISTICS

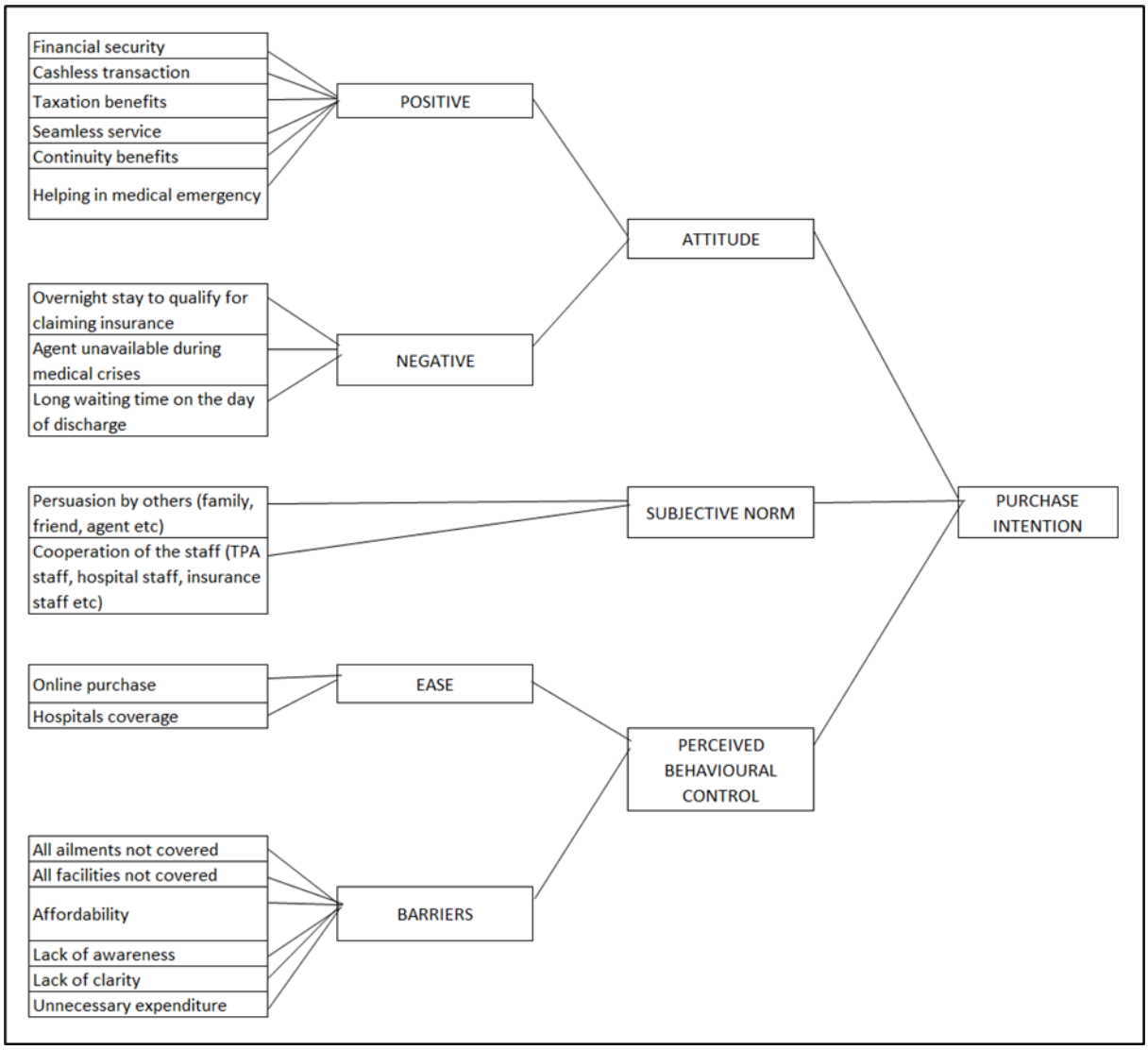
Out of the 18 respondents, we summarize the characteristics of the respondents:

- Gender:
  - ✓ 72% were female
  - ✓ 28% were male
- Marital status:
  - ✓ 67% were married
  - ✓ 33% were single
- Age group:
  - ✓ 44% were from 41-50 years
  - ✓ 28% from 21-30 years
  - ✓ 17% from above 50 years
  - ✓ 11% from 31 to 40 years
- Education:
  - ✓ 39% were post-graduate,
  - ✓ 33% were Ph.D. holders
  - ✓ remaining 28 per cent were graduates or undergraduates.
- The annual household income was above ₹20 Lakhs for the majority of the respondents.

RESULTS

Figure 2 presents the summary of results in line with our conceptual framework.

FIGURE 2: SUMMARY OF RESULTS



ATTITUDE - POSITIVE

The major factors which motivated the respondents to purchase health insurance were: financial security, cashless transaction, taxation benefits, seamless service, continuity of care benefits and help in a medical emergency. With reference to financial security, some of the respondents said:

It is better to have some kind of financial security. So, if there are some unforeseen circumstances where at least the basic medical expenses need to be covered. – Respondent 16

I think overall it is very important very necessary to have health insurance because most of the expenditure would be covered by the insurance, that you know it gives relief and takes away a lot of the anxiety, about the hospital bills. – Respondent 1

The cost of health care is remarkably high in India. And usually, hospital bills are very highly unaffordable. I prefer going to a private hospital or consulting a private doctor for any kind of ailments. And looking at the cost, I thought it's better to be insured. – – Respondent 4

With regards to cashless transactions, some of the respondents quoted:

Zero cash/cashless kind of facility they offer and the hospital network which they cover, that is one thing which they talk about – – Respondent 11

We didn't need to pay anything; everything was covered under the medical insurance. Maybe the cashless kind of technologies. - – Respondent 2

When we had some hospitalisation cases in the family, I used cashless transaction and that was the most important attraction for me because most of the hospitals require the security deposits immediately and we didn't have that much cash. – – Respondent 5

With respect to tax benefits, some of the respondents quoted:

It helps that the premium paid for health insurance gives a tax deduction – – Respondent 1

Another advantage is the tax benefit I'm getting – – Respondent 6

Respondents felt that having health insurance helps in medical emergency as seen in the following quotes:

When we get some sudden medical expenses, then we feel that whatever we have got or whatever we have planned it is getting hampered So I feel that this will be helping us to face any sudden crisis that can happen. – – Respondent 15

Life is full of uncertainty. So, it's always a good idea to have a risk cover. We live in a fast progressive life, where bodies also, body and mind both are, in fact, attuned to a lot of stresses and strains. So, this is something which is as basic as everything, there is no doubt that health insurance is necessary. - – Respondent 13

ATTITUDE - NEGATIVE

The major negative factors stated by the respondents while purchasing health insurance was the need to be in hospital overnight to be able to claim on the insurance, agent unavailable during medical crises and long waiting time on the day of discharge.

Regarding overnight stay the quotes from some of the respondents include:

But when he was admitted to a hospital, they did not reimburse the charges, because they said that you were not there in the hospital overnight. Now that the operation was a big operation, but they let him go home by evening, but he was not reimbursed for it, because they said that unless you stay overnight, which would have meant an extra charges and since the doctor said that he is free to go and he can take care at home, he had to you know, he had to shell it out from his own pocket. So, which was very disappointing. – – Respondent 14

Some of the respondents quotes in support of long waiting times include:

On the day of discharge from the hospital at that time, I found that the waiting time was very long in the processing. I mean, we had to wait for quite some time, six to seven hours, there was a lot of coordination between the TPA (third party administrator) at the hospital, the insurance company and the billing counter at the hospital. So that

was a little tiresome, and a long wait. So, I wish the duration would be reduced. — Respondent 1

SUBJECTIVE NORM

The key indicators of subjective norms as per the respondents include persuasion by others (family, friend, agent etc) for the purchase of health insurance, and the cooperation of the staff (TPA staff, hospital staff, insurance staff etc).

The respondents quoted the following arguments to claim Persuasion by others while deliberating on their purchase decision:

There was a young cousin of ours, who approached us, and she did encourage us – – Respondent 14

A close couple of friends were discussing with me and they told me that it is very important to have a good amount of coverage during these challenging times. And so they were a convincing factor. They told me how important it is to increase the amount of coverage because what is provided by my employer is good, but not very high — Respondent 1

The respondents shared their experience with the cooperation of the staff TPA staff as mentioned in the undermentioned quotes:

Excellent, because during such time, it was the kind of service they provided to me, like only one phone call. They didn't ask me anything. They called the hospital, and they did all the arrangements, and it was hassle free – Respondent 15

Very helpful in getting and co-ordinating for the payments' procedure for cashless transaction. It went very smooth -– Respondent 5

The respondents also shared the helpfulness or not of the hospital staff while availing health insurance:

Yeah, I think the concerned hospital staff were cooperating -– Respondent 10

The point of contact at the hospital and the people at the hospital were also really helpful — Respondent 6

PERCEIVED BEHAVIOURAL CONTROL - EASE

The factors that contributed to the ease in the purchase of health insurance policies are stated by the respondents as an online purchase and hospitals coverage.

The respondents quoted the following while discussing an online purchase:

The choosing of health insurance via online is a very good idea because at least we get to decide on our own. There are various websites available where we can compare the different health insurance plan instead of opting to choose what are our friends or colleagues have chosen. So that is a good thing. We come to know the details of our plan. And we know that we have purchased a good plan for ourselves - – Respondent 16

The below statement is from a respondent in support of hospitals coverage or tie-ups:
I check whether their (health insurance provider) tie-up hospital is nearby to my home and my hometown. If I'm there in the hometown by chance and so I may need, I checked that also – Respondent 6

PERCEIVED BEHAVIOURAL CONTROL – BARRIERS

The significant barriers to the purchase of health insurance as identified by the participants include factors such as all ailments not covered, all facilities not covered, affordability, lack of awareness, lack of clarity and regarding the expense as an unnecessary expenditure.

The quotes from respondents in support of all ailments not covered and all facilities not covered include:

Most of the diseases should be covered, most of the disease conditions and surgery should be covered. Many of the medical policies, they don't cover things like, you know, deliveries. Right. All these are not covered. – – Respondent 17

They (medical insurances) don't cover pre-existing diseases. - – Respondent 8

The respondents made the following statements concerning the affordability factor:

Premium was a barrier, because I didn't want to pay a very high premium – – Respondent 1

As I'm getting older, I have also increased my overall insurance to let's say around seven lakhs or something like that. Now moving forward, I'm going to find it unaffordable – – Respondent 4

I think the premiums are very high. And if you want to penetrate at a lower-level, premiums should be really affordable — Respondent 9

With respect to the factor of lack of awareness and lack of clarity, respondents indicated:
Many times, the terms and conditions are not clear to the layman. An agent will tell you all the plans, he will tell you the difference, but at the end the lay man is not able to understand which plan he should have - – Respondent 6

One thing where I would urge any medical insurance company to be a bit more clear, a bit more honest, not just you know sugar-coat the product and then sell it and then you find that a person in need is really struggling. - – Respondent 16

The respondents quote the following about the premium being an unnecessary expenditure:

I think the biggest barrier could be when you are healthy, you are not able to see how much could be the hospitalization costs, even something like five days of private hospitalization can actually take away all your savings – – Respondent 4

The middle class always feel that it's an unnecessary expenditure - – Respondent 16

DISCUSSION

The main aim of this study was to understand and explore the motivations and barriers faced by customers while purchasing health insurance. The TPB was used as a conceptual framework in this study. Various themes emerged from this qualitative study under each of the respective antecedents of purchase intention namely attitude, subjective norm and perceived behavioural control.

The positive factors pertaining to attitude identified in this study included 6 factors. One factor namely helping in a medical emergency is similar to the factor of social security against unexpected health issues from the study by [3]. The negative factors identified in this study are three. Long waiting times were observed to be matching with the research findings of the past [3, 4].

With respect to the subjective norm, two factors were identified in this study. In a study by [5] subjective norm was observed to have a significant positive influence on the intention to purchase health insurance. In the present study, the respondents indicated good co-operation of the staff which is similar to the findings of [6]. Regarding perceived behavioural control two factors were identified under ease and six factors under barriers. The lack of awareness factor is matching with the findings of the study by [8].

Overall, the results of the research are consistent with the limited previous studies that were found in the literature. As a result of the pandemic, there has been an uptake in demand for health insurance in the last two years. However, increased efforts will make health insurance more accessible to the public at large. This study assists insurance providers in framing their policies.

CONCLUSION

The study uses the TPB framework to ascertain the factors which contribute to the major themes during the course of content analysis. Our results indicate that respondents view factors such as financial security, cashless transaction, taxation benefits, seamless service, continuity of health care benefits and helping in a medical emergency as the major motivations to purchase health insurance. Overnight stay to qualify for claiming insurance, agent unavailable during medical crises and long waiting time on the day of discharge are the major negative factors that respondents state regarding purchasing health insurance. Such issues could be resolved by making the insurance agents more accountable and reducing the waiting time for processing the claims.

The key indicators of subjective norms as per the respondents include persuasion by others (family, friend, agent etc) for the purchase of health insurance policy and the cooperation of the staff (TPA staff, hospital staff, insurance staff etc).

The factors that contributed to the ease in the purchase of health insurance policies are stated by the respondents as online purchase and hospitals coverage. The significant

barriers to the purchase of health insurance as identified by the participants include factors such as all ailments not covered, affordability, lack of awareness, lack of clarity and regarding the expense as an unnecessary expenditure. A possible solution for such barriers is to widen the scope of financial literacy to include the benefits of health insurance and make people aware of the details of such policies. Insurance companies should also try to reduce the premium charged.

We acknowledge the limitation of generalization of results due to conducting of survey in one city namely: Mumbai, hence future researchers may conduct similar studies in different cities and states of India. Qualitative research methodology has its limitations hence further studies in this area can be done using quantitative research methodologies or mixed method. The research in this area could assist insurance companies in the development of health insurance for the Indian population.

References:

1. Ramani. Vaidyanathan. COVID-19 impact: Here's why insurance may never be the same again. 2020. Available from: https://indianexpress.com/article/business/covid-19-impact-heres-why-insurance-may-never-be-the-same-again-6581731/
2. Fenny AP, Kusi A, Arhinful DK, Asante FA. Factors contributing to low uptake and renewal of health insurance: a qualitative study in Ghana. Glob Health Res Policy 2016; 1(1):1-0.
3. Kumi-Kyereme A, Amu H, Darteh EK. Barriers and motivations for health insurance subscription in Cape Coast, Ghana: a qualitative study. Arch Public Health 2017; 75(1):1-0.
4. Al-Hanawi MK, Alsharqi O, Almazrou S, Vaidya K. Healthcare finance in the Kingdom of Saudi Arabia: a qualitative study of householders' attitudes. Appl Health Econ Health Policy 2018 Feb;16(1):55-64.
5. Brahmana R, Brahmana RK, Memarista G. Planned behaviour in purchasing health Insurance. The South East Asian Journal of Management 2018.
6. Mamun AA, Rahman MK, Munikrishnan UT, Permarupan PY. Predicting the Intention and Purchase of Health Insurance Among Malaysian Working Adults. SAGE Open 2021; 11(4):21582440211061373.
7. Ahlin T, Nichter M, Pillai G. Health insurance in India: what do we know and why is ethnographic research needed. Anthropology & medicine 2016; 23(1):102-24.
8. Thakur H. Study of awareness, enrollment, and utilization of Rashtriya Swasthya Bima Yojana (national health insurance scheme) in Maharashtra, India. Front Public Health 2016; 3:282.
9. Kautish P, Khare A, Sharma R. Health insurance policy renewal: an exploration of reputation, performance, and affect to understand customer inertia. Journal of Marketing Analytics 2021; 4:1-8.
10. Ajzen I. The theory of planned behavior. Organizational behavior and human decision processes. 1991; 50(2):179-211.

ACHSM Asia-Pacific Journal of Health Management

CONFERENCE ARTICLE

A STUDY ON CHALLENGES OF DATA SECURITY AND DATA PRIVACY IN THE HEALTHCARE SECTOR: SWOT ANALYSIS

Asha Prasuna, Avani Rachh*

K J Somaiya Institute of Management, Somaiya Vidyavihar University (SVU), Vidyavihar (E) Mumbai 400077, India

Correspondence: ashasivakumar@somaiya.edu

ABSTRACT

OBJECTIVE

The aim of this research paper is to analyse and provide suggestions to overcome challenges of data security and data privacy in the healthcare sector. The objective is to also conduct a SWOT analysis to understand the current scenario of the healthcare sector. It will provide detail on the concerns of the healthcare sector.

DESIGN AND SETTING

A quantitative data analysis was conducted. The online Google forms were used to gather primary data. Statistical analysis software was used for data analyses like independent sample t-tests and one-way anova.

RESULTS

The healthcare sector is concerned about data security and data privacy. The violation of privacy cases in India has increased over several years. The data security and data privacy in healthcare sector are very important. The female respondents felt that it is very important that their consent is taken before their personal information is sold or shared with others plus before tracking their movement on the internet than male respondents.

CONCLUSION

Healthcare and information technology sectors are among the most important sectors in the current online world. The strengths are healthcare awareness and mobile applications while weakness are ineffectively protected systems and infrastructure problems. The opportunities are investments for different facilities in the sector plus increase in research and development. The threats are violation of data privacy, data thefts and cyber-attacks putting a question on data security. Proper effective procedures have to be implemented to improve data security.

2nd International Healthcare Management Conference 2022 - Navigating the New Normal with Focus on Healthcare Accessibility, Innovation and Sustainability

KEYWORDS

data security, data privacy, SWOT analysis, challenges, healthcare sector.

INTRODUCTION

The healthcare sector has played an important role in the current pandemic. The sector has benefited from information technology by providing information about health care, medical facilities, COVID-19 vaccinations, etc. on different websites and mobile applications (usually known as "apps."). They are application software that run on mobile devices. The hospitals, pathology laboratories, diagnostic centres, pharmacy plus medical stores etc. use websites and mobile applications to connect with people.

People can online book medical tests, order medicines, procure medical reports, etc. on different websites and apps. India's Ministry of Health and Family Welfare has developed (https://www.cowin.gov.in/) an online facility for people to book online vaccination slots and get digital vaccination certificates which accomplish the task of vaccine passports [1]. All of these websites and apps collect a lot of personal and medical data of patients. A Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of healthcare sector was conducted to understand the strength, weakness, opportunities and threats faced by this sector. As per our SWOT analysis, it is a challenging task to secure and protect all data. It is important to secure data. The Indian data security market was worth $USD99.55 million in 2019 and it has been forecasted to be $USD261 million by 2025 [2].

Data security methods are used by organisations to protect data from cyberattacks, data breaches and data losses. Data privacy is related to access of personal information by authorised people plus organisations and simultaneously the person retains control over it [3]. The main challenges of data security in healthcare sector are security of mobiles plus data stored in them, computers and medical devices, software updates, remotely scanning all devices for anti-viruses, phishing attacks and data breaches [4]. The main challenges of data privacy in healthcare sector are legislative gaps, absence of trust due to lack of privacy and patients don't have control over shared medical records [5].

A digital health passport survey was conducted in February 2021. Respondents were youth foreign travellers. The main worries were related to data security and data privacy. The first security worry was hacking of individuals' information. The second worry was concern about privacy when it comes to sharing of health information. The third worry was about the absence of transparency and control over shared data [6]. The number of cybercrime cases related to violation of privacy in India has increased from 62 in 2014 to 742 in 2020 but the conviction rate for violation of privacy is very low [7].

Overall, hardly any research was conducted to find out the views of the users about data security and data privacy. What is lacking today? The willing consents of website and app users are not requested/taken. It is users' personal data and they are under duress to provide the same, if they have to use different health related websites plus mobile applications including India's COVID-19 vaccine registrations. In many times the users' data are misused. An effort is made to understand their viewpoints on this and provide the suggestions to improve the situation.

SWOT ANALYSIS

Strengths of healthcare sector are economical treatments, availability of generic drugs, increasing healthcare awareness, willingness to pay for quality healthcare and mobile applications for different healthcare facilities. Big data will help organisations to analyse it. It helps the organisations to take effective decisions for business growth. The data can be accessed from any location, easy to use and maintain.

Weaknesses are infrastructure deficiency, inadequately protected systems, limited medical and information technology specialists. Some of the organisations do not have enough data storage facilities creating problems for data access as well as for data sharing among employees to complete a particular task. It could happen due to poor information system planning. The implementation of laws is poor. Some work environments are toxic. Inadequate training to users with respect to applications and systems. Poor mobile networks and internet facilities are also issues.

Opportunities are more awareness about healthcare, life expectancy has increased, medical tourism, more medical colleges, foreign direct investments in infrastructure plus research and development. Better healthcare facilities will increase lifestyle support and public health. It will also reduce cost and increase fraud detection. New business models will be developed and specific treatments can be provided. Low cost skilled and qualified employees are available in India. The launch of 5G network will improve the capacity plus coverage of mobile networks and internet speeds in India.

Threats are costly treatments in private plus super-speciality hospitals, import duties on medical equipments, human errors, counterfeit medicines, cyberattacks like ransomwares', data thefts and violation of data privacy. Many times government healthcare facilities are not maintained properly. Corruption is also a problem. The other concern is brain drain in medical field. The main issues are data privacy, securing data, unauthorised use of information plus selling data and information for pecuniary benefits. [8] [9] [10] [11] [12]

METHODS

RESEARCH OBJECTIVES

- To carry out a SWOT analysis of healthcare sector.
- To find out challenges of data security and data privacy in healthcare sector.
- To find out opinions of the respondents about importance of their consent regarding data privacy with respect to types of mobile plans.
- To find out number of cybercrime cases reported under violation of privacy in India.

RESEARCH METHODOLOGY

The SWOT Analysis was conducted to know the threats faced by the healthcare sector. This strategic analytical tool provided detail of the main challenges encountered by the healthcare sector. It became a base for collecting primary data to understand the concerns of health related websites and app users. The primary data were gathered for empirical research analysis. Quantitative research techniques were used for analysis. Online survey was conducted to collect primary data and tool used was Google Forms. The sample size of primary data was 192. The respondents were major internet users in the age group of 20 to 30 years from Mumbai, India.

DATA ANALYSIS

The data analyses were done using SPSS statistical analysis software. The data analyses like frequency distributions, independent sample t-tests and one-way anova were conducted.

HYPOTHESES

The Independent Sample T-Tests and One-Way Anova were conducted on primary data. The hypotheses statements for Independent Sample T-Tests were as follows:

- Ho1: There is no significant difference in opinions of the respondents about before installing applications, do they read application provider's privacy policy for using application with respect to gender.
- Ho2: There is no significant difference in opinions of the respondents about authentication systems used to lock mobile screens for security with respect to gender.
- Ho3: There is no significant difference in opinions of the respondents about content providers have the right to sell information about its users to other companies with respect to gender.
- Ho4: There is no significant difference in opinions of the respondents about importance of their consent regarding data privacy with respect to gender for all the attributes.

The One-Way Anova hypothesis statement was as follows:
Ho5: There is no significant difference in opinions of the respondents about importance of their consent regarding data privacy with respect to types of mobile plans for all the attributes.

RESULTS

The questionnaire asked questions related to gender and for how many years respondents hve been using the internet. Respondents were also asked about the type of mobile plans used. The mobile plans are of two2 types: Pre-paid and Post-paid. In case of pre-paid mobile plans, the user pays the full amount in advance and gets the mobile service for a fixed number of days. While in case of post-paid plans, the user gets the bill after using the service for a month. The user generally gets two weeks to pay the monthly bill amount. Some of the respondents used both types of mobile plans. The respondents were also asked about whether they give importance to convenience or privacy?

The SWOT Analysis was the base for the following questions using Google Forms:

1. Before installing an application, do you read application provider's Privacy Policy for using applications?
2. What authentication system do you use to Lock Screen for security?
3. Whether content providers have the right to sell information about its users to other companies?

4. How important is their consent with respect different parameters related to data privacy?

Question numbers 1 had 3 options: never, sometimes and always. Question number 2 had 6 options: none, pin, password, pattern, fingerprint and face. Question number 3 had options based on a 5 points Agree Likert scale. Question number 4 had options based on a 5 points Important Likert scale. Question numbers 1, 3 and 4 required the respondents to select only one option while for question number 2 they had choice to select multiple options.

The sample size contains 95 males and 97 females. Seventy-five percentage of males and 78% of females use pre-paid mobile plans. Seventy-one percentage of pre-paid, 79% of post-paid and 73% of both mobile plan users gave importance to privacy over convenience. The questionnaire had third gender as an option but no one selected. Therefore, Independent Sample t-test was conducted on two groups i.e. male and female. The first three Independent Sample T-Tests null hypotheses were accepted as significance value was more than 0.05 at 95% confidence level.

The Independent Sample T-Tests null hypothesis i.e. Ho4: "There is no significant difference in opinions of the respondents about importance of their consent regarding data privacy with respect to gender for all the attributes" had six attributes. The three attributes of null Independent Sample T-Test hypothesis were accepted as the significance value was greater than 0.05 at 95% confidence level. The three attributes of the null Independent Sample T-Test hypothesis i.e. Ho4: "There is no significant difference in opinions of the respondents about importance of their consent regarding data privacy with respect to gender" were as follows:

- Sites track your movement around their site.
- Sites track your online purchases.
- Sites customize your online experience to your personal preferences.

The significance values of the other three attributes were less than 0.05. So, they were rejected at 0.05 significance level as p values are less than a. Therefore, the other three attributes for alternative hypothesis i.e. Ha4: "There is significant difference in opinions of the respondents about importance of their consent regarding data privacy with respect to gender" were accepted and the attributes were as follows:

- Sites sell/share your personal information with others.
- Sites track your movement around the Internet.
- Sites gather in-depth personal profiles about you from other outside databases.

To find out the difference between the three attributes the values in the Table 1 refer. The female group had a higher mean as compared to male group for all the three attributes and for rest of the attributes opinions of respondents were same for both male and female groups.

TABLE 1: PARTICIPANT GROUP STATISTICS FOR THIS STUDY

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Sites sell/share your personal information with others	Male	95	4.52	0.944	0.097
	Female	97	4.76	0.658	0.067
Sites track your movement around the Internet	Male	95	4.41	0.905	0.093
	Female	97	4.73	0.654	0.066
Sites gather in-depth personal profiles about you from other outside databases	Male	95	4.35	1.070	0.110
	Female	97	4.68	0.798	0.081

The One-Way Anova was conducted as three types of mobile plans were considered while preparing the questionnaire. The three types of mobile plans are pre-paid, post-paid and both. According to Table 2, One-Way Anova null hypothesis i.e. Ho5 statement was accepted for all the attributes as significance (2-tailed) value was more than 0.05 at 95% Confidence Level.

TABLE 2: ANOVA TABLE – THREE TYPES OF MOBILE PLAN IN THIS STUDY

		Sum of Squares	df	Mean Square	F	Sig.
Sites sell/share your personal information with others	Between Groups	1.590	2	.795	1.187	.307
	Within Groups	126.613	189	.670		
	Total	128.203	191			
Sites track your movement around their site	Between Groups	.296	2	.148	.130	.878
	Within Groups	214.517	189	1.135		
	Total	214.813	191			
Sites track your movement around the Internet	Between Groups	.051	2	.026	.039	.961
	Within Groups	122.928	189	.650		
	Total	122.979	191			
Sites track your online purchases	Between Groups	.013	2	.007	.008	.992
	Within Groups	156.799	189	.830		
	Total	156.812	191			
Sites gather in-depth personal profiles about you from other outside databases	Between Groups	1.068	2	.534	.584	.559
	Within Groups	172.885	189	.915		
	Total	173.953	191			
Sites customize your online experience to your personal preferences	Between Groups	.092	2	.046	.040	.961
	Within Groups	219.903	189	1.164		
	Total	219.995	191			

DISCUSSION

The willing consent of the user with respect to collecting private data is not taken. The majority of the respondents gave priority to privacy in comparison to convenience. The findings match with other research work where the patient's consent is not taken for data sharing. The questions were raised whether patients will give consent for sharing their personal data as it invades data privacy and due to challenges of data security [13]. In the same way most of the respondents are not bothered to read application provider's privacy policy before installing applications as it is one sided. The users cannot use the applications, if they don't accept the privacy policies. The impression is that it is useless to read the same.

The other work also raised the consent of the user with respect to data sharing. It does not mean the consent to use or share the contact details of his or her family members and friends [14]. The Wall Street Journal had established that in 2011, 56% of the mobile applications collected the mobile's unique identification number plus 47% of the mobile applications gathered location of mobile devices and provided the information to third parties without the user's consent or awareness. Again in 2015, forty-seven percent of iOS and seventy-three percent of Android applications gathered private information like email addresses, location of mobile devices and passed on to third parties [15]. The situation has not changed from 2011 to 2023. The current research also points to the same findings. More research can be done on the importance of consent of application and website users. It is important as their private data are collected. It is the duty of the application and website developers to safeguard the data and not to invade the users' privacy.

LIMITATIONS

The primary data was collected in a short period therefore the sample size was only 192 respondents. The secondary data was downloaded from online sources due to pandemic, paucity of time and resources.

IMPLICATIONS

The survey was conducted to understand the opinions of respondents. The system is collecting their personal data but users are not aware about how it is used? The data collected by health related applications are shared with third parties. The users don't have control over their personal data. Most of the applications force the users to give access to their mobile devices cameras, microphones, phone, contacts, messaging services, location, photos and

videos, music plus audio, notifications, nearby devices, etc. to use the applications and websites. The mobile applications cannot be used, if their accesses are denied by the users. Most of the time this type of access is ideally not required for using the application or website. However, the users are forced to agree to one-sided privacy policies of these applications invading data privacy. Many times hackers hack the servers and collect the private data including medical records of the patients. It is a data security issue.

The healthcare sector had cost wise the highest average breach worth $USD7.13 million in 2020 which had increased by 10.5% from 2019 [16]. The number of cybercrime cases like hacking, data breaches and violation of privacy has increased. The current Information Technology Act is inadequate to protect data privacy. Therefore, the Indian Data Protection Bill, 2021 is framed and expected to become an Act soon. It will protect personal plus non-personal data and data breaches have to be reported within 72 hours [17].

The application developers should not ask for any kind of access to devices like mobiles, laptops, etc. of the users. It will lessen the data privacy issue and burden on the organisations for securing systems and data. It will reduce the workload of the government agencies to solve cybercrime cases as the number of cases will come down.

CONCLUSION

The aim was to gather viewpoints of users with respect to different aspects of data security and data privacy. The purpose was to know whether the users' consent is taken with respect to collection of private data by health related mobile applications and websites.

Health related data is ever increasing. It is stored on different devices and that brings more challenges for securing the same. Hackers are targeting these devices to get medical records which can be used to blackmail and humiliate people. It is important to encrypt data, take data backups and have them at different locations, educate employees and conduct security audits [18]. The control of patients' personal data, transparency and data privacy are the main concerns as new medical applications are developed. Better data security and data privacy laws with standards and effective implementations of the same are the need of the hour in order to avoid cyber threats.

Data protection policies and strategies will help healthcare sector to secure data from external plus internal threats. It will also help the sector to obey the laws of the land with respect to data security and data privacy [19]. More resources and time are required to conduct research to understand the challenges faced worldwide and provide country specific solutions.

References

1. Co-WIN [Internet]. Cowin.gov.in. 2023 [cited 2023 Jan 22]. Available from: https://www.cowin.gov.in/
2. India: Data security market size 2025 | Statista [Internet]. Statista. Statista; 2019 [cited 2022 Jan 4]. Available from: https://www.statista.com/statistics/1197259/india-data-security-market-size/
3. Data Privacy vs. Data Security: What Is the Real Difference? [Internet]. Netwrix.com. 2019 [cited 2022 Jan 5]. Available from: https://blog.netwrix.com/2019/06/25/data-privacy-vs-data-security-what-is-the-real-difference/
4. 5 Data Security Challenges in Healthcare [Internet]. Health Administration Degrees. 2021 [cited 2022 Jan 3]. Available from: https://www.healthadministrationdegrees.com/articles/data-security-challenges-in-healthcare/
5. Top 3 issues facing patient privacy [Internet]. Healthcare IT News. 2012 [cited 2022 Jan 5]. Available from: https://www.healthcareitnews.com/news/top-3-issues-facing-patient-privacy
6. Rebuild Travel Digital Health Survey Reports | Amadeus [Internet]. Amadeus | The leading travel technology company. 2021 [cited 2022 Jan 5]. Available from: https://amadeus.com/en/insights/research-report/rebuild-travel-digital-health-survey-reports
7. Crime In India | National Crime Records Bureau [Internet]. Ncrb.gov.in. 2021 [cited 2022 Jan 4]. Available from: https://ncrb.gov.in/en/crime-india
8. Dias C, Santos M, Portela F. A SWOT Analysis of Big Data in Healthcare. Proceedings of the 6th International Conference on Information and Communication Technologies for Ageing Well and e-Health. 2020. Available from: https://www.scitepress.org/Papers/2020/93902/93902.pdf
9. Ganesan L, R.Senthamizh Veena. "Make In India" For Healthcare Sector in India: A SWOT Analysis on Current Status and Future Prospects [Internet]. ResearchGate. unknown; 2019 [cited 2022 Jan 4]. Available from: https://www.researchgate.net/publication/332292618

_'Make_In_India'_For_Healthcare_Sector_in_India_A_SWOT_Analysis_on_Current_Status_and_Future_Prospects

10. Pereira R, Salazar M, Abelha A, Machado J. SWOT Analysis of a Portuguese Electronic Health Record. IFIP Advances in Information and Communication Technology [Internet]. 2013 [cited 2022 Apr 17];169–77. Available from: https://ifip.hal.science/IFIP-AICT-399/hal-01470531
11. S. A, Dhastagir Sultan S. Health Care Delivery in India - SWOT Analyses. International Archives of Public Health and Community Medicine [Internet]. 2019 Aug 2 [cited 2022 Apr 17];3(2). Available from: https://clinmedjournals.org/articles/iaphcm/international-archives-of-public-health-and-community-medicine-iaphcm-3-024.php?jid=iaphcm
12. Indian healthcare to prioritize cyber security and put in place robust data privacy framework [Internet]. Pharmabiz.com. 2021 [cited 2022 Jan 3]. Available from: http://www.pharmabiz.com/NewsDetails.aspx?aid=143687&sid=1
13. Handler I. Data Sharing Defined—Really! Computer [Internet]. 2018 Feb 1 [cited 2022 Apr 16]; 51(2):36–42. Available from: https://search.ebscohost.com/login.aspx?direct=true&AuthType=cookie,ip,uid,url&db=edseee&AN=edseee.8301118&site=eds-live
14. Isaak J, Hanna MJ. User Data Privacy: Facebook, Cambridge Analytica, and Privacy Protection. Computer [Internet]. 2018 Aug [cited 2022 Apr 17];51(8):56–9. Available from: https://ieeexplore.ieee.org/abstract/document/8436400
15. Published by: Department of the Taoiseach on behalf of the Government Data Forum, January 28th 2016 Authored by: Rob Kitchin, NIRSA, Maynooth University Suggested citation: Kitchin, R. (2016) Getting smarter about smart cities: Improving data privacy and data security. Data Protection Unit, Department of the Taoiseach, Dublin, Ireland. Available from: https://www.researchgate.net/publication/293755608_Getting_smarter_about_smart_cities_Improving_data_privacy_and_data_security
16. 100 Data Privacy and Data Security statistics – Data Privacy Manager [Internet]. Data Privacy Manager. 2020 [cited 2022 Jan 2]. Available from: https://dataprivacymanager.net/100-data-privacy-and-data-security-statistics-for-2020/
17. Rao S. Parliament Annual Round-Up 2021 [Internet]. Livelaw.in. Live Law; 2021 [cited 2022 Jan 2]. Available from: https://www.livelaw.in/top-stories/parliament-annual-round-up-2021-188545
18. Trevor Morgan. The Data Security Challenges Faced by the Healthcare Industry - [Internet]. Thejournalofmhealth.com. 2021 [cited 2022 Jan 3]. Available from: https://thejournalofmhealth.com/the-data-security-challenges-faced-by-the-healthcare-industry/
19. DQINDIA Online. Data privacy and protection: A must for the healthcare sector [Internet]. DATAQUEST. 2021 [cited 2022 Apr 16]. Available from: https://www.dqindia.com/data-privacy-protection-must-healthcare-sector/