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CONFERENCE SECTION

Selected papers from the ***Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-Being on 10-11 December 2022 in Delhi, India***
Guest Sub-Editors: Asst. Prof. Anuj Kumar, Apeejay School of Management, Dwarka, Delhi, India
Dr. Sukhmeet Kaur, International Research Manager, Confab 360 Degree, India

ACHSM Asia-Pacific Journal of Health Management

WELCOME TO THE NEW ISSUE OF THE COLLEGE'S ASIA PACIFIC JOURNAL OF HEALTH MANAGEMENT FOR 2023

Dr Neale Fong FCHSM

President of Australasian College of Health Service Management

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

At this time of year, the College is particularly busy preparing for our annual Asia Pacific Health Leadership Congress which this year is being held at the National Convention Centre, Canberra, 11-13 October 2023. The Congress seats are filling up fast and we have a wonderful program in place with themes of Sustainability and Workforce.

Our team aims to drastically reduce our own wastage for this event – e.g., there will be no satchel this year with all individual information including our sponsor promotions on our Congress app, recyclable plastic badges and a giveaway drink bottle made from sugarcane for each attendee with several water stations for re-filling. It is not too late to register for this Congress! https://www.achsm.org.au/canberra2023

Our 2024-2027 ACHSM Strategic Plan will be launched at the Congress. This plan has been several months coming to fruition and incorporates an aim to be a stronger system voice for our members and all health managers and leaders.

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. 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

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EDITORIAL

KNOWLEDGE TRANSLATION TO PRACTICE AND COMPETENCY IN TRANSLATION METHODS

Dr Mark Avery

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

Translation or implementation science involves implementing intervention to enhance uptake and use of evidence and knowledge to improve outcomes in health care [1]. Translation sciences play a critical role in health, aged and social care delivery bridging the gap between research and practical patient or client care. This interdisciplinary field encompasses a wide range of activities, from translating health related literature and research findings into clinical and operational practice; to facilitating effective communication between carers and providers; and consumers from diverse linguistic and cultural backgrounds.

A critical aspect of translation sciences in health is ensuring that clinical and other information is accessible and comprehensible to all individuals, regardless of their language proficiency. In a globalised world, where health providers and consumers often come from different backgrounds and knowledge bases, accurate translation is essential to ensure consumers receive appropriate care and understand their health situations, options, rights and responsibilities.

Translation sciences contribute significantly to research by enabling the dissemination of knowledge across system, operational and change barriers. This facilitates collaboration among researchers and service providers worldwide and accelerates the pace of knowledge discovery. Additionally, it ensures that clinical trials and studies are accessible to diverse populations, promoting inclusivity and diversity in research.

Translation sciences in health are indispensable for delivering equitable and effective care and services. They promote patient and client centred care, enhance research, and foster inclusivity in the health system, ultimately improving health outcomes and the quality of life for individuals and communities nationally and internationally.

There are key objectives in building and strengthening adaptive capacity and preparedness in our workforces so as to strengthen approaches and models of organisation and operations by engaging in translational sciences [2]. Adaptive capacity is enabled through strong and effective leadership and management particularly in relation to the quality and efficiency of translational research. Sustained program and opportunities aimed at developing workforce in value, use and application of translation science drives opportunity and capacity. Leaders need to recognise and focus on the key preparedness agenda issues of reflexivity, structures and empowerment in order to develop resilience in health workforce as part of the reform, change and outcomes focus for parts o the health care system.

In this issue there are many contributions that identify and provide opportunity related to translation science opportunity.

Oh and colleagues have examined and evaluated an automated bed assignment algorithm for use in complex tertiary level hospitals.

McInerney and colleagues reviewed the shifting landscape of health service ownership and delivery in the context of public and private partnerships (PPP) approaches and delivery.

Rajasulochana and other authors have studied the impact of out-of-pocket payments by consumers for medications and diagnostic investigations relate to hypertension and how consideration needs to be given to care cost impact on household wealth in India.

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Ridoutt and colleagues have identified competencies, that if enabled through training and experience opportunities, for roles of health information advocates could support best practice in data collection in health organisations and services.

Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-Being on 10-11 December 2022 in Delhi, India

Selected papers from this conference are included in this issue.

Guest Sub-Editors:

- Asst. Prof. Anuj Kumar, Apeejay School of Management, Dwarka, Delhi
- Dr. Sukhmeet Kaur, International Research Manager, Confab 360 Degree, India

This conference was organised by Confab 360 Degree, Delhi in collaboration with UK and Indian universities and colleges. The conference helped academics to understand and interlink their research on health management in line with the requirement of the APJHM journal. The experts and reviewers refined their research related to health management. Further, the implications of the papers published in APJHM can be useful for policymakers and other fellow researchers researching in the area of health management. In many conference papers in this collection, the advanced usage of emerging technology has also been discussed within healthcare institutions. It will add value for the readers of the journal.

Mark Avery
Editor-in-Chief

1. Titler MG. Translation Research in Practice: An Introduction. The Online Journal of Issues in Nursing. 2018;23(2).
2. Volkov BB, Ragon B, Doyle JM, Bredella MA. Adaptive capacity and preparedness of Clinical and Translational Science Award Program hubs: Overview of an environmental scan2023; 7.

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REVIEW ARTICLE

PRIVATE EQUITY INVESTMENT IN PRIVATE FOR-PROFIT HEALTHCARE IN AUSTRALIA AND NEW ZEALAND: A SCOPING REVIEW

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ABSTRACT

OBJECTIVES

Private Equity (PE) involvement in healthcare has been evident in the United States (US) for some time, with questionable benefits reported. There are significant differences in funding, health insurance and regulation in the US, when compared to Australia and New Zealand (NZ), so it is not clear whether existing US research can be generalised to these settings. This study aims to examine published information regarding PE involvement in the private-for-profit (PFP) healthcare sector in Australia and NZ, including evidence of PE shareholdings and its impacts.

DESIGN

This scoping review considers academic and grey literature, including academic research and commentary papers, media reports, corporate reports, PFP healthcare websites and government submissions.

MAIN OUTCOME & RESULTS

Thirty-three relevant sources were identified, but no specific information on the impacts of PE investment were discovered. The academic papers highlight an ongoing debate (but limited research evidence) about PFP healthcare, including the quality of clinical care, practice consolidation and a downward trend on clinician ownership. The grey literature offered more information on PE investment and growth of the PFP sector, but limited detail about shareholdings.

CONCLUSION

With little research on PE investment in Australia and NZ, it is difficult to know if continued PE growth will have a positive or negative affect on operational performance and outcomes, such as clinician engagement and clinical care. The authors conclude that there is a shifting landscape of PFP healthcare in Australia and NZ, to less clinician and greater PE ownership. Given the reports of negative impacts of PE involvement in the US, these trends pose significant immediate and long-term implications. This paper sets the agenda for further research to explore the organisational and system-level impacts of PE growth in Australia and NZ.

KEYWORDS

Ownership, Healthcare, pathology, imaging, hospital facility, aged care, for-profit, not-for-profit, Australia, New Zealand private equity,

INTRODUCTION AND BACKGROUND

There has been considerable growth in the number of private-for-profit (PFP) healthcare organisations in Australia and New Zealand (NZ) over recent decades. This trend began in Australia in the late 1980s when corporations like Mayne Nickless started acquiring hospitals. [1-3] In NZ, growth in PFP resulted from outsourcing of public services to private ownership during the 1990s.[4-6]

Internationally, Private Equity (PE) has become a major player in the PFP healthcare sector, especially in the United States (US).[7] PE refers to a class of funds, under management by PE firms, used for investing in other companies. [8, 9] PE Investment concerns value creation through the application of effective management expertise to make organisational and structural changes that improve efficiency. These changes generally occur over a 3-5-year period, prior to realising the added value of the healthcare entity through on-sale or listing on the stock exchange.

The most recent data available on PE deals in healthcare globally shows growth of 187% from 2010-2017, to a value of US$42.6 billion.[10] Incentives for PE firms to acquire healthcare entities lie in the conditions of management and sale. One such condition is PE firms' insistence on holding paid management service agreements with an acquired healthcare entity.[7] Even more important are the debt and eventual sale conditions. In common PE investment models, PE firms (on behalf of PE funds) acquire a healthcare entity using approximately 70% debt [7, 15, 17], which the acquired entity is responsible for, and the remaining 30% is raised by the PE fund and partners.

PE firms aim to acquire high asset turnover entities including larger physician practices that can be expanded, such as ophthalmology [11], dermatology [10] and radiology [12]. The PE firm behind the PE fund may fund as little as 2-10% of the purchase. Despite this small investment, on exit the PE firm typically takes up to 20% of any capital gain. PE firms therefore place emphasis on profit growth, often attempted via acquisition and consolidation of smaller entities. However, the financial risk from the debt remains with the healthcare entity. [7, 11]

The overt focus on short-term profits by PE firms has raised concerns about clinician engagement, organisational performance, and clinical outcomes. [7, 10, 12, 13] Clinician engagement is broadly defined as "the involvement of clinicians in the planning, delivery, improvement and evaluation of health services…".[59] Organisational performance refers to performance on governance, financial, human resource and other non-clinical measures.

Clinician concerns with PE acquisition include reporting to non-medical managers, increasing clinician workloads, decreasing clinical quality and higher clinician turnover.[14] Long term engagement by a PE firm in an acquired healthcare entity can be of concern to clinicians due to the firm's focus on increasing short-term revenue targets for on-sale, which may impact patient care.[7] However, relevant evidence is limited to mainly the US, and inconclusive.[15]

PE activity in healthcare in both Australia and NZ has increased in recent decades.[16-18] Between 2015 and 2021, 111 PE healthcare acquisitions and mergers were recorded.[19] A recent example is the international PE firm KKR's [20] failed attempt to acquire Australia's largest provider of private healthcare, Ramsay Health Care, for approximately AU$20 billion.[21] Similarly, there has been PE interest in NZ with the proposed acquisition of Pulse Health NZ by Pacific in 2021.[22] Despite this trend, there is even less known of the impact of PE on healthcare delivery in Australia and NZ, when compared to the US.

Recent US research investigating PE investment in nursing homes found alarming levels of morbidity and mortality.[57] In Australia, there was recent news of GenesisCare, an Australian PFP specialist healthcare provider with significant PE investment, suffering significant financial distress. GenesisCare originated in specialist rooms and grew to become an international radiation oncology provider that is now facing severe liquidity problems. Lynch, et al. (2023) stated that this news has "added stress to GenesisCare's thousands of patients who are at their most vulnerable while receiving treatment for cancer and sounded an alarm to doctors when corporations approach them about joint ownership models". [58 p17]

The existing research on outcomes of PE investment in healthcare is largely limited to reporting from the US, which has a significantly different health system structure to Australia and NZ. These differences include: universal healthcare funding (Medicare and Medicaid in the US differs from funding in Australia and NZ); the types of health insurance organisations (no Healthcare Maintenance

Organisations in Australia and NZ and no private health insurance available for general practice or outpatient specialist consults in Australia); and divergent regulatory regimes in all three countries. Given these differences, one may assume that there would be diverse patterns of PE investment and outcomes across each context.

The aim of this exploratory, scoping review is to explore what is known in the academic research and grey literature of PFP healthcare ownership in Australia and NZ, with an emphasis on PE investment and its impacts. This represents the first stage of a broader research project aiming to rigorously evaluate the impact of PE investment on clinician engagement, organisational performance, and clinical outcomes.

METHODS

A scoping review was undertaken of academic and grey literature, focused on the following PFP sectors: hospitals, pathology, diagnostic imaging, aged care facilities and general practices. These are all prominent in relevant US literature [11,12, 14] and identified in the Preqin database as the object of multiple PE transactions.[19] The review utilised Arksey & O'Malley's scoping review framework [23] as it is advantageous when considering a broad, under-explored or under-theorised topic.

The review of academic literature occurred in August 2021, searching the following databases: ABI/Inform, CINAHL, Medline, and Pubmed. The date range was 1990-2021. The search terms were:

> *Ownership AND (healthcare OR "health care" OR clinic OR pathology OR practice OR Imaging OR hospital OR facility OR specialist* OR "aged care") AND (private OR for-profit OR not-for-profit) AND (Australia OR New Zealand) OR (corporates* OR "private equity")) AND (loc.exact("Australia") AND ("New Zealand")* [1]

A further database (Proquest/Australian Financial Review) was searched using the same search terms. This search in March 2022 was limited to three years (29/3/2019 – 29/3/2021) to identify media articles on contemporaneous ownership in PFP healthcare in Australia and NZ. This search covered a shorter time frame for practical reasons, as the daily reporting in the AFR results in a vast number of potentially relevant articles.

Included in both searches were all material that discussed private healthcare ownership in Australia and/or NZ, published in English. Excluded were any articles that: did not include Australia and NZ (Reason 1), did not discuss private health care (Reason 2), were solely clinical in focus (i.e., not management) (Reason 3), were non-healthcare-related (Reason 4), or not available to be accessed (Reason 5). [2]

Additional grey literature sources were searched via Google. Keywords were used (as above) and up to 20 pages examined. Specific sites were also reviewed, including: the Australian Bureau of Statistics, NZ Statistics, the World Health Organisation (WHO), the Australian Institute of Health and Welfare (AIHW), as well as websites of the main four investment and accounting firms in both Australia and NZ – Price Waterhouse Coopers (PWC), Deloitte, Ernst & Young (EY) and KPMG. Annual reports from the two largest PFP health care companies, Ramsay Health Care and Healthscope[3], were also examined, as it was thought likely that these companies might have PE involvement. The websites of other private healthcare providers were also reviewed, including: Virtus, Icon, Nexus, and Genesis Care in Australia, and TPG Medical Imaging, Evolution Healthcare and Ascot Cardiology in New Zealand.[4]

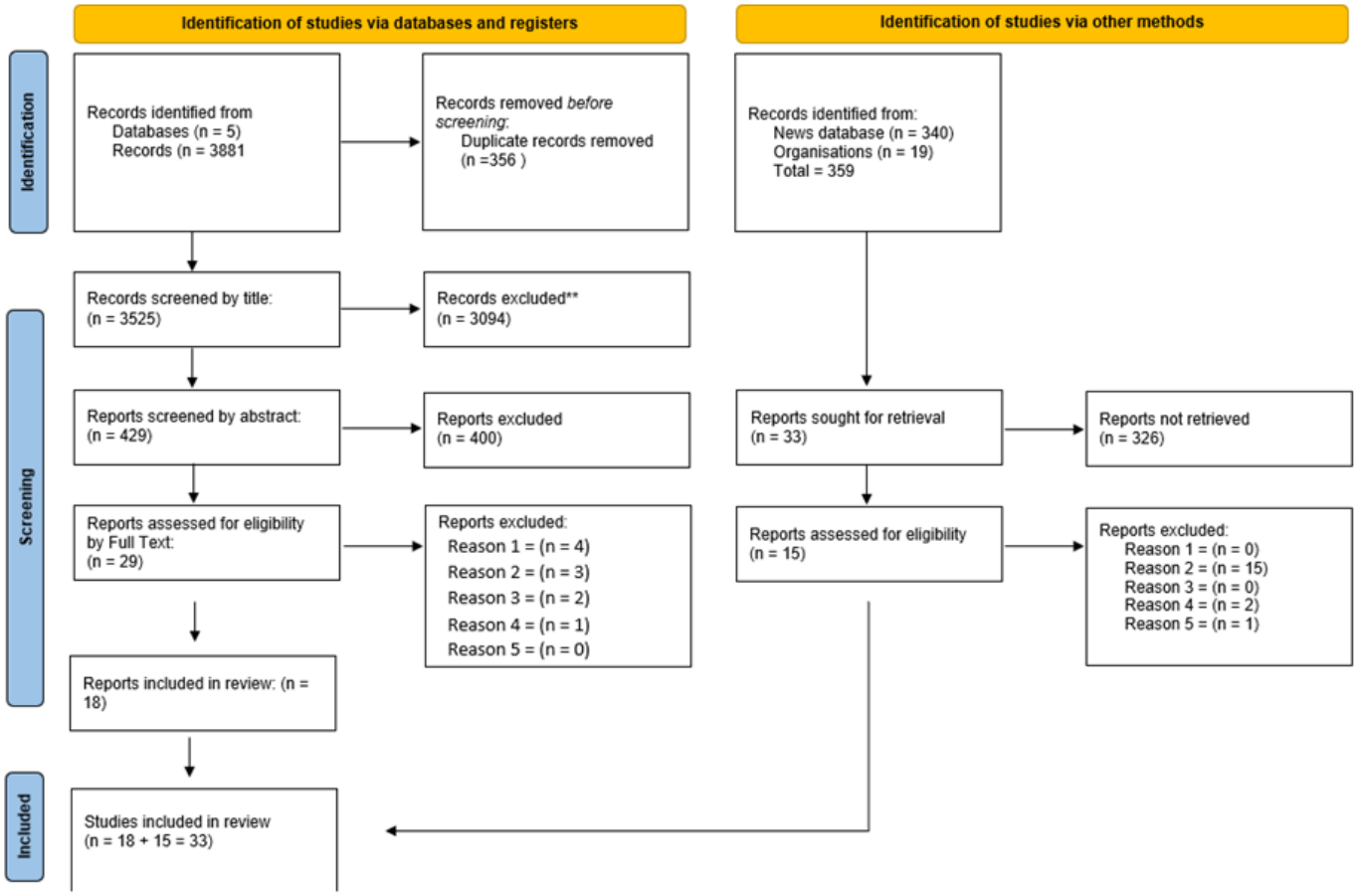
Screening and data extraction was completed by the first author, with regular input from the other authors. Disagreements regarding inclusion were resolved through mutual consensus. Emergent themes were debated and consolidated collaboratively among the authors.

RESULTS

Across the academic and grey literature, 3,884 sources were identified after duplicates were removed. Thirty-three met the inclusion criteria (see Table 1).

1. Australia and New Zealand searched separately in ABI/Inform.
2. It is notable that some papers were excluded on several criteria.
3. Ibisworld Industry Report: https://my.ibisworld.com/au/en/industry/home
4. The above is a sample not an exhaustive list of sites reviewed.

TABLE 1: PRISMA FLOWCHART: SCOPING REVIEW – OWNERSHIP TYPES IN PRIVATE HEALTH CARE AUSTRALIA & NEW ZEALAND 2022



ORIGINAL RESEARCH LITERATURE

Only eight research articles were identified in the Australasian context that analyse the ownership of PFP healthcare organisations, the factors influencing ownership, or the outcomes produced (see Table 2).

TABLE 2: RESEARCH PAPERS INCLUDED IN THE FINAL REVIEW OF ACADEMIC LITERATURE.

Authors, Title	Year	Country	Profession/ Perspective	Findings
Barnett, P., & Malcolm, L. Beyond ideology: the emerging roles of New Zealand's crown health enterprises.	1997	NZ	Cross sectoral	Historical study of public health reforms in NZ found public reforms meant outsourced purchase and providers, primary health care remained outside of accountability, implementation of reforms less radical than proposed.
Cheng, T. C., Joyce, C. M., & Scott, A. An empirical analysis of public and private medical practice in Australia.	2013	Aust.	Specialist	Analysis of data from MABEL surveys found considerable variations in practice patterns across doctors' employment arrangements, specialist practicing in public or private, remuneration and number of locations. Findings included no gender or total hours difference in type of practice and proposed policy initiatives to induce specialists to spend more time in public. Ownership structures/frameworks not considered.
Crampton, P. The ownership elephant: ownership and community-governance in primary care.	2005	NZ	GP	Data analysis of NatMedCa surveys. Study concerned hypothesis testing between community owned GPs and for-profit, looked at quality, cost, and other areas. Findings - as non-profit and for-profit ownership forms have different social roles, and as meaningful community participation in governance is determined in large part by ownership structures.
Crampton, P., Davis, P., Lay-Yee, R., Raymont, A., Forrest, C. B., & Starfield, B.	2005	NZ	GP	Considered the above study, the findings support a link between higher governance with non-profit community governance occurring in New Zealand.
Joyce, C., McDonald, H., & Lawlor-Smith, L. (2016). General practitioners' perceptions of different practice models: a qualitative study.	2016	Aust.	GP	Data analysis of semi structured interviews reviewed impact of general practice and ownership model. Outcomes highlighted the variety of differing perceptions of advantages and disadvantages of practice ownership and reinforced downward trend on ownership.
Moel-Mandel, C., Sundararajan, V., & de Moel-Mandel, C. The impact of practice size and ownership on general practice care in Australia.	2021	Aust.	General Practice	Analysis of RACGP "Health of a Nation" report considers impact of practice size and ownership on service provision, concludes that, whilst there is a move to larger corporate practices (though fewer corporate groups) and against individual ownership, there is no discernible difference to patient care.
Sturgiss, E. B., Haesler, E., & Anderson, K. General practice trainees face practice ownership with fear.	2016	Aust.	GP	Semi structured interviews on ownership with GP trainees. Found fear expressed in regard to ownership due to financial, business concerns. No structures discussed.
Yong, J., Yang, O., Zhang, Y., & Scott, A. Ownership, quality, and prices of nursing homes in Australia: Why greater private sector participation did not improve performance.	2021	Aust.	Aged Care	Internal data studied (Quality and price efficiency) of government NFP, government and FP aged care. Found government facilities greater quality and price over NFP and FP.

Barnett, et al. (1997) explored the impact of the 1993 NZ health sector reforms, including the creation of a managed market with publicly owned, corporate providers. This research reviewed reform documentation and interviews with 21 CEOs of Crown Health Entities (CHE's). This study found public reforms meant outsourcing, both of purchasing and service providers, resulting in primary healthcare remaining outside of existing accountability mechanisms, and that reform implementation was less radical than proposed.[4] The authors concluded that the intended benefit from competition was not particularly helpful, with collaboration thought more useful.

Crampton, et al. (2005a) utilised data from the NZ National Primary Medical Care Survey MaMa 2001-2002 to explore the impact of community governed not-for-profit (NFP) GP practices versus PFP practices. The study identified that community governed NFP differ from their for-profit counterparts around social roles, and that meaningful community participation in governance is determined by ownership type. Crampton, et al. [28] reviewed Quality Management System (QMS) presence as an indicator of governance quality in general practice in 2001-2002 and found that NFP organisations had more systems in place. However, the authors noted that PFP practices were likely to have access to significantly more equipment than NFP practices.

A second report from Crampton (2005b) on the above NatMedCa results, aimed to: (a) define ownership and community participation; (b) summarise evidence on ownership related differences; and (c) discuss policy implications of different ownership types in primary care including implications of merging types under the umbrella of Primary Health Organisations (PHO)s. This report supported the strong relationship between ownership and governance and found that community owned, NFP, primary healthcare organisations were more likely to have diverse community input in governance. Community-governed NFP charged lower patient fees, employed more Māori and Pacific Island staff, thus reducing financial and cultural barriers to access. The capacity of community governed NFP practices to serve diverse ethnic and low-income population groups highlights the role of ownership and governance in shaping the purpose and function of primary care practices.[27]

Cheng, et al. (2013) undertook a quantitative analysis on the "Medicine in Australia: Balancing Employment and Life (MABEL)" survey of more than 10,000 doctors, including the differences in public and private sector medical specialist work. They found that mixed and private practice specialists differ from public sector specialists on annual earnings, sources of income, maternity and other leave taken, and number of practice locations. Public sector specialists are likely to be younger, international medical graduates, devote more time to education and research, and more likely to do after hours and on-call work compared with private sector specialists.[26]

Joyce, et al. (2016) discussed the trend to larger practice sizes in Australia and explored GPs' attitudes towards different ownership types through semi-structured interviews, analysed thematically. The study noted the downward trend of GP ownership. The authors state that during the early 1990's up to 25% of practices were solo practices and 40% of GPs working in practices of 2-3 GPs. These figures had reduced to 9.8% and 23.3% respectively by 2013. The factors driving GP ownership were flexibility, autonomy, and financial rewards. Factors discouraging ownership were increased responsibility, time commitment, and financial burden. Participants indicated an interest in future ownership, but GPs were concerned about knowledge and skills required. Another trend that emerged was that of consolidation.[32]

Moel-Mandel, et al. (2021) in their literature review noted that in 2020, 16% of GPs in Australia worked in corporate-owned practices.[34] They considered the impact of practice size and ownership on service provision and found, whilst there is a move to larger corporate practices (though fewer corporate groups), there is no discernible difference to patient care. The factors driving changes to practice size included management responsibilities, financial burdens, and a lack of work–life balance. The study reported that 60% of non-owning GPs are "not at all interested" in ownership in the future. The review investigated whether quality indicators such as patient satisfaction differed with practice size and ownership; however, their results were inconclusive.[34]

Sturgiss, et al. (2016) explored the perception of Registrars and new Fellows regarding practice ownership and management in Australia; specifically, the desire to own, and facilitators and barriers to ownership. Using focus groups and interviews, they identified "worry and fear" (p.662), specifically related to financial concerns, lack of relevant knowledge and skills and balancing different roles as a barrier. The authors identified the presence of role

models and GP supervisors as a facilitator to practice ownership and management. [37]

Public vs private performance efficiencies were examined in a quantitative study of aged care homes in Australia by Yong, et al. (2013), which noted the rise in privatisation and PE firm investment.[39] Utilising retrospective facility-level quality data and measures of price, the study examined which type of ownership - government owned, NFP and PFP aged care homes - gave a higher quality of care within an efficient price range. Government owned NFP aged care homes were found to perform consistently higher on quality indicators and were more efficient on price.

An important implication emerging from this summary of published research above, is that despite there being many purported benefits of PFP ownership, there is limited supporting evidence in Australia and NZ. One key theme was that public NFP aged care facilities appear more efficient and of better quality, while NFP general practice organisations had better community engagement, outreach, and lower prices. On the other hand, the literature also indicates that fears of ownership responsibilities may dissuade younger non-owner clinicians from ownership and management. While these findings are of interest, the research reviewed does not report on ownership structures, PE shareholdings or any subsequent impacts.

See Tables 3 & 4 for a thematic analysis of the research literature.

ACADEMIC COMMENTARY LITERATURE

Table 5 details the academic commentary literature reviewed. These sources, based on author's opinions, identified conflicting interests in the supply of private healthcare to public patients in NZ,[5] increased separations and vertical integration in private healthcare in Australia,[36] perceived disadvantages (or advantages) of private ownership of public services, and conflicts of interest in private and public ownership of healthcare organisations over the searched timeframe. [3, 5, 25, , 29-31, 35, 38]

MEDIA REPORTS – AUSTRALIAN FINANCIAL REVIEW (AFR)

The most information on ownership of PFP healthcare and PE investment was found in media reports of acquisitions and divestments of publicly listed companies (see Table 6). Nine sources reported acquisitions and divestments of private healthcare entities. Of the nine, seven discussed acquisitions in Australia, with two also covering NZ. [40-44, 47, 48] Two discussed acquisitions by Fund Management firms (not PE), the remaining five reported on PE investment. Of the two sources that discussed divestment, one was by shareholders (in response to a notification of lower dividends), and one was by PE. More importantly, seven of the nine sources discussed growth in PE acquisitions. Four separate PE firms were mentioned, KKR being mentioned twice. One paper [46] discussed shareholdings briefly and mentioned that Centuria (a funds management platform) had acquired healthcare assets, including three Nexus hospitals. That article stated that the specialist doctors will retain fifteen percent of shareholdings.

TABLE 3: THEMATIC ANALYSIS OF THE LITERATURE REVIEW

Ref	Authors, Tit	Year	Country	Profession/ Perspective	Study Design or Format	Ownership/Priv. of Public	Perspectives of Ownership and hygiene factors/conditions	Downward trend in ownership/consolidation	Quality Indicators
[4]	Barnett, P., & Malcolm, L. Beyond ideology: the emerging roles of New Zealand's crown health enterprises.	1997	NZ	Cross sectoral	Qualitative - Survey	1			
[26]	Cheng, T. C., Joyce, C. M., & Scott, A. An empirical analysis of public and private medical practice in Australia.	2013	Aust.	Specialist	Quantitative secondary data.		1		
[27]	Crampton, P. The ownership elephant: ownership and community-governance in primary care.	2005	NZ	GP	Analysis/Discussion from NatMedCa studies.	1			1
[28]	Crampton, P., Davis, P., Lay-Yee, R., Raymont, A., Forrest, C. B., & Starfield, B.	2005	NZ	GP	Data extraction and Analysis from National Primary Medical Care Survey (NatMedCa) 2001-2002.	1			1
[32]	Joyce, C., McDonald, H., & Lawlor-Smith, L. (2016). General practitioners' perceptions of different practice models: a qualitative study.	2016	Aust.	GP	Qualitative study		1	1	
[34]	Moel-Mandel, C., Sundararajan, V., & de Moel-Mandel, C. The impact of practice size and ownership on general practice care in Australia.	2021	Aust.	General Practice	Scoping Review			1	1
[37]	Sturgiss, E. B., Haesler, E., & Anderson, K. General practice trainees face practice ownership with fear.	2016	Aust.	GP	Qualitative ground theory study			1	
[39]	Yong, J., Yang, O., Zhang, Y., & Scott, A. Ownership, quality, and prices of nursing homes in Australia: Why greater private sector participation did not improve performance.	2021	Aust.	Aged Care	Quantitative	1			1

TABLE 4: DESCRIPTION OF THEMES IN TABLE 3

Theme Number	Description
1	There is considerable discussion in regard **to the relationship between ownership and clinical engagement**. This discussion relates to comparative analysis of public vs private healthcare [4, 27, 28,39], including a paper considering conditions of work in public vs private. [26]
2	There is public discussion about **the relative efficiencies** of private for profit, private not-for-profit and public ownership. Includes conditions of practice i.e., employment conditions (herein discussed as "hygiene" conditions). [4,26, 32, 37]
3	Sources also revealed a trend of **increased consolidation of GP practices** to increase economies of scale, and a downward trend on clinician ownership due to concerns from younger GPs about risks of ownership. [32, 34, 37] A further theme was the use of Quality Indicator measures [27, 28, 34, 39] These themes were identified in Table 3.
4	**Quality Indicators were used as outcome measures in four** of the above sources. [27, 28, 34, 39] Where used, these indicators gave a measurable picture of efficacy, but the outcome overall was unclear due to the various other factors present and differing models of practice. Multiple quality indicators (i.e., falls, adverse events etc) and price were reviewed by Yong, et al. [39] in their investigation of type of aged care facility, but their outcome was conclusively in favour of government facilities as per above.

TABLE 5: REMAINING NON RESEARCH LITERATURE REVIEWED

Cit No.	Authors, Title	Year	Country	Profession/ Perspective	Themes
[25]	Carrigan, C. Privatisation: the threat to Australia's public hospitals.	2013	Aust.	Hospitals	Private interests' conflict with public health needs as costs and risk differ.
[5]	Coney, S. New Zealand doctors' financial ventures.	1995	NZ	Radiology	Clinicians' financial involvement in private facilities can lead to a conflict of interest in referrals.

Cit No.	Authors, Title	Year	Country	Profession/ Perspective	Themes
[29]	Duckett, S. Commentary: The Consequences of Private Involvement in Healthcare - The Australian Experience.	2020	Aust.	Cross sectoral	Mixed public private and private health service have had a deleterious effect on public healthcare in Australia.
[30]	Duckett, S. Does it matter who owns health facilities?	2001	Int	Hospital	Privately funded services are not necessarily more efficient, and emphasis should be placed on policies that improve efficiencies in public healthcare.
[31]	Forde, K., & Malley, A. Privatisation in health care: theoretical considerations, current trends, and future options.	1992	Aust.	Cross sectoral	Viewed advantages and disadvantages of private healthcare. Concluded with a call for attention to contract conditions to safeguard against potential conflicts.
[33]	Lees, M. (1994). Ownership issues obscure outcomes.	1994	Aust.	Cross sectoral	Ownership issues obscure structural issues in public healthcare. A stronger emphasis on health promotion and prevention is necessary.
[35]	Nil. Privatised public health restarts on the Northern Beaches.	2013	Aust.	Hospitals	Private care did not deliver better patient care to local community.
[36]	O'Loughlin, M. A. Conflicting interests in private hospital care.	2002	Aust.	Hospitals	Discussion of changing conditions in healthcare. After an examination of separations, growth in private healthcare provision and providers and complexities of health insurance funding the article warns of conflicts of interest in negotiations.
[3]	White, K., & Collyer, F. Health care markets in Australia: ownership of the private hospital sector.	1998	Aust.	Hospitals	Privatisation of healthcare not advantageous as economic and financial imperatives sacrifice healthcare social objectives.
[38]	White, K., & Collyer, F. To market, to market: corporatisation, privatisation, and hospital costs.	1997	Aust.	Hospitals	The evidence refutes the use of market strategies including privatisation in healthcare for cost efficiencies.

TABLE 6: AUSTRALIAN FINANCIAL REVIEW (AFR) SEARCH THEMES

Cit No	Authors, Title	Year	Country	Profession/ Perspective	Divestment	Acquisition	PE Growth discussed	Funds involved.
[40]	La Frenz, C. Liverpool Partners snare Healius' Adora Fertility	2022	Aus	IVF		PE Acq	Yes	Liverpool partners (PE)
[41]	La Frenz, C. Investors sell off ACL despite bumper half	2022	Aus	Pathology	Divestment by shareholders			
[42]	Whyte, J. Quadrant tips $100m into cancer group	2021	Aus	Cancer		PE Acquisition	Yes	Quadrant (PE)
[43]	Macdonald, A, Redrup, Y., and Sood, K. PE snaps up Kiwi IVF player Fertility Associates	2021	Aus/NZ	IVF		PE Acquisition	Yes	Consortium: New Zealand PE firm Pioneer Capital, UK firm White Cloud Capital and Kiwi pension fund NZ Super.
[44]	Schlesinger, L. Developer doubles money on hospital	2021	Aus	Hospital		FM[1] Acquisition	Yes	Centuria (FM)
[45]	La Frenz, C. Medibank closes in on Myhealth	2021	Aus	Medical Centres	PE Divestment			Crescent Capital (PE)
[46]	Fuary-Wagner, I. Centuria ups healthcare dose with $115m spend: Exclusive	2020	Aus	Medical Centres & Day surgery		FM Acquisition	Yes	Centuria (FM)
[47]	Thompson, S., Macdonald, A., and Boyd,T. Bankers hired to sell Australian Clinical Labs	2019	Aus	Pathology		PE Acquisition	Yes	KKE (PE)
[48]	Evans, S. KKR cash injection powers Laser Clinics' foreign foray	2029	Aus	Laser clinic		PE Acquisition	Yes	KKR (PE)

[1] Fund other than PE

OTHER GREY LITERATURE

Amongst the organisational reports, submissions and websites reviewed, few detailed ownership of private healthcare organisations or discussed the impact of PE investment (Table 7). PWC [49] noted consolidation trends in the healthcare mergers and acquisitions markets.[49] A press release regarding Queensland Investment Corporation and Sunsuper [50] noted the NZ Evolution acquisition of hospital assets. The Cura Group Hospital Group website [54] stated that it was established in 2008, with mixed funding including that of the specialist doctors involved in the hospitals.

Annual reports obtained from Virtus Health,[52] Ramsay Healthcare [51] and Healthscope [53] included significant shareholders in their annual reports as required by regulation. However, entities that acquire shares are often opaque, with company names obscuring actual ownership (i.e., it is not clear whether the acquiring company is owned by individual private shareholders or PE funds).

TABLE 7: OTHER GREY LITERATURE

Cit No.	Source	Year	Details	Country	Sector	Format	Findings
[49]	PWC. The Australian M&A Outlook: Health care Insights	2022	https://www.pwc.com.au/	Aus	Cross sectoral	Report	Insights into investment activity in Australia
[50]	QIC: QIC acquires New Zealand's Evolution Healthcare	2021	www.qic.com.au	Aus/NZ	Hospitals	website	As per title - Asset management and Sunsuper acq Evolution.
[51]	Ramsay Health Care. Ramsay Annual Report	2021	https://www.ramsayhealth.com/Investors/Annual-and-Financial-Reports/Annual-Report-2021	Inter	Cross sectoral	Annual Report	Executive staff shares identified; largest shareholders identified.
[52]	Virtus Health	2022	https://www.virtushealth.com.au/	Inter	IVF	Annual Report	Largest shareholders identified.
[53]	Health scope Healthscope Annual Report	2018	https://healthscope.com.au/application/files/3915/3481/6104/HSO_Annual_Report_30_June_18_-_LODGEMENT_VERSION.compressed.pdf	Inter	Cross sectoral	Annual Report	Executive staff shares identified; largest shareholders identified.
[54]	Cura group	2022	https://curagroup.com.au/cura-group/about-cura-group/align-with-cura	Aust	Hospitals	Website	Declares Dr ownership

TABLE 8: PRIVATE FOR PROFIT HEALTHCARE PROVIDERS INDUSTRY THAT MAY OR MAY NOT BE ATTRACTIVE TO PE.

Type	Capital Intensive	NDE	Type	Surgery at private hospitals or own facilities	Regulatory Structure	Margin (profitability)	Private Health Insurance	Medicare (Aus)	ACC (NZ)	PE Activity
Hospitals	High	Yes	Nursing/allied health etc	Own	Corporations Act 2001 Aus, Companies Act 2023, mandated quality accreditation, clinical colleges, country (NZ) and state health regulations.	Low	Yes	Yes	Yes	In high volume i.e., Ramsay
Diagnostic Imaging	High	Yes	Radiographers	Other	As per above, additional radiation authorities. Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	Mid	Yes	Yes	Yes	In high volume
Pathology	High	Yes	Scientists, analysing software	Nil	As per above.	High	Yes	Yes	Yes	In high volume
General Practice	Low	No	Dependant on clinician	Minor	As per above.	Low	No	Yes	Yes	In high volume/consolidate
Ophthalmology	Mid	Yes	Optometrists/orthoptists	Own and other	As per above.	High	Yes	Yes	Yes	In high volume/consolidate
IVF	High	Yes	Nursing/technicians	Own and other	As per above.	Mid	Yes	Yes	No	In high volume/consolidate
ENT	Low	Yes	Audiologists etc	Own and other	As per above.	High	Yes	Yes	Yes	Mid
Cardiologists	Low	Yes	Cardiac sonographers/technicians	Other	As per above.	Mid	Yes	Yes	Yes	Mid
Surgeons	Low	No	Dependant on clinician	Other	As per above.	High	Yes	Yes	Yes	Low
Other rooms based physicians. *	Low	?		Other	As per above.	Mid	Yes	Yes	?	Low
NDE = Non-Discretionary Energy - does not depend on clinician alone										
*Including all rooms based: endocrinologists etc.										

DISCUSSION

The aim of this review was to explore what is known of PFP ownership, with an emphasis on those with PE investment in healthcare in Australia and NZ, both in the academic research and grey literature. None of the academic publications reported detail of PFP ownership structures, PE shareholdings or any subsequent impacts of PE ownership. Whilst the grey literature did discuss PE activity, it did not inform our understanding of the shareholdings within entities (did doctors still have ownership?), with only one source discussing this subject.

Despite this limitation, several findings and implications emerged from this review. It was clear that there is consolidation in the PFP sector, but limited information on the ownership of PFP healthcare in Australia and NZ. No literature regarding PE shareholdings was identified and, more particularly, whether PE firm ownership models include clinicians. This may be because PE investment is commercially sensitive, with fewer regulations requiring transparency than for publicly traded reporting entities.[56] These lower transparency requirements, when combined with the commercial need for confidentiality, may limit the capacity for researchers to identify PE ownership to study the impacts.[11] This is of concern in a healthcare environment characterised by increasing PE activity, with ongoing questions about impact.

It is important to understand the impact of PE investment in PFP healthcare in Australia and NZ, as there is increased volume of PE trading and, given the experience of growth in PE investment in the US, there are potential challenges here which appear to be a major concern to many stakeholders.[11,12,25,29,30,35] The consolidation of practices and "fear and worry" regarding clinician ownership is a trend that also needs to be considered. [32,37]

Given these findings on the diminishing trend in clinician ownership, will further consolidation and PE investment in fields such as radiation oncology [58] impact clinician engagement in healthcare? How will further PE investment impact clinicians and consumers? More generally, should healthcare, which is considered a public good, be run by big business? This review represents the first attempt, within a broader body of work, to uncover and produce evidence that can help answer these important questions.

Limitations and future research

The main limitation was that, despite using a broad search strategy, few relevant sources were identified. This restricted the ability to generate broad theorisation on the topic. Further research is required to understand whether PE acquisition targets in Australia and NZ are similar to the US and other regions and, if so, why? The "high value" sectors which may attract PE investment in Australia/NZ could be argued to be those which have potential for: high cash flows backed by government funding; revenue growth through strategic investment in capital equipment (high capital intensity sectors); cost savings through financial management (efficient debt/equity funding); efficiencies of scale achieved through purchase of smaller competitors and/or vertical integration (e.g. primary care, telehealth, hospital in the home and hospitals) and savings from expert management of workforce, their largest expense (e.g. hospitals, large pathology, diagnostic imaging). Table 8 provides an overview of the relative importance of these factors, which may influence PE investment decisions. Whether these factors help to explain PE investment choices remains a question for future research.

Given the lack of publicly available data on PE investment in Australia and NZ, a potentially fruitful area for future research would be qualitative investigations, such as longitudinal case studies. Cases could provide rich sources of data to better understand the PE investment model, experience of clinicians, clinical and organisational outcomes. Insights from qualitative research could be further enhanced by collecting quantitative data on clinical outcomes. Data collection could include information collected under regulations (e.g., reporting requirements under the Corporations Act, 2001 in Australia, and the Companies Act, 2013 in NZ), and from quality accreditation systems.

CONCLUSION

Given the current lack of research on PE investment in healthcare in Australia and NZ, further investigations that enable a better understanding of the relationship between PE shareholdings, clinician engagement, organisational performance and clinical outcomes may provide valuable insights to allay consumer and clinician concerns and enhance service provision by the increasing number of PE owned PFP healthcare providers. It is hoped that this initial review of published information may provide a catalyst for further stakeholder reflections, and research investigations,

on how best to understand the increasing role of PE in PFP healthcare.

CONFLICTS OF INTEREST

There are no conflicts of interest to report.

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REVIEW ARTICLE

CULTURAL AND SOCIAL BARRIER IN COMMUNITY PHYSIOTHERAPY PRACTICE: ETHICS IN THE INDIAN CONTEXT

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ABSTRACT

BACKGROUND:

Ethics becomes inevitable in the physiotherapy profession as it is concerned with professionalism and patient outcomes by avoiding patient-therapist conflicts and helps avoiding medical negligence.

OBJCTIVE:

This study aims to explore the impedance faced by the community physiotherapist in implementing the code of ethics.

METHODOLOGY:

A structured interview-based questionnaire was framed to assess the perception of ethics, role of ethics and the barriers faced in implementing ethical guidelines by community physiotherapist during their practice.

RESULTS:

Ethics is important as it dignifies the profession and gains the confidences of the patient and helps in developing a good rapport with the patient. The most important barriers faced by the physiotherapist in abiding by the code of ethics were the unawareness among the patient and their cultural belief alongside with lack of inter-sectorial harmony.

CONCLUSION:

This study concludes that educating the patients and creating an inter-sectoral harmony will be most effective in breaking the barriers in ethical implementation in practice.

KEYWORDS

Ethics in practice, barriers, community-based physiotherapy, physiotherapy.

INTRODUCTION

Physiotherapy is a two-way treatment program where the patient is expected to adhere and equally participate in the tailored treatment protocol for the better outcome.[1] Therefore to have a good rapport with the patients, a physiotherapist is expected to have a sound knowledge of professionalism and good ethical knowledge.

As explained by the American Physical Therapy Association (APTA) the chief components of ethics that any physiotherapist practising must possess were integrity,

excellence, compassion, altruism, accountability, social responsibility and professional duty. [2,3]

Owing to the importance of ethical knowledge and guidelines in clinical decision making, bioethics is accepted as theoretical, academic and practical part of health care profession while Purtilo has mentioned physiotherapy ethics as seeds of care. [4,5]

Physiotherapists are bound to spend a prolonged time with patients in a treatment course.[6] The close physical contact throughout the treatment session, makes for the physiotherapist having no exception in facing ethical issues in his everyday life.[7]

This prolonged duration of treatment involving the physical contact with the patient emphasizes the importance of the ethical conduct and the patient awareness to avoid inconveniences during the session. To avoid medical negligence, which has been identified as one of the major causes of death globally, ethical knowledge and its implementation becomes inevitable in health care profession.[7]

Though following a code of ethics has become an integral part of health care profession, it has been noted that there are several barriers in implementing the physiotherapy practice on ethical grounds which are also perceived by the patient that includes social, economical and cultural barriers. [8,9]

This study aims to explore the impedance faced by the community physiotherapist in implementing the code of ethics in their everyday practice.

MATERIALS AND METHODOLOGY

As the study aimed to find the impedance faced by the community physiotherapist in implementing the code of ethics, a qualitative exploratory analysis was conducted.

Face to face semi-structured probing interview was developed for this study so as to obtain introspective data from the participants.

QUESTIONNAIRE DESIGN

A semi structured interview-based questionnaire was framed to find out the cultural and social barriers of the community physiotherapist. Before commencing the study ethical committee permission was obtained from the Scientific Committee of the SRM College of Physiotherapy. A questionnaire was designed to interrogate their perception towards ethics, role of ethics in their practice and their adherence to the ethical guidelines, it further involved questions that explored the impendence in implementing ethics in practice and the measures they adapt to overcome the barriers they face. Five community physiotherapists' opinions were sought after the questionnaire created, and after that, certain additional questions were included. After this, a panel discussion was held and the study's content was validated.

SAMPLING

A purposive sampling method was employed to choose participants from the field was of community-based physiotherapy practice who was genuinely interested to take part in their study. Prospective sampling method was used. Participants from community practice with various backgrounds (with various specialization, clinical set up, clinical centres) who can add to the study were selected. A total of 10 interviews were conducted.

Prior to the commencement of face-to-face interviews, the participants were informed that for the purpose of clear transcription, the entire session would be recorded and consent was obtained for the same.

SETTING OF INTERVIEWS

After fixing an appointment with the physiotherapists, an interview was conducted in a separate room to make sure that there were no interruptions during the course of the interview.

INTERVIEW

As the interview began, questions were prompted and probed. Participants were given enough time to think and answer. Each interview lasted for approximately 30 to 45 minutes. To gain the maximum insight of the participant, at the end of the interview a question was added stating, "Do you want to add anything that we have missed to discuss".

The interview was conducted untill the point of data saturation, which was obtained with the 10th participant. All the participants we community-based physiotherapists with a minimum experience of five years.

TRANSCRIPTION AND ANALYSIS

All the responses were transcribed into narrative format without changing the meaning of the responses. Coding of the responses were done online with grounded theory in

phases of open, axial and selective coding following which themes were identified and the results were narrated.

RESULTS AND DISCUSSION

Implementing ethics in practice of physiotherapy has been gaining momentum and has become inevitable to have a sound professional practice. But it is not documented to what extent has the ethics been implied in community practice especially in Indian context. This study included ten physiotherapists practicing for more than five years in community settings.

Physiotherapists have been interviewed with a semi structured interview guide to gain their perspectives in ethics in practice and common barriers encountered while implementing ethics in Indian context.

TABLE 1. DESCRIPTION OF THEMES, SUB-THEMES FRAMED AND BASED ON HIGHLIGHTED KEY POINTS OF RESPONSES CODED FROM THE RESPONSES OF THE PHYSIOTHERAPISTS' VIEW WITH REGARDS TO CULTURAL SOCIAL BARRIERS IN IMPLEMENTING ETHICAL GUIDELINES IN COMMUNITY BASED PHYSIOTHERAPY PRACTICE IN INDIAN CONTEXT.

HIGHLIGHTED KEY POINTS	SUB THEMES	THEME
• Punctuality • Regularity • Liability • Loyalty • Equality • Mandatory in practice	Defining ethics	ETHICS IN COMMUNITY PRACICE
• Inevitable • Maintaining confidentiality • Gaining momentum • Avoid misconduct • Dignity	Ethics in physiotherapy practice	
• Language • Time consuming • Unawareness about Physiotherapy • Dilemma in practice • Patient beliefs does not meet the goal setting	Barriers in implementing ethics	BARIERS IN PRACTICE
• No supervision • Lack of laws • Lack of time • Hesitation in expressing negative outcomes of treatment	Confounding factors in abiding code of ethics	
• Gender • Exposure of treatment area • Removing ornaments • Quantity more than quality • Unawareness • Avoiding documentation to avoid complication • Time • Patient customs and beliefs • Google consultations • Access to treatment	Cultural and social barriers	

• Two-way effort • Patient education • Explain in patient terms • Video demonstrations • Referrals • Community education	Possible measures to tackle cultural and social barriers	

THEME 1: ETHICS IN COMMUNITY PRACTICE

Sub theme 1: defining ethics

Seven of ten respondents recorded that ethics is an inevitable basic quality and a value that a professional should possess. Ethics is punctuality, regularity that a physiotherapist has to follow. It is all about taking the liability and staying loyal to the patient as well as his profession at all times that it brings laurels not only the one who treats but confidence to the one who is receiving the treatment.

One respondent stated that ethics is merely a guideline that states, how the profession should be practiced. Ethics demonstrates the respect, rights and the needs of the client as well as the professional. Each and every physiotherapy practitioner should follow ethics as it regulates the profession.

One of those ten responses stated that, ethics is respecting the patient, identifying the needs of the patients and providing the best available treatment on basis of ethical guidelines of the particular country that they reside by.

A participant recorded that, "If a patient is economically unstable to pay, ethically he should not be devoid of treatment. It becomes our moral responsibility provide a free treatment. Though the treatment is provided free, we should provide our best and not for name sake. And I personally feel that this is our professional ethics".

Sub theme 2: ethics in physiotherapy practice

Around eight respondents agreed to a fact that, ethics plays an inevitable role that it dignifies the profession. As a physiotherapist spends more time with client than most of the health professionals it is not uncommon for a client to open up his secrets to the physiotherapist. In that case it becomes the sole responsibility of the physiotherapist to abide by ethics and maintain the secrecy. He/she must make sure that at no costs the clients are being cheated or misused and must prove to be trustworthy.

While few responded that, ethics is based on the values, that one must follow and becomes mandatory. In Western countries, the ethical guidelines are strictly followed but as far as India is concerned, ethics hasn't gained a momentum. But it has to be implemented.

One respondent recorded that, "Following ethics in physiotherapy practice is as important as following the traffic rules. If one individual does not follow the traffic rules, the accident caused by him not only affects the particular person but a community as whole. Such that failing to abide ethics affects the career of the physiotherapist, the patient and the dignity of the profession as whole".

THEME 2: BARRIERS IN PRACTICE

Sub theme 1: barriers in implementing ethics

Most of the respondents agreed to the fact that language is the most common barrier faced by almost all the physiotherapists. Unawareness about the physiotherapy management and the modalities that are being implied in process of treatment makes it further difficult to treat a patient was accepted as a major barrier by nine of ten respondents. Patient expects a quick relief and they trust medicines to be remedy for all the physiological problems and have less belief on the physiotherapy management.

In contrast, one respondent recorded that, "Unawareness of a layman about physiotherapy is a common phenomenon and is not actually a barrier of treatment, a common man is not bound to have knowledge about the exercises and it is the mere duty of the physiotherapy professionals to educate the patient".

While two of ten respondents noted that, physiotherapists are expected to maintain secrecy at all costs but then when most of the relatives enquire about the condition about the client especially during house visits, Physiotherapists are bound to reveal the actual facts though they are not the stakeholders. These results were supported by the study of Kati Kulju et al., where in they stated that physiotherapist frequently encounter barriers in ethical implementation which is quite often due to the unawareness of the patients, the role to maintain secrecy and the problems with goal setting and patient's belief.[7]

Sub theme 2: confounding factors in abiding code of ethics

In most cases, physiotherapists act according to their own convenience and act to follow the code of ethics only when being supervised. This is owing to the reason that there are no laws being strictly implemented on ethical guidelines.

Though the physiotherapists are aware of all the norms and ethical principles, they don't implement to the fullest in their practice. One of the ten respondents recorded that, "The lenient laws and lack of treatment time deviates me from abiding the rules to the fullest. I give all the instructions and benefits of the treatment to the patients and I treat them with due respect both to the patient and the caregivers but then I hesitate to say the negative outcomes of the treatment".

This response was in contrast to the other responses as other responded noted that though they face barriers the try to abide by the ethics at all time to the maximum as possible

Sub theme 3: cultural and social barriers

Cultural, social and economic factors can't be overseen in treating a patient because these factors are also said to have an impact not only on disease and health but also on the outcomes of treatment. [10,11,12]

The major cultural barrier faced is that the gender difference. Especially when it comes to female client, they hesitate with a male therapist. Culturally some would hesitate to remove jewellery that they wear and they cannot be forced to remove it for the sake of treatment.[13] This barrier was faced by 100% of the respondents who participated in the study.

60% of the responses stated that, their unawareness about the physiotherapy profession and management and this becomes a major barrier in physiotherapy management and lack of time becomes a major barrier to document the assessment, treatment or the consent. As in India, there is no appointments fixed for treatment and as many as patients can come in one single day.

One participant added a note that, "In Indian practice quantity is considered more important than the quality. This makes the time to be insufficient and, in most cases, whenever I know I am liable, I hesitate to document the procedure to avoid further complications legally".

40% of the responses stated that, though ethical guidelines states that the negative outcomes of the treatment should be explained to the client as well, it is not being implemented. This is again because of unawareness. The patient will be already anxious and afraid of the electrotherapy modalities, in addition if the negative outcomes of the treatment are explained, it become even more difficult to convince the patient to undergo the treatment.

In few cases, the clients themselves will be in hurry to leave due to some commitment/work or wants to get cured within one or two days. In such cases they cannot be effectively treated ethically according to the professional norms. On the whole 6 respondents considered time as barrier while eight of ten respondents considered unawareness as the major barrier.

In contrast to all the above mentioned barriers, one of tens respondents stated google as a barrier to their treatment. One recorded that, "Owing to the unawareness and anxiety, patient tend to google their symptoms and treatment. By the time they come to the physiotherapist, they are prefixed with the googled treatment and it becomes hard to make the patient understand the approach and treatment we give in our setups. This makes the patient unsatisfied".

When barriers are discussed, language can never be neglected. It becomes more difficult when it comes to treat a patient who speaks a language which is not a well-versed language by the therapist. It makes it more difficult to explain the treatment and gain the confidence of the patient. [14,15]

Being an integral part of multidisciplinary rehabilitation team, though he is bound to keep secrecy, physiotherapist cannot abide by it when another member of the rehabilitation, enquires about it, be it a physiatrist or surgeon, etc.

Ethically, every patient has the right to treatment but practically in the access of people living in rural areas to physiotherapy remains a struggle which may deny them from receiving the treatment on time. [16,17]

As far as Tamil Nadu is concerned, although a physiotherapist is an independent first-hand practitioner, the mode of physiotherapy management to be given to the patient is highly influenced by a mode of physiotherapy

management, especially which involved exposing body areas, and management which may go against their beliefs, which again becomes a barrier to choosing the treatment according to the patient needs and treatment goals.

Sub theme 4: possible measures to tackle cultural and social barriers

As discussed earlier, the rate of success of physiotherapy management depends upon the two-way efforts for which the engagement of patient becomes inevitable. Therefore, it becomes important for a physiotherapist follow culturally adapted approaches that improves the patient's involvement.[18]

80% of the respondents felt that, educating the common people about the physiotherapy and creating awareness about the physiotherapy management is an essential and integral part in removing the obstacles in implementing the practice as per the code of ethics.

Four of ten responses stated that, as the individual cannot be forced to remove the ornaments, it is best advised to modify the treatment such that the accessories that the client wears neither hinders the treatment not causes harm to the individual who receives the treatment.

One respondent stated that, "As a measure to tackle the knowledge barrier, it is advisable for the physiotherapist to learn a few key words in the language that the patient can understand in the subsequent visits. Physiotherapist must try to make the client understand through video demonstrations, actions and gestures".

A responded recorded that, "If distance or economy becomes a barrier and if I know the patient requires treatment mandatorily, I will see to that the patient gets treated, if I am unable to go, I will refer someone who can actually treat him. I will make sure that he is not deprived from treatment".

A limitation of the study were that these results were assessed qualitatively, to understand the barriers that are most commonly faced by the physiotherapists, a quantitative study must be conducted. The study only examined the impediments faced by the community physiotherapists in the ethical implementation in practice. Further studies should assess and compare the impediments faced by both community and institutionalized physiotherapists. The relationship between the breech of ethical implementation and the outcomes of the treatment were not examined in the study.

The study conducted by Vajravelu et al., was on par with results of our study where they explained that physiotherapists treat patients and plans protocol only based on their needs and not based on their socio-economic status and treat them with no partiality given towards their status and are with due respects to the cultural and religious beliefs.[19]

Praestegaard et al., have stated in their study that the first session of treatment is the most important part of session as it has a higher impact on the patient. It is at this session the therapist has to establish a good relationship with patient and his family and should make them understand the treatment which helps in gaining confidence of the patient. This helps in avoiding the breech of ethics due to the above mentioned barriers. [20]

Patel et al., stated that physiotherapists lack the knowledge about the importance of ethics in their student life which again becomes a barrier in the implementation of ethics inn their professional life.[2]

Implementation of bioethics stands on top of the priority list of the health care profession as it has importance and significance in doctor- patient, patient – therapist and inter-sectoral relationship healthier. This makes it necessary to overcome all the barriers set in implementing ethics in practice.[5]

CONCLUSION

Lack of awareness about physiotherapy among people, alongside of cultural, economic and social factors, lack of inter-sectorial harmony and their interference impedes the ethical implication. This study concludes that educating patients and creating an inter-sectoral harmony will be most effective in breaking the barriers in ethical implementation in practice.

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REVIEW ARTICLE

LEADERSHIP AT THE INTERSECTION OF HEALTHCARE AND CONSTRUCTIVE DEVELOPMENTAL THEORY: A SCOPING REVIEW

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ABSTRACT

OBJECTIVE:

The purpose of this scoping review was to examine the nature and extent of the evidence for the use of a stage theory of adult development, Constructive Developmental Theory (CDT) within healthcare leadership.

DESIGN:

A systematic methodology was employed, utilising inclusion and exclusion criteria and searching across seven databases.

MAIN OUTCOME MEASURES:

Summary of literature in response to three key questions.

RESULTS:

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Scoping Reviews (PRISMA-ScR) flow diagram illustrates the study selection process with 154 records screened, 35 full-text articles assessed for eligibility and 7 studies included in the final analysis. Three themes emerged from the data: (1) healthcare as a complex system, (2) complexity of leadership in healthcare, (3) developmental leadership progression in healthcare.

CONCLUSIONS:

This review highlighted that CDT could provide a roadmap for individual change and adult developmental growth, thereby supporting the opportunity for more complex thinking and perspective taking within healthcare leadership. For the healthcare leader, the benefit of an awareness, understanding and application of CDT, is the potential for an increased capacity for recognising and dealing with complex challenges both personally and professionally.

The study protocol is registered with Open Science Framework (OSF).

KEYWORDS

constructive developmental, leadership, nursing supervisory, subject-object interview, WUSCT, healthcare leadership

INTRODUCTION

Healthcare and healthcare systems are becoming increasingly complex [1]. Clinical expertise may once have been considered sufficient for a leadership role in healthcare. The development of more skills, while valuable in allowing for additional professional coping capacity [2], does not address the core issue of leading through complexity. Healthcare leaders now require a much broader perspective to adequately contend with the multiplicity of competing systemic demands and complicated leadership challenges [3]. Support for a healthcare leader's adult developmental growth and attendant broadening of their perspective taking capacity, can assist the individual healthcare leader to meet the challenges of a complex environment and the demands of their role.

Human development extends beyond adolescence, continuing throughout the lifespan, through recognisable stages of growth [4]. Constructive developmental theory's (CDT) focus on expanding perspective taking capacity can provide healthcare leaders with a greater understanding of themselves, others, and the broader perspective necessary to engage with complex healthcare leadership responsibilities. Box 1 summarises seven basic propositions of CDT [5].

BOX 1. SEVEN BASIC PROPOSITIONS OF CONSTRUCTIVE-DEVELOPMENTAL THEORY

1.	People actively construct ways of understanding and making sense of themselves and their world
2.	There are identifiable patterns of meaning making that people share with one another; these are variously referred to as stages, orders of consciousness, ways of knowing, levels of development, organizing principles, or orders of development.
3.	Orders of development unfold in a specific invariant sequence, with each successive order transcending and including the previous order.
4.	In general, people do not regress; once an order of development has been constructed, the previous order loses its organizing function, but remains as a perspective that can now be reflected upon.
5.	Because subsequent orders include all earlier orders as special cases, later orders are more complex (they support more comprehensive understanding) than earlier orders; later orders are not better in any absolute sense.
6.	Developmental movement from one order to the next is driven by limitations in the current way of constructing meaning; this can happen when a person faces increased complexity in the environment that requires a more complex way of understanding themselves and the world.
7.	People's order of development influences what they notice or can become aware of, and therefore, what they can describe, reflect on, and change

Research on leadership and CDT to date has primarily focused on leadership within the educational and business sectors. The findings show that individuals with a more advanced adult developmental level have an increased ability to understand and influence others [6], are more able to self-regulate, and have a strong self-identity. Individual work-based performance associated with the ability to handle complexity was also associated with adult developmental levels, where leaders with more advanced developmental stages were comfortable with handling higher degrees of complexity and successful transformational change [2, 5, 7-11].

In healthcare, there is a significant amount of leadership research on identifying contributing factors to leadership, including specific competencies, skillset acquisition and types of leadership [12, 13]. Surprisingly, there is limited research focusing on the application of adult developmental, and specifically, constructive developmental theory to healthcare leadership. A scoping review was therefore the ideal instrument to provide a thorough overview of the current knowledge in the field of healthcare leadership and an identification of the gaps within the literature [14, 15].

OBJECTIVES

The aim of this systematic scoping review was to examine the extent and nature of the evidence for the use of constructive development theory within the context of healthcare leadership. The three research questions asked considering this aim included: (1) What does the existing literature say about the use of constructive developmental theory in the context of healthcare leadership? (2) How is healthcare leadership experienced by the individual leader operating at different stages of adult development? (3) How is the organisation affected (if at all), by leadership at different levels of adult development?

METHODOLOGY

FRAMEWORK

An evidence-based scoping review checklist, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Scoping Reviews (PRISMA-ScR), [16, 17] was used to provide guidance on the framework for the key criteria included in the review (Appendix A).

ELIGIBILITY CRITERIA.

Inclusion Criteria. Studies selected for inclusion in the review (see PICO table Appendix B) (1) Population: the study focused on leaders, or individuals with formal or informal leadership roles, or those preparing for leadership, executives, or managers (2) phenomena of Interest: constructive developmental theory measures were used to assess levels of adult development (3) Context: healthcare settings either public and/or private, (4) Outcomes: The review outcomes explore how in the context of healthcare leadership, the adult developmental stage of the study participants may be manifested. (5) Studies were only included which were published in English. (6) Qualitative, quantitative, and mixed methods studies were eligible for inclusion with no limitations on the study design or year of publication. (7) To provide further coverage, discussion papers were eligible for inclusion, in addition to unpublished theses which met the inclusion criteria.

Exclusion Criteria. Book reviews, letters, commentaries, and conference proceedings were excluded from the review.

A PICO table (Appendix B) 'Population, Phenomenon of interest, Context, Outcomes' was used to develop the relevant research questions and preliminary search terms.

INFORMATION SOURCES

An initial search of the electronic databases PsycINFO, PubMed and CINAHL was followed by an analysis of keywords contained in the retrieved article's title, abstract, and the index terms. These keywords were then used to generate a subsequent search which was carried out using all identified key words and index terms (see Appendix C). Additional databases searched included, Business Source Complete, ERIC, EMBASE, ProQuest Health and Medical. In addition, hand searches of reference lists and citations and forwards and backwards citation searching were also undertaken. Table 1 outlines search terms.

SEARCH TERMS

Constructive Development Theory	Measurement	Healthcare Leadership
Constructive development theory constructive development constructive developmental ego development stage development	Subject-Object Interview (SOI) Washington University Sentence Completion Test (WUSCT) action-logics Maturity Assessment Profile (SCTi-MAP) Global Leadership Profile (GLP) Leadership Development Profile (LDP)	healthcare leadership healthcare leader health manager healthcare executive leadership manager physician executive nursing leadership allied health supervisor

SELECTION OF SOURCES OF EVIDENCE

After de-duplication, identified studies were imported to Endnote. Two reviewers independently screened titles, abstracts and full texts. Differences of opinion were resolved through discussion and re-evaluation of the studies with a third reviewer.

DATA CHARTING PROCESS

Study data was extracted using a bespoke data charting form (Table 5) which was developed by the first author and refined in consultation with the other two researchers.

DATA ITEMS

The data extracted included, author/s, date of publication, study design, participants, study aim, CDT measurement tool, results and key findings [15]. Descriptions of each of the CDT measurements are included in the measurement tool key Appendix D.

CRITICAL APPRAISAL OF INDIVIDUAL SOURCES OF EVIDENCE

A critical appraisal assessment (Table 3) was conducted separately by two reviewers following the approach outlined in the Mixed Methods Appraisal Tool (MMAT) [18].

SYNTHESIS OF RESULTS

Data charting was completed on each included study. One reviewer extracted the key findings from each article, primarily from the results section. In line with recommendations for the data analysis of a scoping study [17], basic coding of the data was performed to identify major themes or characteristics relevant to the research questions.

THEMATIC ANALYSIS

Thematic analysis was selected as an analytical qualitative research tool to provide a rich and comprehensive rendition of the data, while allowing for the flexibility to cope with disparate approaches in the text [19]. The six phases of thematic analysis were adapted to provide a guide to the process of analysis (Table 2).

TABLE 2. PHASES OF THEMATIC ANALYSIS

Phase	Description of the process
Becoming familiar with the selected studies	Reading and re-reading the data noting key elements from each study.
Generating initial codes	Key elements are mapped against the 7 propositions of CDT, plus other category and the 3 research questions in a matrix format. Initial codes are developed from this data.
Searching for themes	Collating codes into potential themes by concept mapping the codes and examining potential linkages and patterns to form an initial synthesis.
Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set. Creation of an overall thematic map.
Defining and naming the themes	Further refinement and discussion between researchers concerning the themes.
Producing the report	Final analysis and selection of extracts, relating back to the research question. Production of a scholarly report of the analysis.

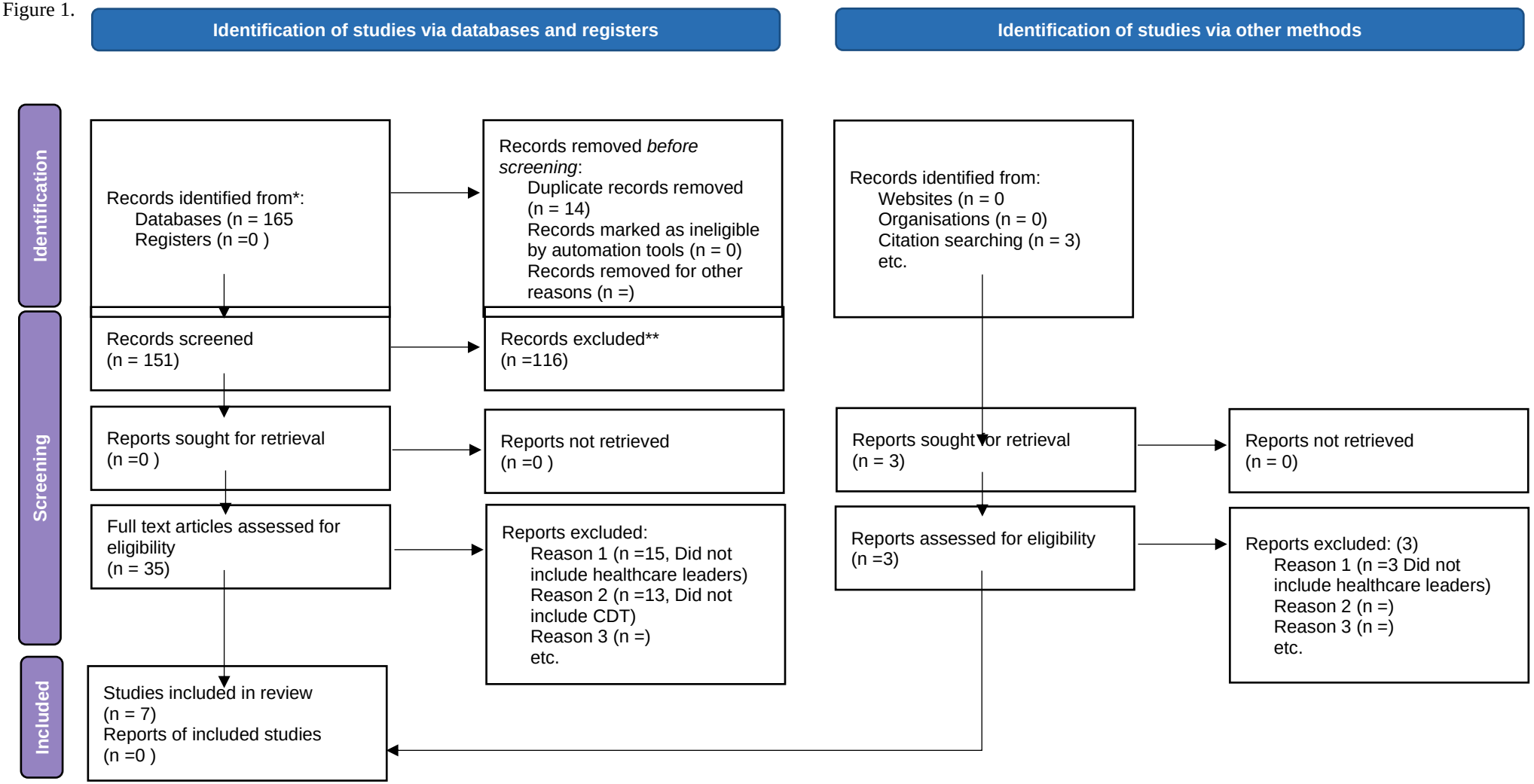
RESULTS

Selection of Sources of Evidence

Database searches between 06/07/2020 and 20/10/ 2020 yielded 165 articles with an additional three articles identified through hand searching. Following screening of title and abstract, 35 full-text articles were assessed for eligibility and consequently, seven studies were included for charting.

The PRISMA flow diagram [20], illustrates the study screening and selection process (Figure 1).

Figure 1.


Identification of studies via databases and registers
Identification of studies via other methods
Identification
Screening
Included
Records identified from*:
Databases (n = 165
Registers (n =0)
Records removed *before screening*:
Duplicate records removed (n = 14)
Records marked as ineligible by automation tools (n = 0)
Records removed for other reasons (n =)
Records identified from:
Websites (n = 0
Organisations (n = 0)
Citation searching (n = 3)
etc.
Records screened
(n = 151)
Records excluded**
(n =116)
Reports sought for retrieval
(n =0)
Reports not retrieved
(n =0)
Reports sought for retrieval
(n = 3)
Reports not retrieved
(n = 0)
Full text articles assessed for eligibility
(n = 35)
Reports excluded:
Reason 1 (n =15, Did not include healthcare leaders)
Reason 2 (n =13, Did not include CDT)
Reason 3 (n =)
etc.
Reports assessed for eligibility
(n =3)
Reports excluded: (3)
Reason 1 (n =3 Did not include healthcare leaders)
Reason 2 (n =)
Reason 3 (n =)
etc.
Studies included in review
(n = 7)
Reports of included studies
(n =0)

CRITICAL APPRAISAL OF SOURCES OF EVIDENCE

A quality review was undertaken on the four empirical studies [21], (Table 3), and the three theoretical discussion papers [22], (Table 4). No aggregate numerical score was attached to the quality review. These included studies demonstrated an overall acceptable level of evidence.

TABLE 3. QUALITY REVIEW OF EMPIRICAL STUDIES

Study	Byers (2019 [26]	Hunter et al. (2014) [28]	Larson (2011) [25]	Philip et al. (2016) [29]
JBI Critical Appraisal checklist for Qualitative Research				
Is there congruity between the stated philosophical perspective and the research methodology?	U	U	Y	U
Is there congruity between the research methodology and the research question or objectives?	Y	Y	Y	Y
Is there congruity between the research methodology and the methods used to collect data?	Y	Y	Y	Y
Is there congruity between the research methodology and the representation and analysis of data?	Y	Y	Y	Y
Is there congruity between the research methodology and the interpretation of results?	Y	Y	Y	Y
Is there a statement locating the researcher culturally or theoretically?	Y	N	Y	N
Is the influence of the researcher on the research, and vice- versa, addressed?	Y	N	Y	N
Are participants, and their voices, adequately represented?	Y	Y	Y	Y
Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	Y	Y	Y	Y
Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	Y	Y	Y	Y
Yes = Y, No = N, U= Unclear, NA = Not Applicable				

TABLE 4. QUALITY REVIEW FOR DISCUSSION PAPERS

Study	Pesut and Thompson (2018) [24]	Petrie and Swanson (2018) [27]	Beaton and Amella (1990) [23]
JBI Critical Appraisal Checklist for Text and Opinion papers.			
Is the source of the opinion clearly identified?	Y	Y	Y
Does the source of opinion have standing in the field of expertise?	Y	Y	Y
Are the interests of the relevant population the central focus of the opinion?	Y	Y	Y
Is the stated position the result of an analytical process, and is there logic in the opinion expressed?	Y	Y	Y
Is there reference to the extant literature?	Y	Y	Y
Is any incongruence with the literature/sources logically defended?	NA	NA	Y
Yes = Y, No = N, U= Unclear, NA = Not Applicable			

TABLE 5. DATA CHARTING OF INCLUDED STUDIES

Author/s Date of Publication	Study Design	Participants	Aim of Research Study or Theoretical Discussion paper	CDT measurement tool	Results and Key Findings
Byers (2019) [26]	PhD Thesis qualitative case study interviews	Hospital Healthcare leaders *n* = 14	To explore and contribute to academic knowledge on optimal practices for healthcare leaders engaged in leading improvement and change management within their organisations.	Action Logics	The primary action-logic used by healthcare leaders engaged in a change management project within the study, was Achiever. Leaders with higher levels of action-logics experienced more of the lean management strategic elements of learning, best practice, and complex system improvement. Depending on their stage of adult development, individual perspectives of the challenges of the project differed from outcome challenges (achiever action logic) to challenges with organizational principles (Defining action logic).
Philip et al (2016) [29]	Interviews using a structured questionnaire	Pharmacy leaders *n* = 14	To explore pharmacy leader development over time using the seven action logics.	Action Logics	All pharmacy leaders demonstrated progression from lower levels of adult development to successive levels. Ten leaders (71%) were diplomats during their early years. Six leaders (43% were experts during their education years, and 4 (29%) were strategists or alchemists. During their work years, all leaders had a percentage of their answers coded as alchemist (range, 5-22%). Awareness of the adult developmental pathway may support and encourage the adult developmental growth of pharmacist leaders and enhance their ability to achieve their leadership goals.

Hunter, Lewis, and Ritter-Gooder (2014) [28]	Qualitative Questionnaire	Leaders of the American Dietetic Association *n* = 46	Exploring the awareness of adult development/leadership development stage of ADA leaders to give insight for leadership development programs.	SCTi-MAP	The majority (87%) of the ADA leaders were found to be in the conventional domain of adult development. (Kegan's stage 3/4, stage 4) This may indicate a comfort with and tolerance for, the current dietetics environment. 13% of the respondents registered as Individualist. A leader's awareness of their own action logic may be beneficial in supporting their leadership ability and tolerating complexity and ambiguity.
Larson, J.A. (2011) [25]	PhD Thesis autoethnographic case study	H/C manager *n* = 1	To provide insight and support to manager's experiencing transition within their work and personal lives, by exploring the author's experience as a healthcare manager going through a professional transition.	SCTi-MAP	Adult developmental growth was catalysed through challenging career transitions. Awareness of the terrain of adult development and how to learn and grow from challenging circumstances can help to support the individual on both a personal and professional level
Pesut and Thompson (2018) [24]	Theoretical Discussion Paper	HC Leaders: Nursing	"To discuss insights derived from adult cognitive developmental theories and relate the insights to vertical leadership development in academic nursing contexts." (p.122)	Action Logics	Leadership wisdom is a function of both horizontal skill acquisition and expertise, coupled with vertical consciousness development. Wise leaders demonstrating higher order cognitive sense-making are essential to adequately address the complexity of challenges facing the profession of nursing, nursing education and healthcare.
Petrie and Swanson (2018) [27]	Theoretical Discussion paper	HC Leaders	To explore and discuss how the intersection of adult development theory and the complex healthcare system, can see the emergence of new forms of leadership skills and frameworks.	Action Logics	Healthcare is a complex system where to effect meaningful transformation requires developing how we transform i.e. The focus is not only on *what* we know but *how* we know it. A focus on the adult development of the individual leader is an underemphasised key component of health system transformation. A systemic, purpose driven approach to healthcare leadership requires leaders who are supported to develop a mindset capable of engaging with complex problems.

Beaton and Amella (1990) [23]	Theoretical Discussion paper	HC Leaders Nursing	To introduce an integration of Benner's (1984) leadership framework and Loevinger's (1987) theory of ego development. To assist in developing teaching methods designed to increase perspective taking capacity in both professional practical applications and personal self-esteem enhancement.	Loevinger's sentence completion test WUSCT	As nurses develop to higher stages of adult development, they increase their ability to gain an enhanced perspective on their clinical practice. This can manifest in positive change through an awareness and appreciation of competing tensions, for example, in areas such as quality of care and resourcing availability.
Larson, J.A. (2011) [25]	PhD Thesis autoethnographic case study	H/C manager *n* = 1	To provide insight and support to manager's experiencing transition within their work and personal lives, by exploring the author's experience as a healthcare manager going through a professional transition.	SCTi-MAP	• Adult developmental growth was catalysed through challenging career transitions. • Awareness of the terrain of adult development and how to learn and grow from challenging circumstances can help to support the individual on both a personal and professional level
Pesut and Thompson (2018) [24]	Theoretical Discussion Paper	HC Leaders: Nursing	"To discuss insights derived from adult cognitive developmental theories and relate the insights to vertical leadership development in academic nursing contexts." (p.122)	Action Logics	• Leadership wisdom is a function of both horizontal skill acquisition and expertise, coupled with vertical consciousness development. • Wise leaders demonstrating higher order cognitive sense-making are essential to adequately address the complexity of challenges facing the profession of nursing, nursing education and healthcare.
Petrie and Swanson (2018) [27]	Theoretical Discussion paper	HC Leaders	To explore and discuss how the intersection of adult development theory and the complex healthcare system, can see the	Action Logics	• Healthcare is a complex system where to effect meaningful transformation requires developing how we transform i.e. The focus is not only on *what* we know but *how* we know it. • A focus on the adult development of the individual leader is an underemphasised key component of health system transformation.

			emergence of new forms of leadership skills and frameworks.		• A systemic, purpose driven approach to healthcare leadership requires leaders who are supported to develop a mindset capable of engaging with complex problems.
Beaton and Amella (1990) [23]	Theoretical Discussion paper	HC Leaders Nursing	To introduce an integration of Benner's (1984) leadership framework and Loevinger's (1987) theory of ego development. To assist in developing teaching methods designed to increase perspective taking capacity in both professional practical applications and personal self-esteem enhancement.	Loevinger's sentence completion test WUSCT	• As nurses develop to higher stages of adult development, they increase their ability to gain an enhanced perspective on their clinical practice. • This can manifest in positive change through an awareness and appreciation of competing tensions, for example, in areas such as quality of care and resourcing availability.

SUMMARY OF THE EVIDENCE

The included seven studies approached the concepts of CDT and healthcare leadership from several viewpoints. The viewpoints included: Expanding academic teaching methods to enhance vertical leadership development [23-26];; exploring optimal practices for healthcare leaders in leading change management initiatives [25, 26]; investigating the personal and professional transition of a manager using an adult developmental lens [25]; and exploring new ways of healthcare leadership in complex healthcare systems [27]. The data are described in the following sections as they address each research question.

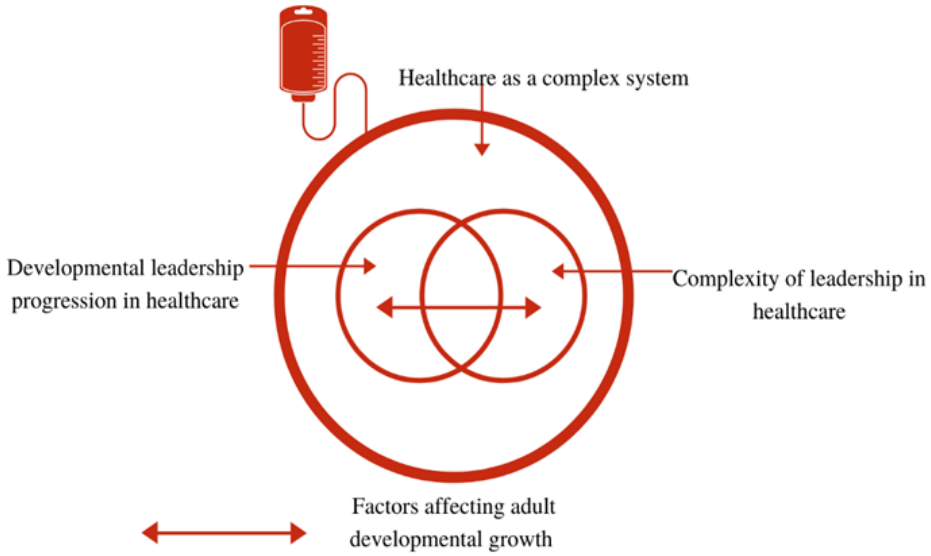
RESEARCH QUESTION ONE

What does the existing literature say about the use of constructive developmental theory in the context of healthcare leadership?

Each of the studies makes the argument for developing the cognitive complexity of the individual healthcare leader. Specifically, the aim of developing the leader's cognitive complexity focussed on: enhancing their perspective in clinical practice [23], facilitating distributive leadership and organisational change [26], supporting leadership abilities through increased tolerance for ambiguity and complexity [28], providing insight and support in personal and professional transitions [25], promoting vertical leadership development [24], exploring leadership development over time through CDT [29], and supporting the emergence of a new approach to leadership in complexity [27].

Following the exploration, identification, and coding of concepts within each paper, the studies revealed that when CDT was considered within the context of healthcare leadership, three main overarching themes were identified: Healthcare as a complex system (Theme 1), Complexity of leadership in healthcare (Theme 2) and Developmental leadership progression in healthcare (Theme 3). Figure 2 provides a graphical overview of the key themes and their relationship with each other in the context of healthcare leadership and constructive development theory. The themes are referenced within this scoping study as a common thread in the responses to each of the three research questions.

FIGURE 2. OVERVIEW OF KEY THEMES: HEALTHCARE AS A COMPLEX SYSTEM/ COMPLEXITY OF LEADERSHIP IN HEALTHCARE/DEVELOPMENTAL LEADERSHIP PROGRESSION IN HEALTHCARE



The studies maintain that in complex healthcare systems, having a healthcare leader with a level of adult development sufficient to engage with a more comprehensive understanding, and perspective taking, can be beneficial. The potential flow-on consequences of a healthcare leadership which does not recognise and accommodate the complexity and changing nature of the healthcare system, is an organisation which is more fragile, more rigid, and less capable of agility and adaptability (Theme 1, Table 6). A health system which is restrictive and inhibited, shows symptoms of an immunity to change and manifests in suboptimal functioning [27], (Theme 1, Table 6). Table 6 presents samples, quotes, and codes for the thematic analysis of theme 1, Healthcare as a complex system.

TABLE 6, THEME 1. HEALTHCARE AS A COMPLEX SYSTEM

Codes	Sample Quotes from studies
Theme 1: Healthcare as a complex system	
Health system change	"Health system transformation is not rocket science; it is far more complex than that". "If we insist on applying machine models to complex system problems, we are doomed to fail" (Petrie & Swanson, 2018, p.207).
Volatility of the healthcare system	"In health care focus areas such as patient population management, health outcomes, medical procedures, and the coordination of diagnoses, the healthcare field is complex, rife with inherent uncertainty and desires to change" [26]. "Man-made systems become unstable, creating uncontrollable situations even when decision makers are well-skilled, have all the data and technology at their disposal, and do their best" [27]. The healthcare system faces many complex issues, "medical error, rapid change, rising costs, and uncertainty" [24].
Complex issues in healthcare	
Healthcare system is linked to other systems	"We built our strategies and success around the assumption of indefinitely generous healthcare benefits in a growing employer and patient base. As employers began laying off employees en masse or going out of business or leaving the state, these assumptions suddenly did not hold true" [25].

In alignment with Theme 2 (Table 7), Complexity of leadership in healthcare, the studies emphasised that leaders within healthcare systems are faced with a multitude of problems every day, from: how to sponsor and integrate the latest change initiative across multiple disciplines and sites [26], to promoting intersectoral collaboration between siloed professions [25, 26], and ultimately how to deliver the best possible standard of healthcare to a wide variety of patients [26].

Advocating for an increased awareness and support for adult developmental growth was a core component of some studies [23-26, 28, 29]. Beaton (1990) partly attributes the display of increased clinical proficiency in specialist nurse leaders to more advanced levels of adult development, where a broader perspective can manifest in increased empathy for the client population. Pharmacist leaders reported increased perspective taking and associated adult development growth over the course of their careers [29] (Theme 3, Table 8). The connection between more advanced levels of adult development and leadership effectiveness was also demonstrated [25].

In summary, all seven studies described ways in which the development of individual perspective taking, was both useful and valuable as a component of healthcare leadership. CDT was inherent in both highlighting the prospect of continued growth in perspective taking and marking its occurrence.

RESEARCH QUESTION TWO

How is healthcare leadership experienced by the individual leader operating at different stages of adult development?

Within the studies, it was noted that healthcare leaders at different stages of adult development experienced their role and responsibilities in a variety of ways. In the following table (Table 7), quotes extracted from the included studies illustrate the thematic analysis addressing the question of healthcare leadership experience at various stages of adult development. The adjacent codes are grouped under two of the three overarching themes and encapsulate the information relevant to the research question.

TABLE 7. RESEARCH QUESTION 2. HOW IS HEALTHCARE LEADERSHIP EXPERIENCED BY THE INDIVIDUAL LEADER OPERATING AT DIFFERENT STAGES OF ADULT DEVELOPMENT?

Codes	Sample Quotes from studies
Theme 2: Complexity of leadership in healthcare	
Ethical decision making	"Nurses at higher levels of ego development appreciate the often-conflicting tensions when the need for autonomy opposes safety or when resource utilization issues are pitted against the right to quality care" [23].
Organisational change facilitation	At earlier stages of adult development, "The implications of this theory are that the action logic of the leader may be challenged by the complexity systems thinking required for large-scale change… this is a major factor in why transformational change is often difficult for individuals and organizations" [27].
Dealing with ambiguity and complexity	"Participants assessed at redefining and transforming action-logics tended to recount organizational principles, values, and ambiguity associated with improvement work, whereas participants assessed at the achiever action-logic recounted learning from goals, lean management tools and outcomes" [26].
Theme 3: Developmental Leadership progression in healthcare	
Tolerance for differences Getting the best out of people	"When I first became a pharmacy director…I tried to hire people that were like me, but over time realized it might not be the best idea to have so many people that think the same way. I then transitioned to making it a goal of getting the most out of people, regardless of the way that they think and having them share a common goal." [29].
Capability for collaboration	Healthcare Leaders at higher levels of adult development, "… described their applications of LM (Lean Management) more systemically and collaboratively" [26].
Self-Awareness and Insight	"Self-knowledge helps leaders where they are on the vertical leadership development paths. Blind spots, a leader's biases, and assumptions, if not exposed, will impede an openness to learn and embrace diverse opinions and perspectives" [24].
Transition Personal and Professional	"It seems that life is a spiral of transition, giving us every opportunity, should we choose to do so, to develop and grow every day. Life is a series of problems to be solved that are felt as pain. But once we accept this fact, we can transcend it and welcome these problems as an opportunity to grow" [25].
Movement away from black and white thinking	"An appreciation that there are grey areas is a sign of growth" [23].
Professional and clinical proficiency	"A portion of the variance in proficiency can be explained by the ego developmental levels of individual nurses" [23].
Capacity for reflective practice	"The findings identified that leaders with greater capacities for reflection and meaning-making are those with later action-logics" [26].

How healthcare leader's experience their role, is both unique to themselves, and has elements in common with their stage of adult development, as this influences what they can be aware of, and how they see the world. As the leader progressed in their level of adult development, they began to experience a movement away from black and white thinking to a greater degree of flexibility and nuance in their perspective [23, 28, 29].

It was noted that leaders at the post stage four level of adult development, can have an increased awareness and appreciation for differences between individuals. [24, 30] In contrast, earlier developmental stages are more focused on similarities and maintaining the status quo [23, 28, 29]. In a similar vein, collaboration is a key component of change, and the ability to engage effectively with others is mediated by the leader's level of adult development.

In relation to the healthcare leader's experience of change, Byers (2019) reports that healthcare leaders with the ability to reflect, which is further advanced at higher levels of adult development, are better placed to cope with change strategies. The gap between the meaning making inherent in the adult developmental level of the leader, and the cognitive complexity required of their role, can also lead to a demonstrated lack of insight or an immunity or reluctance to change [27]. The ability for a healthcare leader to change and reorient with the advent of updated information through technological change or altered circumstances is vital in a volatile, complex and uncertain healthcare world [25].

In summary, the studies described how healthcare leadership was experienced at different levels of adult development, Leaders were reported to engage with nuanced perspectives and responses, appreciate conflicting tensions, show capability for personal reflectivity, capacity for collaboration, tolerance for differences, self-awareness and insight, and the ability to deal with change, ambiguity and complexity. These insights describe the value of factoring in adult developmental growth in both the academic and professional contexts of healthcare leadership.

RESEARCH QUESTION THREE

How is the organisation affected (if at all), by leadership at different levels of adult development?

This question was not addressed explicitly across the included studies, however, leaders at post-conventional adult developmental stages may provide industry wide change through an ability to see and imagine different pathways and futures (Table 8, Theme 2). Successful collaboration between multiple and diverse key stakeholders is integral to successfully drafting and implementing an innovative and transformative organisational strategy (Table 8, Theme 2). Table 8 presents a sample of the codes aligned with research question three, grouped under the theme, Complexity of leadership in healthcare.

TABLE 8. RESEARCH QUESTION THREE HOW IS THE ORGANISATION AFFECTED (IF AT ALL) BY LEADERSHIP AT DIFFERENT LEVELS OF ADULT DEVELOPMENT?

Codes	Sample Quotes from studies
Theme 2: Complexity of leadership in healthcare	
Ethical decision making	"Nurses at higher levels of ego development appreciate the often-conflicting tensions when the need for autonomy opposes safety or when resource utilization issues are pitted against the right to quality care" [23].
Organisational change facilitation	At earlier stages of adult development, "The implications of this theory are that the action logic of the leader may be challenged by the complexity systems thinking required for large-scale change… this is a major factor in why transformational change is often difficult for individuals and organizations" [27].
Dealing with ambiguity and complexity	"Participants assessed at redefining and transforming action-logics tended to recount organizational principles, values, and ambiguity associated with improvement work, whereas participants assessed at the achiever action-logic recounted learning from goals, lean management tools and outcomes" [26].
Theme 3: Developmental Leadership progression in healthcare	
Tolerance for differences Getting the best out of people	"When I first became a pharmacy director…I tried to hire people that were like me, but over time realized it might not be the best idea to have so many people that think the same way. I then transitioned to making it a goal of getting the most out of people, regardless of the way that they think and having them share a common goal." [29].
Capability for collaboration	Healthcare Leaders at higher levels of adult development, "… described their applications of LM (Lean Management) more systemically and collaboratively" [26].
Self-Awareness and Insight	"Self-knowledge helps leaders where they are on the vertical leadership development paths. Blind spots, a leader's biases, and assumptions, if not exposed,

	will impede an openness to learn and embrace diverse opinions and perspectives" [24].
Transition Personal and Professional	"It seems that life is a spiral of transition, giving us every opportunity, should we choose to do so, to develop and grow every day. Life is a series of problems to be solved that are felt as pain. But once we accept this fact, we can transcend it and welcome these problems as an opportunity to grow" [25].
Movement away from black and white thinking	"An appreciation that there are grey areas is a sign of growth" [23].
Professional and clinical proficiency	"A portion of the variance in proficiency can be explained by the ego developmental levels of individual nurses" [23].
Capacity for reflective practice	"The findings identified that leaders with greater capacities for reflection and meaning-making are those with later action-logics" [26].

Matching the organisation's demands to the healthcare leader's level of adult development can assist in creating an environment conducive to productivity, [26] and creating a dynamic, flexible and healthy workplace [24, 26-28].

DISCUSSION

This scoping review provides additional insight into the extent and nature of the current evidence for the use of constructive development theory within the context of healthcare leadership. The review answered the three research questions. In addition, three overarching themes were identified from the data: 1) healthcare as a complex system, 2) complexity of leadership in healthcare and 3) developmental leadership progression in healthcare.

This scoping review emphasises the need for healthcare leaders operating within highly complex and rapidly changing environments to have the perspective taking capacity to meet the challenges of their role. The alignment between mental complexity level and performance expectations is integral to their performance capacity [26]. These findings are consistent with research from outside the healthcare field, where a contributing factor of leadership efficacy was found to be increased cognitive complexity [6, 31-34]. In other studies, stage development was found to be predictive of leadership effectiveness [7, 35]. Research has also found that the nature and extent of an individual leader's successes and challenges were related to their level of adult development [36].

The included studies highlighted the value of an awareness and support for adult developmental growth as part of a healthcare leader's personal and professional leadership development [25, 26, 28]. This finding is consistent with the extant literature, in a community leadership development program with integrated support for adult developmental growth a positive association existed between level of cognitive complexity and improved leadership and organisational performance [37].

Increased flexibility, emotional agility and adult developmental growth can be developed through engaging in reflective practice [25]. A key differentiating factor in adult developmental levels in CDT, is the ability for the individual to engage in reflective practice on both intrapersonal and interpersonal levels [38]. Being an effective leader in a complex and rapidly changing environment requires an ability to continually challenge personal perspectives and assumptions. CDT's focus on expanding cognitive capacity and perspective taking [39] provides the individual healthcare leader with a greater understanding of themselves, of others and complex healthcare leadership responsibilities [25].

LIMITATIONS AND FUTURE RESEARCH

There are limitations of this scoping review that are acknowledged. The criterion that studies must be published in English could have overlooked potentially relevant papers published in a language other than English. In addition, the variability in the measurement tools used to determine the participant's adult developmental stage, could limit the transferability and trustworthiness of the results.

Key areas for future research could include benchmarking the healthcare leader's level of adult development and exploring how they experience their leadership role. Further research could explore the healthcare leader's

effectiveness from the perspective of other stakeholders using constructive developmental theory. Research could also explore the performance outcomes of both healthcare leaders and/or healthcare organisations which deliberately incorporate an adult developmental approach.

MEANING OF THE STUDY AND IMPLICATIONS FOR HEALTHCARE LEADERS AND MANAGERS

For healthcare leaders to adequately wrestle with new and legacy complex challenges, the leader requires an ability for complex understanding and integration of both themselves and the situation [5]. A leader's developmental mindset impacts on their leadership ability by influencing what they can perceive as important and how they choose to frame problems. What a leader chooses to pay attention to is influenced by the complexity of their mind-set [39]. Without a complexity of understanding, complex problems can be interpreted from a rigid, black and white, simplistic perspective, thereby putting at risk a more comprehensive examination and solution building [40].

CONCLUSIONS

This scoping study examined the extent and nature of the evidence for the use of constructive development theory in the context of healthcare leadership. From the included studies, there are strong indications to support the importance of healthcare leaders and managers having an understanding and consciousness of the impact of adult developmental growth. The evidence also suggests the benefits of actively incorporating and promoting the concepts of CDT within an integrated healthcare leadership development program. This development involves expanding the perspective taking and meaning making of the individual such that they have more capacity to engage with, operate in, and understand complex healthcare leadership environments.

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STUDY REGISTRATION

The study protocol is registered with Open Science Framework:

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OSF | Leadership at the Intersection of Healthcare and Constructive Developmental Theory: A Scoping Review

CONFLICTS OF INTEREST

Conflicts of Interest: None

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APPENDIX A

PREFERRED REPORTING ITEMS OF SYSTEMATIC REVIEW AND META-ANALYSES EXTENSION FOR SCOPING REVIEWS (PRISMA-SCR) CHECKLIST [16]

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	2,3
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	3
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	18
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	3
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	25
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	4
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	4
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	5
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	5
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	5
RESULTS			

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	6
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	7,10
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	8,9
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	10,11
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	12
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	12-17
Limitations	20	Discuss the limitations of the scoping review process.	18
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	19
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	19

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

APPENDIX B: PICO TABLE

Review Questions	➢ What does the existing literature say about the use of constructive development theory in the context of healthcare leadership? ➢ How is healthcare leadership experienced by the individual leader operating at different stages of adult development? ➢ How is the organisation affected (if at all), by leadership at different levels of adult development?
Population	➢ This review will consider studies in the field of healthcare, which includes leaders in formal or informal leadership positions and those who are preparing for leadership roles within the sector. ➢ Participants do not have to have a health or allied health degree. ➢ No limits are placed on their time in the role
phenomena of **I**nterest	➢ The adult developmental stage of the healthcare leader measured by a constructive developmental theory measurement.
Context	Healthcare settings both public and private
Outcomes	➢ The review outcomes explore how, in the context of healthcare leadership, the adult developmental stage of the study participants may be manifested. ➢ Exploring evidence for how the healthcare leader experiences their leadership role. This may include their levels of self-awareness or understanding, increased confidence, leadership developmental capacity and capability, resilience, agility, sense of empowerment, understanding and capacity for leadership in complexity, improved stakeholder communication, seeking feedback, increased perspective taking, job performance and engagement, vision and purpose. These may be some (not necessarily all) of the outcomes of interest in this review. ➢ Leaders operating at different levels of adult development may have implications for the healthcare organisation. Outcomes could manifest in performance. Measures will be dependent on the study population and location.

APPENDIX C: SEARCH STRATEGY: PUBMED

Pub Med Search with MeSH
("constructive development"[tiab] OR constructive-development*[tiab] OR "constructive developmental"[tiab] OR "constructive development theory"[tiab] OR "ego development"[tiab] OR "stage development* theories")
AND
("subject-object interview"[tiab] OR "SOI"[tiab] OR "WUSCT"[tiab] OR "washington university sentence completion test"[tiab] OR loevinger[tiab] OR torbert[tiab] OR "action logic*"[tiab] OR action-logic[tiab] OR "mature adult profile"[tiab] OR "global leadership profile"[tiab] OR "leadership development profile"[tiab])
AND
("healthcare leadership"[Title/Abstract] OR "healthcare leader"[Title/Abstract] OR "health manager"[Title/Abstract] OR "healthcare executive"[Title/Abstract] OR "Leadership"[Mesh] OR "leader development"[Title/Abstract] OR management[Title/Abstract] OR manager[Title/Abstract] OR "first-line manager"[Title/Abstract] OR physician[Title/Abstract] OR "Physicians"[Mesh] OR "Physician Assistants"[Mesh] OR "Physician Executives"[Mesh] OR "Anesthesiologists"[Mesh] OR "Medical Staff, Hospital"[Mesh] OR medical[Title/Abstract] OR nursing[Title/Abstract] OR "nursing leadership"[Title/Abstract] OR "Nursing, Supervisory"[Mesh] OR "Nurses"[Mesh] OR "Nursing Administration Research"[Mesh] OR hospital[Title/Abstract] OR "Hospitals"[Mesh] OR "allied health"[Title/Abstract] OR dietician[Title/Abstract] OR "Nutritionists"[Mesh] OR physiotherapist[Title/Abstract] OR "Physical Therapists"[Mesh] OR "social worker"[Title/Abstract] OR "Social Workers"[Mesh] OR therapist[Title/Abstract] OR "Counselors"[Mesh] OR "Psychology"[Mesh] OR "occupational therap*"[Title/Abstract] OR "speech therapist"[Title/Abstract] OR "Health Personnel"[Mesh] OR "Pharmacists"[Mesh] OR "health worker"[Title/Abstract] OR "Allied Health Personnel"[Mesh])

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RESEARCH ARTICLE

THE COMPETENCIES NEEDED BY HEALTH SECTOR INFORMATION QUALITY ADVOCATES

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ABSTRACT

OBJECTIVES:

1) To introduce to expert colleagues the concept of health sector information quality advocates.
2) To obtain these colleagues opinions on worth of the advocate role and the competencies needed by an advocate.
3) To identify existing courses that matched the needs of the advocacy role.

DESIGN:

1) A workshop and pre-workshop survey of participants.
2) An online search of courses targeting a health workforce audience based on key words from the competencies identified by the workshop participants.

SETTING:

The workshop was conducted at the 35th Patient Classification Systems International (PCSI) Conference in Iceland in September 2022. The pre-conference online survey used SurveyMonkey. The online course search used Google Chrome and Google Scholar and the English language.

MAIN OUTCOME MEASURES:

1) Agreement of expert colleagues on the need for an Information quality advocate role.
2) Consensus by the expert colleagues on the important competencies.
3) The identified courses described in terms of mode of course delivery, course cost and duration, the delivering institute and key competencies covered. Each course was assessed and scored on a scale from 0 to 10 based on comprehensiveness and effectiveness.

RESULTS:

The top five competencies for the information quality advocate in order of importance were data governance principles, quality management, stakeholder engagement, information and system governance, and information culture. The online search results identified many courses for specific technical roles, but most did not have the focus on data validity, reliability and information usefulness that matched the needs of the advocacy role.

CONCLUSIONS:

Focused training is needed to support appropriately skilled information quality advocates for the health sector. The presence of information quality advocates at the point of data collection facilitates the pathway to best practice in data collection.

KEYWORDS
Data quality, health information, competence, advocate

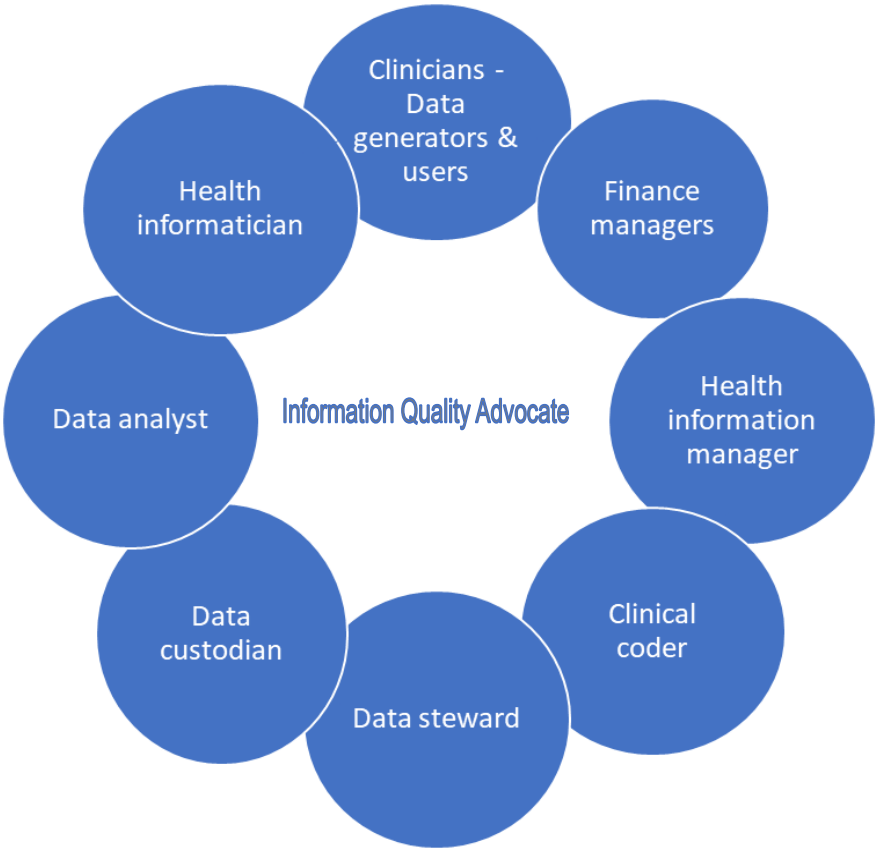
INTRODUCTION

Problems in data quality can arise at every stage of the data life cycle [1] but we have argued elsewhere that a key factor undermining the quality of data is if the data are not used [2]. Not using the data sets up a "vicious cycle" of loss of motivation for the data generators and collectors which perpetuates poor quality data. This situation is widespread as the World Health Organization (WHO) has reported that 50% of (133) countries had data quality limitations for monitoring the quality of care in parts or the whole of their health system [3].

Throughout the authors' work in data quality assessment and improvement conducted in Australia [4], Ireland [5],[6], Singapore [7], Kingdom of Saudi Arabia [8], and Fiji, a set of common factors were identified that undermine data quality improvement initiatives including poor workforce development, fragmented workforce deployment, ambiguous role definition, poor workforce motivation and deficient strategic direction.

The key health workforce categories that influence data quality are shown in Figure 1 (extracted from [9]). These workforce categories tend to function like other specialised professions in the healthcare system, working independently and in operational siloes that are connected but not always integrated [10, 11]. This lack of integration means some areas of practice are performed by several professionals (potential duplication) while responsibility for other areas of practice is unallocated (potential gap). We argue that data quality leadership and governance is the most important area of practice needed for producing the best quality information. We have therefore identified the need for a role we are calling a healthcare information quality advocate – a role that ensures all the components of data quality are addressed and the sum of the parts of the different workforce categories are greater than the whole. Where we have seen evidence of this role being performed (in a hospital, regional health administration, and primary care system), it has had a material effect on the validity, reliability and fit for purpose of the data collected [5].

FIGURE 1: MAIN WORKFORCE CATEGORIES ASSOCIATED WITH DATA QUALITY



What functions would an information quality advocate carry out? Once an information quality advocate is aware of problems in the data and/or that the data are not being used, their function we propose is to:

- Analyse the causes of poor quality and locate any barriers to using the data through using quality management tools such as root cause analysis.
- Identify and understand the stakeholders with essential roles in achieving high quality data.
- Engage/influence/motivate these stakeholders appropriately.
- Create a change management strategy applying sound data governance principles to improve the data quality and use.
- Use data quality improvement tools to create a cycle of continuous improvement.
- Influence decision makers to use the data to improve the care of patients.

The role of an information quality advocate could be played by any (or several) of the professions shown in Figure 1. Some, for instance Health Information Managers, have the competency training [12] to be arguably better suited to the role. However, as noted already, for various structural and organisation cultural reasons allied health professionals tend to act within narrowly defined practice parameters defined through professional socialisation processes [13]. Ideally each data collection and use ecosystem would have several advocates, from different professional backgrounds.

We are proposing that more training and support for people to fill this function is critical to improving the quality of the data. To build a cohort of information quality advocates, the training needs to be appropriate (comprehensive attainment of relevant learning outcomes), and effective (delivering learning outcomes as quickly as possible and for the least cost). The remainder of this article lays the groundwork for the design of such training.

METHODS

The Patient Classification Systems International (PCSI) Conference, held in Reykjavik, Iceland, in September 2022 presented an ideal opportunity to discuss these ideas and validate the need for information quality advocates, identify what training is needed, and assess if the appropriate training is available currently. The input from Conference participants was elicited through a pre-Conference half-day interactive workshop, and through a short pre-Conference survey of participants registered for the workshop. Following the workshop, a web-search for existing courses was undertaken focused on the core competencies identified during the workshop. Each data collection process is described below.

PRE-WORKSHOP SURVEY OF REGISTERED PARTICIPANTS

Conference registrants were asked pre-Conference to nominate as attendees for one of the morning and afternoon workshops on the 27th September 2022. All those who had nominated to attend the 'Health care data advocacy: Meeting the skills needs of information quality advocates for the health sector' workshop by the 1st September (approximately 55 participants although 75 attended the actual workshop), were sent a link to an online survey. The survey was designed in accordance with ethical standards and deemed appropriate to be administered by the Conference organisers independently of the researchers. Participation in the survey, and the workshop described below, was entirely voluntary and so considered to imply consent.

The survey was set up in SurveyMonkey and asked 11 questions. The first two questions sought respondent details, the next two sought information on any courses the respondent knew of that could address one or more of the draft competencies (Appendix 1) that might be required by an information quality advocate.

This draft list of competencies was created by the authors using expert judgement eliciting competencies from broader digital health competency frameworks [12, 14, 15] the first two of which were identified as the most comprehensive in an audit of competency frameworks undertaken by Nazeha, et.al [16]. A total of 22 competencies were identified that might be appropriate for the information quality advocate role.

CONFERENCE WORKSHOP

The workshop commenced with a presentation to outline the issues, define terms and possible areas of learning need. Discussion groups of 5-10 participants were asked to discuss a draft set of competencies for an information quality advocate (Appendix 1) and to:

- Reach agreement on the value and nature of the role including brief description. Are there differences

between low, middle, and high-income countries? Are there differences between primary, secondary, and tertiary care settings?

- Discuss the suitability of the draft competencies for the agreed role. Any competencies missing? Any competencies that need to be discarded?
- Identify core / critical competencies from the list of draft competencies.

Feedback from small group discussions was presented to the whole workshop and synthesized. Prior to a break, participants were asked to independently identify the top five competencies from the draft list that they thought were most applicable to the role of information quality advocate. A total of forty responses were gathered and tallied immediately to create a revised set of competencies.

After the break, the discussion groups were asked to review the revised set of competencies and identify existing courses within their region (Europe, Middle East, Africa, Asia, Western Pacific, Americas) that might be able to satisfy development of some or all the competency requirements, especially the core competencies. The discussion groups presented their findings at the final plenary, which focused on differences between competencies, especially those for which there were some capacity building options and others for which the options were limited.

POST-WORKSHOP WEB-SEARCH FOR DATA QUALITY COURSES

A search was undertaken of the web for any existing courses that addressed competence in attaining data quality in general or any of the competencies ranked highly by participants at the workshop. The search was conducted using Google Chrome and Google Scholar and limited to the English language. The key words adopted for the search are shown in Table 1.

TABLE 1 KEY SEARCH WORDS

Primary key words	Secondary key words
Health	Data governance principles
Information Data quality	Quality management
Advocacy	Stakeholder engagement
Governance / Stewardship	Information and system governance
Leadership	Information culture
	Leadership strategies
	Business alignment
	Legislative and regulative
	Information privacy
	Information science concepts

While many courses focused on data quality exist outside of the health sector it was decided to search only for courses that targeted the health workforce. The search concluded when different searches began to identify the same courses that had already been found.

A total of 45 courses were identified as potentially relevant. Each was described in terms of mode of course delivery, course cost and duration, source of course design, the delivering institute and key competencies covered. These details were captured in an ACCESS database for subsequent analysis. Each course was assessed and scored on a scale from 0 to 10 based on comprehensiveness (the extent to which the key competencies required of the information quality advocate role were covered in the course) and effectiveness (a subjective opinion on the capacity of the course to deliver competency outcomes). Each course was rated independently by two of the authors and where there was disagreement in scores a third author provided an assessment arbitration.

RESULTS

PRE-WORKSHOP SURVEY RESULTS

Just over one third of those registered for the workshop (n = 21, 38.2%), at the time of the survey administration, responded to the survey. As might be expected, given the

location of the Conference, most respondents (52%) to the survey were from the WHO Europe region. There were also respondents from all the other WHO regions except for the Africa region (Table 2).

TABLE 2: DISTRIBUTION OF RESPONDENTS BY GEOGRAPHIC REGION

WHO Region	Percentage (%) of respondents
Africa	0%
Americas	19.0%
Eastern Mediterranean	19.0%
Europe	52.4%
Southeast Asia	4.8%
Western Pacific	4.8%

None of the respondents were able to identify or name any courses with any relevance to the competencies proposed as required for the information quality advocate role. It is possible that some respondents misunderstood the survey question (a possibility that was confirmed during discussion at the workshop). For others, who focused on the role title rather than the competencies, no such course was able to be identified.

RESULTS OF THE WORKSHOP

The workshop attracted 75 of the 255 (29%) people who attended the PCSI conference. The profile of the workshop participants included people across the world who research, develop, and use patient classification systems to support health systems challenges, including pandemics, population ageing, increased rates of chronic disease, workforce shortages and rising health costs.

The initial group discussions, after reporting back to the plenary, overwhelmingly supported the concept of an information quality advocate as a potentially missing ingredient in the pursuit of higher quality data. They were unclear on whether the role was likely to be appropriate in different national contexts (low-, middle- or high-income countries) but felt there was no reason why this shouldn't be the case. Similarly, the information quality advocacy role was considered likely to be equally valuable across different health care contexts (primary, secondary, and tertiary). One participant summed up this aspect of the discussion by saying….

> *"You guys have captured the need for local advocates perfectly."*

The top five competencies identified by participants during the workshop are provided in Table 3. Appendix 1 sets out a brief description of each of the competency areas. Only one area of competency was identified as required by most participants (data governance principles, which requires the application of the principles of data governance to achieve quality data and information).

The top five included three generic / non-technical competency areas, where the so-called 'soft' skills (or non-cognitive competencies [17]) are required to attain high competency performance. If that analysis is extended to the top ten identified areas of competence, it could be argued that seven of the ten competencies are generic rather than digital health technical specific.

TABLE 3: RANKING OF COMPETENCIES REQUIRED BY DATA QUALITY ADVOCATES BY WORKSHOP PARTICIPANTS (N = 40)

Area of skill	Number of workshop participants identifying competence as important	Proportion (%) of total participants (n = 40)
Top five		
Data governance principles	25	62.5
Quality management	18	45.0
Stakeholder engagement	15	37.5
Information and system governance	14	35.0
Information culture	14	35.0
Second five		
Leadership strategies	13	32.5
Business alignment	13	32.5
Legislative and regulative	11	27.5

Area of skill	Number of workshop participants identifying competence as important	Proportion (%) of total participants (n = 40)
Information privacy	11	27.5
Information science concepts	10	25.0
Remaining competencies		
Value management and benefit realisation	9	22.5
Health literacy	9	22.5
Health sector structures	8	20.0
Problem solving	8	20.0
Implementation, adoption, and evaluation	4	10.0
System security	4	10.0
Change management	4	10.0
System lifecycle	3	7.5
Risk management	3	7.5
Health sector roles	2	5.0
Program and project management	2	5.0
Process re-engineering	1	2.5
Indigenous data sovereignty	1	2.5

A common discussion theme was that there was currently no systemic way of evaluating advocate skills nor building capability that was relevant to advocates' local environment and health system. There was consensus that when the identified competencies were present then this established a firm platform for quality improvement. It was felt that 'soft' skills were often forgotten in favour of the technical skills of data acquisition e.g., clinical coding. While both technical and advocacy competencies are important, it was agreed that without the advocacy skills data quality improvement was challenging.

RESULTS OF THE SEARCH FOR EXISTING COURSES

We identified a total of 45 relevant courses. Most of the courses (75.6%, n = 34) were delivered exclusively through an online platform. A much smaller proportion (20%) of the courses were delivered through a mixed mode, with online or remote learning modes being supplemented by face to face (classroom) modes of learning. Only two courses were delivered entirely face to face.

Course duration varied from as little as one hour to three years, but over half (56.1%, n = 23) were less than one week in duration (Figure 2) and 36.6% were only one day or less in duration. The duration of some courses, advertised as self-paced learning, provided nominal hours or days.

As expected, the cost of the courses varied by duration. Course costs varied from free (22.9%, n = 35) to nearly $AUD50,000. Most courses (60%) were under $AUD500 per participant.

If a score of 7 or more is considered to signal that a course is covering key competencies well, then only seven courses (15.6%, n = 45) were adequate (see Figure 3). Most courses (60%) scored less than 5, and no courses scored 9 or 10. Similarly, only 6 courses (13.3%, n = 45) were scored at seven or above for effectiveness, and most courses (55.6%) scored lower than 5.

FIGURE 2: DISTRIBUTION OF COURSES ASSESSED BY COURSE DURATION (N = 41).

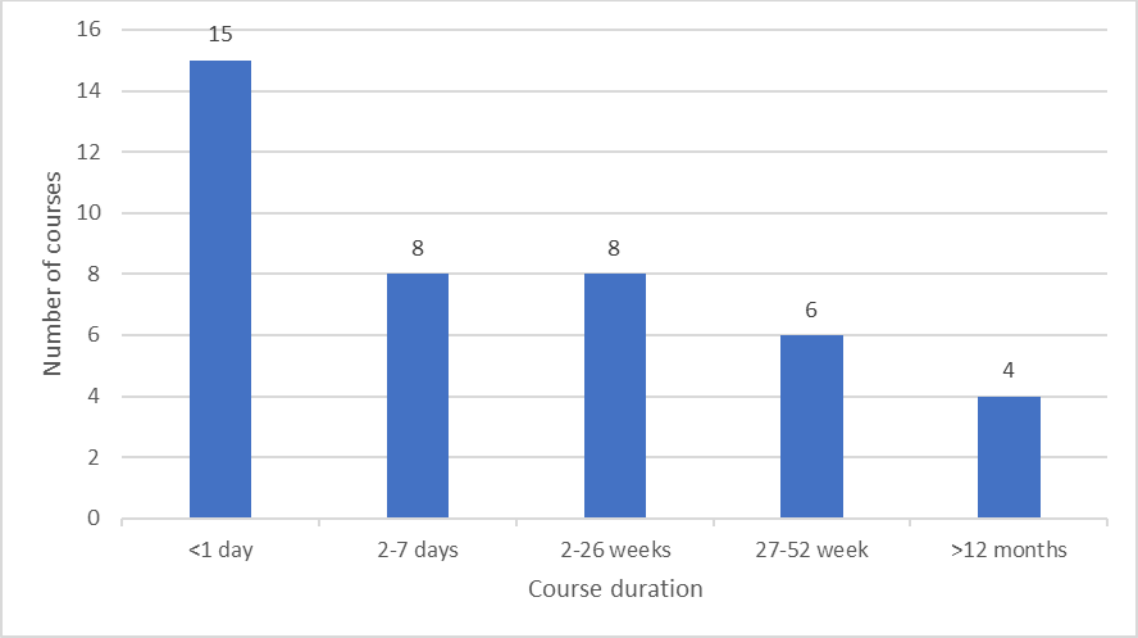
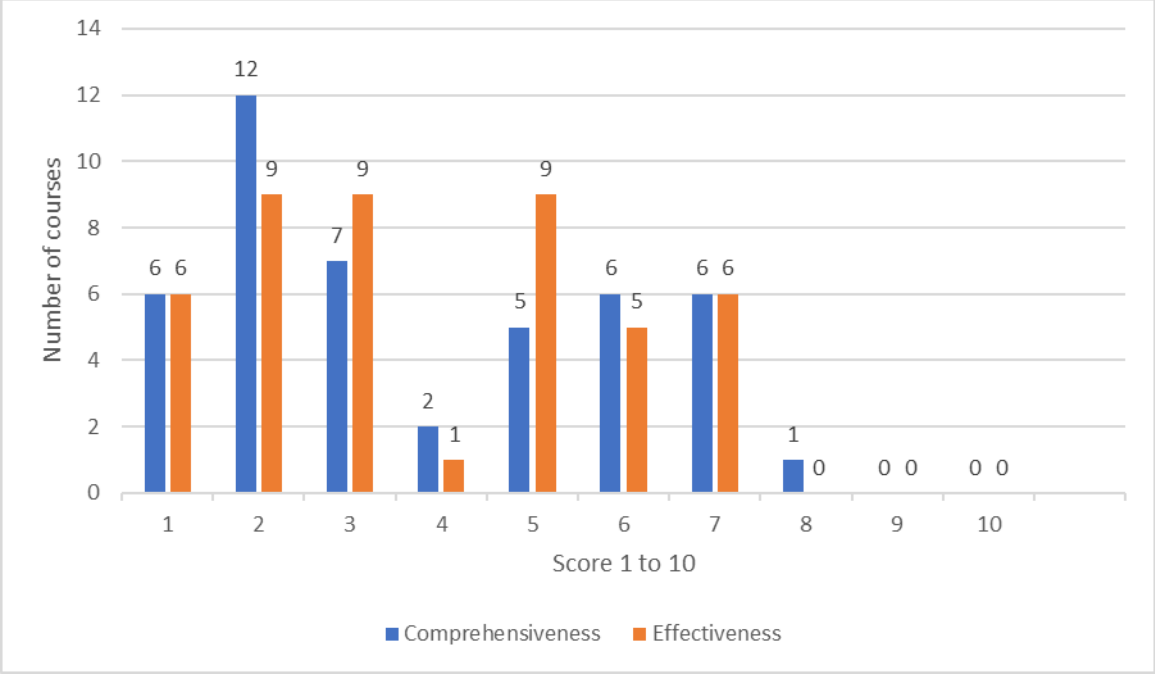


FIGURE 3: DISTRIBUTION OF COURSES ASSESSED BY COMPREHENSIVENESS AND EFFECTIVENESS SCORES.



One might have expected that the longer and more expensive courses would be more comprehensive and / or more effective, but no relationship was found between either of these course variables and either type of score. Half of the best scoring courses for comprehensiveness were under 7 days duration (one was one day or less) and all the most effective courses were under 26 weeks duration. Similarly, there were no courses with a high comprehensiveness score costing more than $AUD5,000 (two of the highest scoring were between $AUD 1-250) and half of the courses with the highest effectiveness score were between $AUD1 and 250.

DISCUSSION

We started this project because we observed, from data quality assessment projects in several countries, that in organisations where there was high quality data then someone was filling the role of an information quality advocate and the reverse was also true. Using the data is

vital to ensuring its quality and the use of the data must have local impact for the data collectors and stewards to understand the impact of their work [2]. The advocates we observed were not restricted to a particular profession, rather they were usually the key drivers of the use of the data.

The participants at the PCSI Pre-Conference workshop were broadly supportive of this idea and were largely agreed on the competencies needed to fill this role, even if they were not able to identify from their previous experience courses that satisfied these competencies. The number of workshop participants represented a substantial proportion of the Conference attendees, who in turn, are recognised experts in data quality issues and represented many countries and world regions.

The skills development of advocates will differ based on their prior education and work experience. However, as recognised by the workshop participants, what is most important for the advocacy role are the 'soft skills' or 'non-cognitive skills' [17] such as those relating to leadership, stakeholder engagement, quality management, cultural awareness, ethics, and aligning the information with the organisational objectives such as improving patient outcomes.

A wide variety of courses currently available online or in person were assessed as excellent in providing technical skills for roles such as data analysts, medical researchers, epidemiologists, and health informaticians. However, only seven of the 45 courses assessed came close to meeting most of the competency requirements of advocates, and none of these matched the competencies well. This is not surprising because the courses have been designed to prepare people for specific jobs in the health care sector, and most of them would do that well, but we could not identify any course that was developed for the health sector with information quality advocacy as a prime focus. While the workshop process was not able to fully explore the differences between low, middle, and high-income countries in the need for an information quality advocate or what shape such a role might take, there is reason to believe that such a role is universal. Based on the authors' experience in low- and middle-income countries it is possible that the focus of data and information quality efforts would be more on primary and secondary health care delivery rather than on tertiary care settings.

STUDY LIMITATIONS

There are some limitations to this study. First, the workshop participants achieved a reasonable level of consensus on the most important competencies, but their views still represent a relatively small number of people.

Second, the internet search for relevant courses was limited to English speaking websites and the search engine constraints which resulted from conducting the search from Australia which preferred sites in other English-speaking countries. There may be courses available in other countries which we were not able to access, or which are offered in-house and are not advertising their availability online. As well, the changing nature of the internet impacts on the reproducibility of the search results. A later search may locate new courses and others may no longer be available.

Third, the descriptions on the internet of the identified courses on offer were also a limiting factor. Many courses give only a brief outline of what the student would achieve, some included only four or five student outcomes and little detail of the course content. It is quite possible that some of the soft skills we were looking for were included but just not mentioned on the website's course promotion.

Another limitation is the subjective element to our assessments of the courses found online. The Methods section explains how we dealt with differences between our independent assessments to reach consensus within our team on course scores. However, others may disagree with our conclusions.

CONCLUSION

We have learned much through the process reported here. We are encouraged by the positive reaction at the workshop to our thesis that advocates are needed to ensure the quality of health data. However, more research is needed to understand whether we have identified a real gap in the health workforce to improving data quality. More work is needed to develop a capacity building framework that would support, identify, and nurture suitable candidates for the information quality advocacy role.

Further work is also needed to examine existing digital health workforce capability frameworks to determine if

they include the skills and competencies necessary for information advocacy. There are many frameworks in use currently around the world [18] to describe the competence requirements of the health information workforce and these need to be examined to assess coverage of information quality advocacy requirements.

As well, work is needed to provide proof of the concept that the number of information quality advocates can be increased through a focused course that covers the competencies identified and that increasing the numbers of quality advocates can impact on the quality of information for the health sector.

ACKNOWLEDGEMENTS

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APPENDIX

DRAFT COMPETENCIES POTENTIALLY REQUIRED FOR INFORMATION QUALITY MANAGERS

Area of skill	Unit of competence
Health sector structures	Describe how health systems are managed, funded, serviced, organised, and measured.
Health sector roles	Differentiate the roles and responsibilities of health professionals within operational, organisational, and regulatory structures
Information science concepts	Articulate how concepts such as data, information, knowledge, and wisdom are used
Implementation, adoption, and evaluation	Apply information science theories in the implementation, adoption, and evaluation of information systems.
System lifecycle	Apply appropriate, efficient, and effective practices throughout the information system lifecycle.
System security	Select system security risks and mitigation strategies
Leadership strategies	Apply leadership strategies to digital health
Information and system governance	Ascertain the appropriateness, ethics, effectiveness, and efficiency of information and information system governance.
Data governance principles	Apply the principles of data governance to achieve quality data and information.
Business alignment	Build alignment between information and information systems, and business/clinical goals and strategies.
Stakeholder engagement	Develop strategies for stakeholder engagement, applying relationship management principles.
Program and project management	Employ appropriate, effective, and efficient program and project management methodologies
Change management	Employ appropriate, effective, and efficient change management methodologies
Risk management	Employ appropriate, effective, and efficient risk management methodologies.
Quality management	Select appropriate, effective, and efficient quality management methodologies
Value management and benefit realisation	Select appropriate value management and benefit realisation strategies to support delivery of successful outcomes.
Process re-engineering	Apply process reengineering to facilitate business and organisational transformation

Area of skill	Unit of competence
Information culture	Develop an organisation's information culture to contribute to a learning health system
Problem solving	Apply problem solving methods for evidence informed decision making.
Legislative and regulative requirements	Interpret the legislative, regulatory, and policy obligations that are relevant in specific digital health contexts.
Information privacy	Determine best practice in the collection, use, disclosure, access, protection, and disposal of health information.
Health literacy	Determine best practice in integrating health literacy into information sources and systems.
Indigenous Data Sovereignty	Apply Indigenous Data Sovereignty principles to reduce the disparity in First Nations People health.

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RESEARCH ARTICLE

OUT-OF-POCKET EXPENDITURE IN HYPERTENSION RELATED CARE IN INDIA: ESTIMATES FROM NATIONAL SAMPLE SURVEY 2017-18

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ABSTRACT

BACKGROUND:

Studies estimating treatment cost associated with hypertension care in the Indian context are limited and show considerable variations.

OBJECTIVE:

To estimate the extent of out-of-pocket expenditure (OOPE) for hypertension care at the population level and its financial impact on households in India.

METHODS:

We analysed the data of the 75th round of the of NSSO survey (India) on the social consumption of health care conducted in 2017-18. OOPE was assessed after deducting the amount reimbursed by insurance from the total medical expenditure per episode of hypertension-related hospitalisation and outpatient visit during the survey period. OOPE for hypertension care was considered catastrophic if exceeding 10% of the household's monthly per capita expenditure. The determinants of catastrophic health expenditures were examined using a multivariate logistic regression analysis.

RESULTS:

A total of 1,351 and 6,379 individuals reported hypertension-related hospitalization and outpatient care, respectively, in the survey. The overall hypertension-related hospitalization rate was 54 per 100,000 persons. OOPE associated with hypertension-related hospitalisation were on an average INR 3,491 (SD 6,176) and INR 24,565 (SD 37,343) in public hospitals and private hospitals, respectively. The OOPE for hypertension related to outpatient visit was INR 277 (SD 571) in public facilities but was in the range of INR 457 (SD 556) – INR 695 (SD 1,431) based on the type of private hospitals/clinics. OOPE on medicines constituted on an average 43% (95% CI: 32-52%) and 66% (95% CI: 54-64%) of public sector hospitalisation and outpatient care respectively. The risk of catastrophic expenditure due to hypertension care was 41% among the poorest households.

CONCLUSION:

Direct expenses on drugs and diagnostic tests contribute significantly to OOPE. The on-going public health efforts towards controlling hypertension need to ensure better access to essential hypertensive drugs and diagnostic tests in public facilities.

KEYWORDS

health expenditure, household survey, India, cost of illness, catastrophic expenditure.

INTRODUCTION

Uncontrolled hypertension is one of the predominant risk factors that cause fatal and non-fatal cardiovascular events across the world. The global prevalence of hypertension is 31.1% in 2010 i.e., nearly one in every three adults who have hypertension. [1] An estimated 1.28 billion adults worldwide have hypertension, with two-thirds living in low and middle -income countries (LMIC). [2] Raised blood pressure causes an estimated 7.5 million deaths globally, about 12.8% of the total deaths, which accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS.[3] In India, only 15% (95% CI: 12-19%) of hypertensive patients have their blood pressure under control and among those under treatment the proportion of controlled hypertension was 46% (95% CI: 40-52%) in the reference period from 2013 to 2021. [4] Around 1.63 million deaths in India were attributed to hypertension and cardiovascular disease and the total DALYs attributable to hypertension increased from 21 million in 1990 to 39 million in 2016. [5]

Hypertension (HTN), being a chronic condition with high risks of CVD events, entails substantial economic burden to households, especially across low- and middle-income countries (LMIC) such as India. Prior studies in the Indian context have attempted to provide economic estimates for the treatment of HTN and CVD, but these are mostly single centre retrospective cost studies conducted in secondary care settings and the variations across estimates was found to be high. [6] A study based on the Indian Human Development Survey (2011–12) data found that the mean annual expenditure on doctor's fees and hospitalisation incurred by people suffering from chronic diseases like HTN and coronary heart disease was around INR 7,033 in rural areas and that INR 6,119 in urban areas. [7] Another cost of illness study in a primary care setting found that the average monthly direct cost of HTN care was INR 223. [8] A multi- country Prospective Urban and Rural Epidemiology (PURE) Study collected data on out-of-pocket expenditure (OOPE) for NCDs between 2005 and 2014 found that the presence of non-communicable diseases such as HTN in a household increases the percentage of effective income spent on healthcare in LMICs like India, with NCD households spending on average 3.55% and HTN-only households 0.94% more than non-NCD households. [9] Existing evidence on the economic burden of HTN in India are limited and outdated, showing inconsistent estimates of economic and financial burden related to HTN care in India. An updated population level estimates of the magnitude of HTN-care related economic burden in India are not readily available to inform policy priorities of reducing OOPE, catastrophic health expenditure and financial risk protection against illness.

Recent studies highlight the rising economic burden due to non-communicable diseases (NCDs) in India at the household level using the nationally representative survey [10,11]. The present study intends to extend this existing line of evidence by focusing on estimation of OOPE for HTN-related treatments in India, which can prevent CVD episodes and consequent impoverishments. India has the highest 15-month OOP expenditures on CVD-related hospitalizations in comparison to other LMIC. [12] Estimation of HTN-related cost of care at the household level is relevant in informing policy makers and administrators on aspects such as: who uses what type of health services? how much do they pay for them? how these OOPE impact their respective household financial condition? and which households specifically experience catastrophic expenditure? Such household expenditure patterns on HTN care would inform risk protection policies as well as policy actions related to effective and multisectoral interventions to reduce economic burden.

We estimated the magnitude and extent of OOPE and catastrophic health expenditure due to HTN related outpatient care and hospitalizations. The study adopts a societal perspective to compute the direct and indirect OOP expenditure related to hospitalization and outpatient visits for HTN care. It utilizes the nationally representative household survey to give latest estimates of economic burden related to HTN care in India.

METHODOLOGY

STUDY DESIGN AND DATA SOURCE

We have utilized the 75th round of NSSO Health survey for the study [13]. The survey covered all districts in the country using stratified multistage sampling design that covered 113,823 households and 555,351 individuals. The survey utilized a stratified multi-stage design, the detailed methodology of the survey has been published elsewhere. [13] The survey reported a total of 91,449 hospitalization episodes and 43,219 outpatient visits for all kinds of ailments. After applying a selection at the question 'nature of aliment for which hospitalisation/ outpatient care was received', we found the OOPE data of 1,351 individuals in the survey who reported HTN-related hospitalization episodes and 6,379 individuals who reported outpatient visits. In the survey, the OOPE for HTN related hospitalization and outpatient visits were assessed for the last 365 days and 15 days, respectively. The survey also reported disease-specific expenditure on drugs, diagnostic tests, and professional fees for doctors, other medical expenses and other indirect expenses incurred on food, lodging and transportations, apart from the socio-economic demographic information of the respondents. The 'source of finance' for hospitalization-related expenses such as household income or savings, borrowings, sale of physical assets, contributions from friends and relatives and others was available.

The dependent variables for the study were the OOPE on HTN related care and associated catastrophic health expenditure. This study adopted the budget share approach, which defines health expenditure as catastrophic if the household's OOPE to household consumption expenditure exceeds a pre-defined (threshold) limit. [14] HTN-related hospitalization expenditure that exceeded 10% of annual household consumption was regarded as catastrophic health expenditure. [15] We also determined the association of various socio-demographic characteristics such as age, education, and contextual factors such as number of days of hospitalization, type of medical institution of seeking care (public/charitable/private), and consumption expenditure quintile, with the catastrophic health expenditure. Consumption expenditure quintiles were determined using Usual Monthly Consumption Expenditure (UMCE) of respondents which reflected their economic status. UMCE was converted into per capita measure by dividing the 'Usual Monthly Per-Capita Consumption Expenditure' (UMPCE) by the household's size, which was classified into quintiles.

DATA ANALYSIS

Data were analysed using STATA software.[16] Continuous variables such as age, OOPE and categorical variables such gender, place of residence, religion, education, contextual variables of HTN care were reported as median (IQR) and proportions (95% CI) respectively.

HTN-related hospitalisations were computed after summing up the expenses of multiple episodes of each patient. Prevalence rate of hospitalization with respect to gender and place of residence were computed by taking the weighted average of corresponding hospitalization rates per 100,000 population, where the weights were the proportion of population in the respective groups.

We also estimated the following indicators: proportion of out-of-pocket hospitalisation expenditure as a proportion of annual household consumption expenditure, proportion of OOP expenditure leading to catastrophic expenditure, proportion of hospitalisation episodes whose expenditure was sourced from borrowings/ sale of physical assets and the utilisation of public sector facilities for HTN related hospitalisation.

The difference in the median hospitalisation expenditure for each episode of hospitalisation across consumption expenditure quintiles and type of medical institution was assessed using Kruskal-Wallis test[1]. Multivariate logistic regressions were performed to examine the socio-economic factors associated with catastrophic expenditure due to HTN related hospitalisation. Sensitivity analysis was done to examine the factors associated with different thresholds (5%, 10% and 15%) of catastrophic spending using regression models. All relevant cost estimates have been expressed in 1 US$= INR 74.58 as on 14th July 2021. A P- value ≤0.05 was considered statistically significant.

ETHICAL APPROVAL

Ethical approval for the study was not sought since it is based on household survey collected by the Government of India and freely available in the public domain for research purposes.

1. Kruskal-Wallis test, proposed by Kruskal and Wallis in 1952, is a nonparametric method for testing whether samples are originated from the same distribution.

RESULTS

SOCIO-DEMOGRAPHIC AND MEDICAL CARE RELATED CHARACTERISTICS

The survey reported 1,351 individuals were hospitalised in the last 365 days due to HTN. Most hospitalised individuals were in the age group 35-59 years (53%) and from rural areas (57%). Nearly 64% were women and most patients (85%) reported hospitalization for less than or equal to 7 days and sought care in the private health sector (54%). 6,379 episodes of outpatient visits were reported in the last 15 days due to HTN. The majority were women (56%) and more than half were aged 60 years and above (53%) and 61% were treated in the private sector (Table 1).

HOSPITALISATION RATES AND EXPENDITURE

The overall HTN related hospitalisation rate was 54 per 1 00,000 persons in the year 2017-18. Figures 1 show that HTN-related hospitalization rates among women were higher than among men in both rural and urban areas.

TABLE 1 SOCIO-DEMOGRAPHIC AND MEDICAL CARE RELATED CHARACTERISTICS OF PATIENTS WHO WERE HOSPITALISED OR RECEIVED OUTPATIENT CARE DUE TO HYPERTENSION, INDIA, 2017- 18

Characteristics	Hospitalisation related N = 1351 (%)	Outpatient related N = 6379 (%)
Sex		
Males	482 (36.65)	2828 (44.34)
Females	869 (64.35)	3550 (55.65)
Transgender	--	1 (0.01)
Age-group (Years)		
0-14	6 (0.44)	2 (0.03)
15-34	115 (8.52)	156(2.45)
35-59	710 (52.55)	2864(44.89)
> 60	520(38.50)	3357(52.62)
Number of days of hospitalisation		
<=7	1150 (85.13)	NA
>7	201(14.87)	NA
Type of Medical Institution		
Govt/Public	598(44.26)	2201(34.50)
Charitable Trust/NG0 run	26(1.91)	73(1.14)
Private hospital	727(53.83)	1946 (30.50)
Private doctor/clinic	NA	1962(30.75)
No care or informal care	NA	197 (3.09)
Place of residence		
Rural	765(56.62)	3222(50.51)
Urban	586(43.38)	3157(49.49)
Social Group		
SC/ST	263(19.46)	880(13.80)
OBC	584(43.21)	2637 (41.35)
Others	504(37.33)	2861(44.85)
Education		
Not literate	512(37.90)	2083(32.65)
Informal education	18(1.33)	41(0.64)
Formal education		
Up to Primary level	304 (22.49)	1489(23.35)
Up to Secondary level or equivalent	296 (21.93)	1586(24.87)
Up to Higher Secondary or equivalent	119(8.84)	451(7.07)

Up to Graduation or equivalent	78(5.77)	554 (8.69)
Post-Graduation and above	24(1.75)	174(2.72)
Consumption expenditure quintile		
I MPCE quintile (Poorest)	151(11.15)	369(5.78)
II MPCE quintile	168 (12.47)	895(14.03)
III MPCE quintile	316(23.43)	962 (15.09)
IV MPCE quintile	302(20.08)	1605 (25.17)
V MPCE quintile (Richest)	413 (30.59)	2547 (39.93)

Source: NSSO, 2017-18 [13]

Note: MPCE, monthly per capita consumption expenditure. Household monthly per capita consumption expenditure limits (in INR) for the five quintiles are as follows: I MPCE quintile (918 -1280), II MPCE quintile (1500 -1667), III MPCE quintile (1967-2125), IV MPCE quintile (2500-3000) and V MPCE quintile (4000-5250).

FIGURE 1 HOSPITALISATION RATES FOR HYPERTENSION REPORTED PER 100 000 PERSONS DURING THE LAST 365 DAYS IN INDIA, 2017-18 BY GENDER AND LOCATION OF RESIDENCE

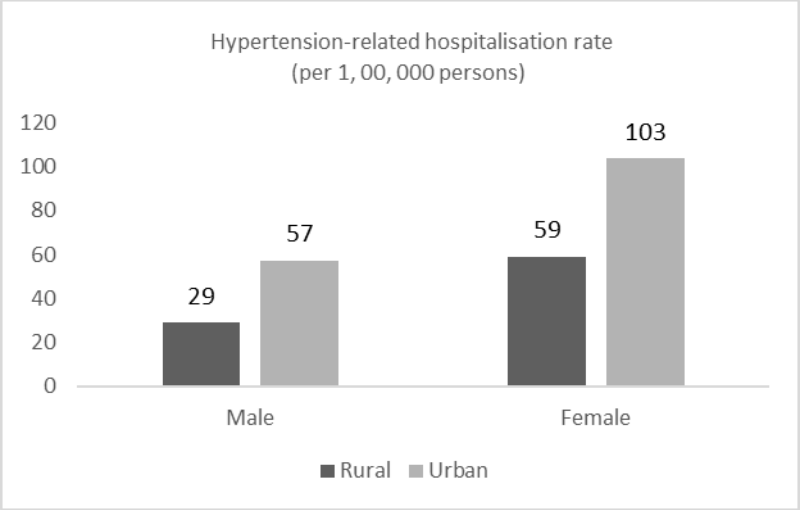

Table 2 shows the median expenditure per episode of HTN-related was INR 5,500 (US$74), and it was INR 7,750 or US$104 among the richest quintile compared with the poorest quintile (INR5,000 or US$67). Out-of-pocket hospitalisation expenditure as a proportion of annual household consumption expenditure on average is highest among Q2 quintiles (18%), followed by the poorest quintile (8%). About 41% of individuals within the poorest quintile spend more than 10% of their annual consumption expenditure for HTN-related hospitalisation. Public sector utilisation by the poorest quintile (60%) was twice more than the richest quintile (29%) ($p<0.001$). Median private sector OOPE for HTN related hospitalisation expenditure (INR 12,230 or US$ 164) was more than six times higher than the public sector (INR 1,800 or US$ 24). Medical expenses were covered through borrowing or sale of assets in 21% HTN related hospitalisation episodes on an average, with highest distress financing of 32% among those seeking care in the non-profit private sector. No significant difference was found for distress financing of HTN related hospitalization across income quintiles.

The average expenditure for HTN related hospitalization in Indian rupees is shown in Table 3. Direct medical expenditure on an average is INR 15,105 (US$ 202). Persons seeking HTN care in public hospitals incur only one-tenth of the direct medical expenditure incurred in the private hospitals. Indirect medical expenditure were almost two times higher in private hospitals than that of public medical institutions. Total medical expenditure were almost eight times higher in private hospitals as compared with public medical institutions. The amount reimbursed by insurance coverage ranged between INR 80 and INR 2,981, resulting in high OOP expenditure on HTN care of about INR 15,176 (US$ 203) on an average. Loss of household income due to hospitalization reported by patients is around INR 1,592 (US$ 21) on an average.

TABLE 2 OUT-OF-POCKET HOSPITALISATION EXPENDITURE, PREVALENCE OF CATASTROPHIC EXPENDITURE AND UTILISATION OF PUBLIC SECTOR FACILITIES FOR EVERY EPISODE OF HOSPITALISATION DUE TO HYPERTENSION BY INCOME QUINTILES AND TYPE OF HEALTH FACILITY IN INDIA, 2017-18

Characteristics	Median hospitalisation expenditure in INR for each episode of hospitalisation (IQR)#	Out-of-pocket hospitalisation expenditure as a proportion of annual household consumption expenditure (%)	Proportion of Out of pocket hospitalisation expenditure leading to catastrophic expenditure * (%)	Proportion of hospitalisation episodes whose expenditure was sourced from borrowings/ sale of physical assets (%)	Utilisation of public sector facilities for hospitalisation due to hypertension (%)
Consumption expenditure quintile					
I MPCE quintile (Poorest)	5000 (2000- 12000)	8	41	25	60
II MPCE quintile	4650 (2010 - 17110)	18	34	21	56
III MPCE quintile	7150 (1590 - 13900)	4	30	22	46
IV MPCE quintile	5200 (2060- 12230)	2	18	22	51
V MPCE quintile (Richest)	7550 (2510- 26200)	6	26	18	29
Type of Medical Institution					
Public	1800 (770 -3650)	2	4	20	-
Non-Profit private	10110 (5600- 32140)	5	10	32	-
Private	12230 (6283 - 27000)	13	22	23	-
Overall	5500 (2000 - 15700)	8	14	21	48

Source: NSSO, 2017-18 [13]
Note: # Kruskal-Wallis H test significant at 1%, *More than 10% of annual household consumption expenditure

TABLE 3 AVERAGE EXPENDITURE (RS.) PER HOSPITALISATION CASE OF HYPERTENSION AND ITS BREAKUP, INDIA, 2017-18

Components	Public (n=653)	Charitable (n=31)	Private (n=667)
Direct Medical expenditure	***2473 (5384)***	***19725 (22162)***	***25326 (41099)***
Doctor's/surgeon's Fee	92 (1564)	3478 (4985)	3515 (9136)
Medicines	1455 (3279)	4161 (4508)	5182 (7750)
Diagnostic Tests	488 (1117)	1176 (2203)	2595 (4606)

Bed charges	55 (339)	2051 (3283)	2871 (5397)
Other medical expenses	213 (725)	2188 (2741)	1669 (6236)
Indirect Medical expenditure			
Expenses on Transport of patients	402 (650)	402 (425)	727 (1192)
Other non-medical expenses	696 (990)	1777 (2625)	1493 (3055)
Total Medical expenditure	***3571 (6239)***	***21904 (24139)***	***27546 (42791)***
Amount reimbursed by insurance	80 (730)	577 (2117)	2981 (18831)
Out of pocket expenditure	***3491 (6176)***	***21327 (24520)***	***24565 (37343)***
Loss of household income due to hospitalization	***964 (2325)***	***3119 (4631)***	***2054 (6095)***

Source: NSSO, 2017-18 [13]

Note:The figures are mean expenditure with standard deviation in the parenthesis.

With regards to the distribution of hospitalisation costs related to HTN care, a doctor's fee was negligible in public hospitals but constituted 23% and 19% of total hospitalization costs in charitable and private hospitals respectively. Medicines accounted for the highest 43% (95% CI: 32-52) of hospitalization expenditure in public hospitals. Diagnostic tests were lowest at 7% of health care cost in charitable hospitals. Bed charges were highest in private hospitals. Other medical expenses were highest at 14% in charitable hospitals. Indirect costs on transport of patients and other non-medical expenses were much higher in the public sector (31%) compared with chartable and private hospitals (around 12-13%).

OUTPATIENT VISITS AND EXPENDITURE

Table 4 shows that around 60% of hypertensive patients reported outpatient visits in the last 15 days to private hospitals or with private doctor or clinic. Out of 6,379 hypertensive patients, 165 people (2.58%) did not specify from where they sought care and 32 persons (0.5%) sought informal care. Total medical expenditure towards HTN care, on an average, was highest in private hospitals (INR 696 or US$ 9), more than double of that reported in public facilities (INR 280 or US$ 4). The amount reimbursed by health insurance is negligible irrespective of the type of medical institutions; hence all of medical expenditure incurred during outpatient visits in the last 15 days was OOP. In terms of distribution of HTN related outpatient visits revealed that medicines accounted for major health component expenses with lowest of 47% in charitable or NGO-run facilities and highest of 87% in informal health care providers. Medicines accounted for 66% (95% CI: 54-64) of costs related to outpatient visits in public facilities.

FACTORS ASSOCIATED WITH CATASTROPHIC EXPENDITURE DUE TO HTN-RELATED HOSPITALISATION

Table 5 displays three regression models representing different thresholds of catastrophic expenditure (5%, 10% and 15% of total annual household expenditure) towards HTN related hospitalization. These models show that the probability of incurring catastrophic expenditure among hospitalised hypertensive was significantly higher among patients from poorest quintiles as compared to the richest quintile, especially those from rural areas. All models showed significant catastrophic health expenditure among those who were treated for longer duration for more than 7 days, particularly in private hospitals

TABLE 4 AVERAGE EXPENDITURE (RS.) PER OUTPATIENT CASE OF HYPERTENSION AND ITS BREAKUP, INDIA, 2017-18

Components	Not specified (n=165)	Public (n=2201)	Charitable / NGO run (n=73)	Private hospital (n=1946)	Private doctor/clinic (n=1962)	Informal health care provider (n=32)
Direct Medical expenditure	***277 (651)***	***219 (468)***	***428 (807)***	***633 (1371)***	***435 (683)***	***63 (78)***
• Doctor's/surgeon's Fee	11 (49)	11 (57)	42 (64)	89 (411)	69 (205)	5 (11)
• Medicines: AYUSH	3 (38)	4 (49)	0.5 (7)	12 (95)	11 (80)	0 (0)
• Medicines: Other than AYUSH	241 (488)	186 (379)	231 (374)	450 (810)	325 (359)	57 (76)
• Diagnostic Tests	18 (121)	13 (81)	155 (453)	52 (314)	26 (188)	0 (1)
• Other medical expenses	4 (109)	6 (51)	0.2 (5)	29 (255)	3 (277)	1 (12)
Indirect Medical expenditure						
Expenses on Transport of patients	**9 (111)**	**37 (93)**	**45 (98)**	**40 (82)**	**18 (47)**	**1 (7)**
Other non-medical expenses	6 (29)	24 (108)	13 (90)	23 (87)	8 (40)	1 (9)
Total Medical expenditure	***292 (710)***	***280 (564)***	***487 (903)***	***696 (1432)***	***461 (723)***	***66 (85)***
Amount reimbursed by insurance	0 (0)	2 (88)	5 (67)	1 (90)	4 (332)	0 (0)
Out of pocket expenditure	***292 (710)***	***277 (571)***	***482 (901)***	***695 (1431)***	***457 (556)***	***66 (85)***
Income loss due to illness	***35 (258)***	***36 (164)***	***178 (609)***	***63 (439)***	***20 (182)***	***3 (38)***

Source: NSSO, 2017-18 [13

Note: The figures are mean expenditure with standard deviation in the parenthesis

TABLE 5 MULTIVARIATE LOGISTIC REGRESSION TO STUDY THE FACTORS ASSOCIATED WITH CATASTROPHIC EXPENDITURE AS A RESULT OF INPATIENT HOSPITALISATION DUE TO HYPERTENSION IN INDIA, 2017-18

Characteristics	Model 1		Model 2		Model 3	
	5% threshold		10% threshold		15% threshold	
	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Gender						
Male	1		1		1	
Female	0.836 (0.633-1.106)	0.211	0.805 (0.573-1.131)	0.213	0.650 (0.443-0.954)	0.028
Age group						
0-14 years	1		1		1	
15-34 years	0.963 (0.073-12.654)	0.978	0.595 (0.039 -8.942)	0.707	0.435 (0.023-8.012)	0.576
35-59 years	0.834 (0.066-10.505)	0.888	0.469 (0.0328-6.703)	0.577	0.347 (0.020-6.018)	0.468
Above 60 years	0.880 (0.069-11.099)	0.922	0.436 (0.030-6.242)	0.541	0.334 (0.019-5.790)	0.451
Place of residence						
Rural	1		1		1	
Urban	0.623 (0.472-0.823)	0.001	0.613 (0.437-0.860)	0.005	0.464 (0.315-0.684)	<0.001
Type of Health Facility						
Govt/Public	1		1		1	
Charitable Trust/NG0 run	1.905 (0.762- 4.763)	0.168	3.127 (1.123-8.705)	0.029	4.495 (1.552-13.021)	0.006
Private	3.986 (2.943- 5.399)	<0.001	5.282 (3.550-7.859)	<0.001	5.629 (3.561 -8.897)	<0.001
Number of days of hospitalisation						
<=7 days	1		1		1	
>7 days	2.083 (1.467 -2.957)	<0.001	3.284 (2.222-4.852)	<0.001	4.098 (2.686- 6.252)	<0.001
Consumption expenditure						
Q5 MPCE quintile (Richest)	1		1		1	
Q4 MPCE quintile	1.337 (0.908- 1.968)	0.141	1.164 (0.711-1.907)	0.544	1.250 (0.703-2.223)	0.447
Q3 MPCE quintile	1.753 (1.181- 2.602)	0.005	1.940 (1.198-3.141)	0.007	2.249 (1.293-3.912)	0.004
Q2 MPCE quintile	1.141 (0.704 – 1.849)	0.591	1.353 (0.754-2.425)	0.310	1.506 (0.770-2.947)	0.231
Q1 MPCE quintile (Poorest)	3.51 (2.28- 5.41)	<0.001	4.579 (2.751- 7.622)	<0.001	6.074 (3.438-10.733)	<0.001
Constant	0.121 (0.009- 1.551)	0.105	0.084 (0.005-1.243)	0.072	0.080 (0.004-1.437)	0.087
Number of Observations	1351		1351		1351	
LR chi2(12)	138.33		147.76		152.87	

Source: Estimated by authors based on NSSO, 2017-18 [13]

DISCUSSION

The survey highlighted that about 46% of inpatients and 40% of outpatients sought hypertensive care in public facilities in India. While catastrophic expenditure due to HTN care is not common across general population, the survey found that lower middle class and poorest quintile from rural areas face OOPE of 18% and 8% respectively of their household annual per capita consumption expenditure on an average on HTN-related hospitalisations. These proportions were higher at 13% for those seeking care in private facilities as compared to 2% for those seeking HTN care in public facilities. About 25% of the poorest households experienced catastrophic expenditure and resorted to distress financing through sale of assets or borrowing. About 60% of the poorest quintiles utilized public facilities for HTN related hospitalisation. The poorest households incurred OOPE on an average INR 3491 (SD 6176) out of which 43% of the total OOPE was spent on drugs and medicines. The mean private sector OOPE on HTN related hospitalisation expenditure was nearly six times higher than in the public sector. Indirect medical expenses on transport, food and other items constituted about one-third of the total OOPE in public facilities.

The NSSO 2017-18 findings in this study are compared and contrasted to those reported in 2011-12 India Human Development Survey (IHDS) study (11). The previous study made no distinction between inpatient services and outpatient visits and reported 73.1% of the hypertensive population have been found to prefer private institutions for treatment. Our study distinguished between treatment as inpatient services and outpatient visits and found that 54% of respondents preferred private institutions for HTN-related hospitalization and 61% of respondents preferred private facilities for outpatient visits. One plausible reason could be the expansion of the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) program since 2010 at different levels of public health systems with greater thrust on NCD care delivery could be the reason for the decline in patients seeking care from the private sector. [17]

The average OOPE HTN related hospitalization among poorest quintile reported in the IHDS study was Rs. 5,834 while the richest quintile spent Rs. 7,619 on HTN related treatment in 2011-12. This study finds similar average hospitalisation expenditure in nominal terms towards HTN care in poorest quintile to be Rs 5000 (2000-12000) while richest quintile to be Rs 7550 (2510- 26200) in 2017-18.These similar expenditures over a period of time cannot be attributed to deflationary conditions and consequent decline in hospitalization expenditure in real terms, since the overall consumer price index in India has increased from 100 in 2012-13 to 146.3 in 2019-20.[18] Further, with regards to components of medical expenditure related to HTN, OOPE on medicines constituted on an average 43% and 66% of public sector hospitalisation and outpatient care respectively. This finding is much less than previous household survey findings that report 70% of OOP expenditures on medicines in India. [19] Although the availability of generic medicines in public facilities has improved in recent years, there is a need to examine thoroughly episodes of drug stock outs as well as prescription patterns for HTN drugs in public facilities.

One of the unique observations from the study is that OOP expenditure on diagnostics especially in charitable facilities was found to be substantially higher as compared to public and private facilities. One probable reason could be the transformation of the charitable and not-for-profit medical institutions, amidst the slowdown in the flow of funds from the churches in Europe, rising commercialisation of medical care and willingness to pay among middle class population for "quality' care. [20]

STRENGTHS AND LIMITATIONS OF THE STUDY

The strength of the study is that it measures the magnitude of OOPE associated with HTN care in India based on a large, nationally representative household survey. The study provides population level information about the magnitude and extent of catastrophic health expenditure due to both HTN related inpatient care and outpatient care in the Indian context. The study provides estimates on average hospitalization expenditure from societal perspective since indirect costs due to loss of wages. The results of this study pinpoint the need for strengthening public health efforts to strengthen HTN control and management programs in India to improve access to HTN-related drugs and medicines to the most deprived and vulnerable sections of the society.

The value of the study lies in its contribution towards providing cost estimates for HTN related care that can serve as inputs for economic evaluation. The cost estimates from NSSO survey on disease specific OOPE enables to be able to account for cost of management of disease condition from societal perspective. The household -based

survey provides estimates on direct and indirect medical expenditure such as transportation and food costs along with loss of income due to illness. Such estimates also can help in informing the potential cost saving in economic evaluation studies that compare HTN control and management interventions through averting CVD-related hospitalizations from patient and their carer's perspective. Limitations of the study are directly related to the features of NSSO household survey that collected data on OOPE is based on broad classification of self-reported ailments. Firstly, the survey does not provide any information about clinical presentation of HTN and its related complications. Secondly, the survey does not provide treatment cost based on standard diagnostic and treatment strategies, rather medical and non-medical expenditure on hospitalization and outpatient visits are self-reported based on recall within the reference period of 365 days and 15 days respectively. Hence, the study does suffer from recall bias inherent in the survey data. Three, the WHO recommends a 40% threshold level for non-food expenditure to define catastrophic expenditure. But this study considers OOP expenditure as a proportion of the annual household consumption expenditure since the survey does not differentiate between food and non-food consumption expenditure.

SCOPE FOR FURTHER RESEARCH

The scope of the study can be extended to conduct the OOPE related to HTN care at the sub-national and regional levels. Such an analysis would inform geographical variations and programmatic efforts by the state health administrators to address concerns over catastrophic health expenditures and its correlates and tackle the inequity gap for utilizing health facilities for NCD-related ailments.

CONCLUSION

With the increasing incidence of HTN and its related consequences and growing commercialisation of health care sector in India, high and persistent OOP expenditure remains a major public health concern. Our study finds that catastrophic expenditure due to HTN care is not common in general population, though about four out of ten households among the poorest quintile are likely to incur catastrophic health expenditure. Also, more than 50% of hypertensive population seeks care from the private sector. Those seeking HTN care in public health care facilities spend around 43% of total medical expenditure was on medicines, followed by 14% on diagnostic tests. Improving the availability of drugs and diagnostic tests within public facilities under the NPCDCS program can reduce HTN related catastrophic expenditure among the poorest quintiles.

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RESEARCH ARTICLE

UNDERSTANDING WORKPLACE SPIRITUALITY IN HEALTH CARE SYSTEMS: PRACTICE AND CHALLENGES

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ABSTRACT

PURPOSE OF THE STUDY:

The purpose of this paper is to make an enquiry into workplace spirituality in health care systems. Based on a theoretical study of spirituality and its growing importance in health care systems; workplace spirituality is discussed with doctors and elements of spirituality which are applied in treating patients are identified. The study has also explored the individual level and system level challenges while practicing spirituality through the identified elements in the health care systems.

METHODOLOGY ADOPTED:

This is an inductive form of research which involved enquiry into the existing literature of spirituality and further records the focused discussions of doctors for capturing the idea of spirituality in health care systems, identification of elements of spirituality and implementation challenges of spiritual elements in health care systems.

FINDINGS:

The idea of spirituality in healthcare systems includes the trust and belief in supreme power, peace of mind, spiritual care and identifying spirituality as an asset. Gratitude and prayers, counseling, inclusion of the yogic techniques and investment of self in the work are identified as elements of spirituality in healthcare systems. Analysis of data also implied challenges in implementation of spirituality in health care systems.

PRACTICAL IMPLICATIONS:

The findings of the study have identified the elements of spirituality in health care systems not addressed in the previous research. The present study suggests to consider the emotional labor and stress of the doctors developed in the treatment process as the role of doctors is crucial in maintaining the integral health of patients. The implementation challenges of spiritual practices in health care systems are also discussed.

KEYWORDS

spirituality, workplace spirituality, spiritual care, counseling, trust and belief, gratitude.

INTRODUCTION

Workplace spirituality and organization spirituality is often used interchangeably. Organization started talking about and accepting spirituality as an important element for the functioning of organizations late in 1990's[1] and the inclusion was because of the change in business environment from stable operating conditions to dynamic situations which required a response other than status- quo. The culture of any organization defines the way in which things are done and the Organizational strategy defines the way in which things are planned [2]. Workplace spirituality is a more subtle term and is defined by different scholars in different ways. Prior to the 1990's the word spirituality was used in close confinement with religion. In the present scenario, spirituality is gaining importance in health, management, counseling, arts, nursing, education, business and psychotherapy [3]. This paper discusses workplace spirituality with reference to health care systems and the growing demand of spiritual care from health care providers while treating patients. Spiritual care given by doctors is an important element of workplace spirituality in health care systems [4]. The individual spirituality of doctors is addressed by individual ideas of spirituality which are practiced by doctors in treating patients. This paper explores the idea of spirituality, elements of spirituality and challenges for implementation of spirituality in health care systems.

LITERATURE REVIEW

Workplace spirituality is defined as the wholeness with which individuals integrate their spirituality with work [2] and can be studied at individual and organizational levels [5]. At the individual level, spirituality is related to the ultimate purpose of life of an individual and the ways in which individual live to fulfill the ultimate purpose [6]. The concept of spirituality is also related to meaningful work which is done in context of the external and internal environment of an organization and is supposed to bring nourishing affect in the inner life of people in the organization [7]. The inner life is nourished by meaningful work [8] and workplace spirituality affects many other dimensions of an organization [9]. Spirituality at workplace leads to high individual performance [8] and is found to be positively related to team performance [10]. A positive affect of workplace spirituality is seen on organizational performance [11], organizational commitment [13], job satisfaction [12] and team satisfaction [10].

With unpredictable working environments and increasing use of technology, the need of spirituality within the workplace has become more predominant [13] and is important in health care [14]. The concept of spirituality is more valued in health care systems [15] because patients suffer not only physically but also mentally and spiritually which should be addressed with elements of their care. Spiritual care involves the faith or spirituality of the patients being included by the doctors in treatment and helps in bringing person- centered approaches [16] in treating patients. There are certain barriers associated with giving spiritual care to patients suffering with terminal illness [17] and lack of spiritual care training is found to be the predominant barrier for nurses and doctors in imparting spiritual care to patients. Spiritual care training program for health care providers is effective in treating patients [18]. Different models have been proposed for integrating spiritual care in health care systems. Each person involved in treating the patients should address the physical, emotional, social and spiritual needs of the patients and such an approach of treating the patient as a whole person is the basis of whole person model of spiritual care [17]. The integration of spiritual care in health care systems is also essential to support patients with feelings like loss of hope, emotional and spiritual distress with this process of approaching the patient forming the basis of existential functioning model [17]. Conversely, an open pluralism view on spiritual care addresses the cultural and religious needs of the patients. Literature has shown that a body's stress responses are reduced for people who are involved in activities like prayers and other religious service activities [19].

METHODS

RESEARCH DESIGN AND DATA COLLECTION

The current study is an enquiry into which the previous theoretical concepts regarding workplace spirituality in health care systems is inferred. This is an inductive form of research. In order to reach to a conclusion; workplace spirituality is studied right from the beginning when the term spirituality was associated only with religion to the stage when organizations started including spirituality as an important construct for their functioning and accepted that spirituality within the workplace is needed with the change in the environment of the organization. In the context of understanding the plausible challenges of practicing spirituality in health care systems the focused discussion regarding the study was done with ten doctors.

The discussions helped in identifying the elements of spirituality in health care systems and understanding the challenges faced by doctors and staff while including spiritual approach in treating patients. Table 1 gives the profile of the ten respondents. In this study, the informed oral consent was obtained from the participants prior to the participation in focused discussion. In this study, qualitative data in the form of recorded statements is presented in the result section without disclosing the identity of the respondents.

TABLE 1: PROFILE OF RESPONDENTS

Respondents (R)	Age (Years)	Experience (Years)	Medical Specialisation
Respondent 1	31	9	Dermatologist& Hair transplant
Respondent 2	31	5	Pediatrician
Respondent 3	50	22	Gynecologist
Respondent 4	29	3.5	Pediatrician
Respondent 5	38	11	Diabetologist
Respondent 6	40	10	Gastroenterologist
Respondent 7	44	12	Gynecologist
Respondent 8	41	10	Neurologist
Respondent 9	40	11	Cardiologist
Respondent 10	43	12.5	Neurosurgeon

The name of respondents and their association with hospitals is kept anonymous which supported the respondents to respond without any pressure. The statements of the discussion were recorded in written form. On an average the discussion lasted for two hours with each of the doctors individually. The concept of spirituality in health care systems was discussed personally with each of the doctors. The discussion was initiated by meeting one of the doctors personally for exploring the concept of spirituality in health care systems. The doctor was allowed to take the lead during the discussion to get an in-depth exploration of the topic. This also enhanced the process of capturing the concept of spirituality in health care systems as the doctor suggested the doctors associated with different health care systems which can be approached to make an enquiry into the subject. The study has taken in consideration to choose doctors from multiple specializations and from multiple hospitals so as to get a clear idea of concept of spirituality in different health care systems. After the discussion the open ended questions were discussed with the doctors individually in written form making use of online resources. The discussion was done with all the doctors individually by one of the authors. The doctors were encouraged to share the individual experiences if they felt it necessary. The discussion was initiated with the exploration of the individual idea of spirituality and included the following themes.

Broad theme for the focused discussion

- What is your view of spirituality in health care systems?
- How do you apply spirituality in treating patients?
- What challenges do you face while applying spirituality in healthcare systems?
- What are the elements of spirituality according to you?

DATA ANALYSIS

The discussions of individual respondents were assembled together by two researchers. The statements conveying the same meaning were assigned to respective categories and the process was confirmed with the theoretical perspectives from the literature review. Both the researchers worked independently in analyzing the data and independently developed their own statements. The grouping of statements was done under three categories- 1) The idea of spirituality in health care systems, 2) Spirituality in practice and 3) Implementation challenges. The independent analysis was shared with the third researcher. The three researchers then discussed the independent sets of statements comparing them with theory and keeping track of any new parameter stated by the respondents. The data gathered and theory was continuously compared during the process of data collection and during the analysis.

Results

All the respondents agreed that spirituality in health care system is an important element and provided valuable and interesting insights on spirituality in healthcare systems. The insights emerged from the practical situations and experiences of the respondents who are active practitioners in health care systems. The findings are divided into three sections namely, 1) Idea of spirituality in health care systems, 2) Spirituality in practice and 3) Implementation challenges.

IDEA OF SPIRITUALITY IN HEALTH CARE SYSTEMS

Trust and belief in Superpower

80 % of doctors in this study voluntarily expressed that trust and belief in a superpower is a source of strength for doctors in dealing with critical situations. This is clear from the following statement:

"We also need support of super power (God) in critical situations and during health care." (R1)

Peace Of Mind

80 % of doctors interviewed relate spirituality with peace of mind and emphasized the importance of maintaining a peaceful state of mind during the treatment process as the role of the doctors is very important in giving spiritual care to patients and treating the patients as a whole being. One of the findings from the analysis of data is recorded in the following statement:

"Peace of mind is also very important in maintaining brain equilibrium." (R1)

The above statement from the respondent makes the fact clear that the doctors who utilizes their skills to restore patients health [20] should have the essential tools for maintaining their own peace of mind. Thus, doctors relate spirituality with the peaceful state of their mind.

Spirituality as an asset:

40 % of doctors in this study considered spirituality as an asset and supportive for speedy recovery from illness. This is clear from the following responses:

"Spirituality is the biggest asset for everything and so is in health care system. There is a strong need for joining spirituality to health care system and its research." (R2)

"Spirituality will definitely help faster recovery from illness." (R5)

Care versus Spiritual Care

Physically and mentally distressing situations require the management of spiritual and religious beliefs of both patients and doctors [21] The analysis of data reveals that 60 percent of doctors were aware about maintaining their own individual spirituality and believes that spirituality is inherent in the nature of care. This is clear from the following statement:

"In my view any care needs spirituality within" (R4)

The element of care practiced by doctors complements the treatment approach. This is recorded in the following statement:

"When you care people as they are child of God, you are able to do justice to their treatment" (R4)

SPIRITUALITY IN PRACTICE

Based on the analysis of the study's data the following elements of spirituality are identified.

Gratitude and Prayers

90 % of doctors voluntarily expressed prayers and gratitude as an important element of spirituality. Analysis of data shows that the practice of spirituality in health care systems includes the touch of supreme power as an imperative element. This is validated by the following statement:

"I always feel that everything is running by some supreme power and there is touch of God in everything. So while treating patients I always remember God every second and treat by taking name of my God. Beyond my

treatment; blessing and love of God which treat my patients." (R2)

Prayer is a way of practicing spirituality by the doctors while handling critical cases and surgeries. The application of spirituality is recorded in the following response.

"Taking the name of God before doing any big surgeries" (R10)

A review of the literature has shown theoretical validation about the role of prayer in reducing the stress response of any person. Prayers have been identified as the coping strategies for nurses in dealing with stress [19]. Analysis of data has also recorded prayer as a strong way and an imperative element while practicing spirituality in health care systems.

"I practice spirituality only by Prayers while treating patients" (R3)

The above statement shows that prayer alone has a strengthening effect that helps doctors in maintaining their spiritual state while treating patients. From analyzing the data prayer was also found as a source of strength and confidence for doctors while treating patients. This is recorded in the following statement:

"The confidence that the person will become alright. It comes to me through Prayers. And miracle happens. We do our best and leaving the rest on God." (R3)

Expressing gratitude is another element that is identified in data analysis as an important element in practicing spirituality in health care systems. This is recorded in the following statement:

"Gratitude to God for everything and taking care of everything." (R6)

Counseling

Data analysis implies counseling of patients as an imperative element of spirituality in health care systems. All the respondents voluntarily discussed the importance of counseling as an imperative element of spirituality. Counseling is a broad term which includes communication, listening and moving towards the approach of treating more than the biology of the person. Counseling is helpful not only in dealing with issues regarding diagnosis, treatment and care but also helpful in issues regarding health awareness, patients perceptions, disease prevention and health promotion.[22]. The importance of counseling is clear from the following statement:

"Spirituality is everywhere- talking to patients, doing their work, feeling their and their families feelings. Find spiritual connection in everything." (R2)

"Counseling of patients is an important element of spirituality" (R7)

The above statement shows that counseling is required for both the patients and family members of the patients. Analyzing the study's data shows that confidence of a patient and family members is built through counseling.

Inclusion of Yogic techniques

Analysis of the data inferred that 40 % of respondents have discussed the inclusion of yoga techniques which is an imperative element of spirituality in the treatment process. There is a positive association of yoga practices with spirituality and yoga practices enhance different aspects of spirituality such as peace, compassion, faith, hope, meaning and purpose in life [23]

This is shown in the statement given below:
"Yoga, meditation, sitting quietly, relaxing with eyes closed are important elements of spirituality." (R5)

"I ask the patients practice yoga and meditation" (R5)

These statements validate the integral approach of healing body, mind and intellect.

Investment of self in the work- Evolution, Satisfaction and Love

40 % of doctors identified self evolution, satisfaction and love as an outcome of the fulfillment of their duty. The result of data analysis is shown in the following statement:

"Curing the ill patients gives you a sense of satisfaction and you move one step toward God." (R4)

The above statement is indicative of the satisfaction that comes when the respondent is able to fulfill the duty and explores evolution of the self which can be considered as an element of individual spirituality.

IMPLEMENTATION CHALLENGES

The implementation of spiritual practices in health care systems are affected by challenges both at the individual and the system levels.

Individual level challenges:

The individual level challenges identified in this study are 1) lack of spiritual connection, 2) limitations of doctors in treating terminal illness, 3) challenges faced in building confidence of patients and 4) reluctance of patients in adopting supportive techniques for treatment. The statements by respondents are stated in the following section.

The limitation of the doctors in treating terminal illness is recorded in the statement given below.

"Sometimes there are diseases which we can't help with, or give relief to patients" (R1)

"Sometimes mistakes do happen from us" (R1)

The demanding roles of doctors leave little room for mistakes and doctors have to handle a range of emotions while treating patients specially in critical cases and terminal illness. The emotional labour of people involved in health care processes can be very high and, as a result, doctors are faced with stress. The previous studies have noted positive correlation of emotional labour with emotional exhaustion, anxiety and physical and mental disorders.[24] The theoretical basis from the literature reviewed is more concerned with the spiritual approach which is patient centric. The previous studies have noted that spiritual care interventions which are patient centric help patients to adhere to healthy lifestyles [25] and keeping patients at the center of care in patient centric care models helps in supportive spiritual care interventions [26]. The stress and emotional labor of doctors should also be considered because patients look upon doctors for motivation and regaining health.

Another individual level challenge is the lack of the spiritual connection. This is given in the statement below:

"Challenges are that many people don't find spiritual connect with health systems, they think only work helps."(R2)

Another statement that infers the variation in the spiritual inclination and insights in doctors is given below:

"The inclination and insight towards spirituality is an individual factor. Some doctors are naturally inclined towards spirituality and takes own initiative to counsel the patients and family of patients." (R6)

Doctors also face challenges in building the confidence of patients which is an important factor for recovery. This is recorded in the statement given below:

"Challenges are faced in building confidence in patients which is the most important thing for recovery and to fight against illness. If person looses confidence no treatment is helpful." (R3)

The irregularity of patients in including the alternative techniques suggested by doctors is also one of the individual level challenges in implementing spirituality in health care systems.

"People don't practice yogic practices regularly this may be due to laziness or time constraints." (R5)

System level challenges:

At a system level implementation of spiritual practices is affected by following factors.

Limitations based on roles and work schedules

The doctors irrespective of having inclination and insights into spirituality stated the lack of required time to implement such practices as a result of hectic work schedules and stated they still try to include spiritual approaches in treatment, as they have spiritual insights within them before starting career as doctors. Because of difference in roles and work schedule some doctors include spiritual approach in treatment as a choice.

Patient to Doctor Ratio

When patients to doctor ratios are high then the doctors are unable to pay much attention to spiritual needs of each patients and it becomes a challenge to implement spiritual practice in health care systems.

Organized Department and Teams

The study found that most of the hospitals do not have dedicated departments or teams to manage the spiritual needs of the patients. Some medical colleges have departments for yoga and meditation for medical staffs and patients which provide facility to doctors and patients for coping stress and can act as a counseling point for patients. The doctors stated that the presence of these

facilities can help in effective time management by collecting the data of individual patients referring to which doctor can get in-hand ideas about the mental, emotional and spiritual state of patients and the data can be utilized to give the required spiritual intervention to patients.

The doctors stated that the presence of these facilities can help in time management by collecting the data of individual patients referring to which doctor can get in-hand ideas about the mental, emotional and spiritual state of patients and the data can be utilized to give the required spiritual intervention to patients. Some medical colleges have the departments for yoga and meditation for medical staffs and patients although there are very few of these services.

Routine of Doctors

The doctors interviewed work overtime and the working conditions and the demands for the availability of the doctors is uncertain which leads to lack of proper sleep and irregularity in the timings of the food. Doctors stated that they still try to make the routines regular. The previous studies have noted that short time frame of doctors to provide care is a barrier in imparting holistic care to patients. [27]

DISCUSSION

Individual spiritual insights of people have an impact on their organizational lives [28]. The study has found that the doctors have their own individual insights about spirituality which they inculcate during the process of treatment and interaction with the patients. Complementary alternative medicine like yoga and meditation is identified as an element of spirituality that can be included in the health care systems but the presence of separate departments is in few premium medical schools. Spiritual practices in health care systems are required not only for patients but also for doctors. The spiritual elements like prayers, counseling and gratitude are practiced by doctors during treatment of patients. The emotional labor and stress of doctors also need to be addressed which specify the need of separate departments for spiritual interventions in health care systems that collect the data from patients or the family members of patients that can be made available to doctor the communication and counseling provided by doctors and other medical staff to patients can be enhanced through this information. The other important issue to be discussed is that these departments can also impart training to doctors and other medical staffs to cater to the spiritual need of patients as there can be differences in the religious and spiritual beliefs of patients and doctors. In addition to these, such departments should also provide modules of specific trainings for doctors and medical staff to maintain their own peaceful state of mind. This can be done by providing a variety of modules which the doctors can choose based on their requirements or religious and spiritual beliefs. For example, there are multiple options of mindfulness techniques which are practiced by different religions and are originated in different countries as well. Multiple options in modules related to spiritual interventions have to be included based on the interest and choice of doctors. This can lead to a better understanding of not only oneself but also the understanding of the beliefs of the others.

STRENGTHS

The study has identified the elements of spirituality in health care system, has noted the implementation challenges and has discussed the possible solutions.

LIMITATIONS

The study can be further expanded and carried out on a larger population of health care professionals.

CONCLUSION

The present study identified the important elements for implementing spirituality in health care systems. The neglected aspects of spirituality in previous research are also addressed. The study has also explored the individual and system level challenges in implementing spirituality in health care systems. Spiritual elements such as prayers give confidence to doctors and counseling as a spiritual element gives confidence to patients. Previous research had noted the patient centric approach of practice of spirituality, but this approach neglects the stress experienced by doctors. The present study also addresses this neglected factor of maintaining the peace of mind of doctors who are acting as a healing agent for patients. This can be achieved by separate departments of alternative therapies like yoga and meditation in hospitals which can act as departments of holistic health for both doctors and patients.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

CONSENT FOR PUBLICATION

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

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RESEARCH ARTICLE

PHYSICIANS' ANTIBIOTICS PRESCRIBING PATTERNS FOR COMMON DISEASES AND KNOWLEDGE ON ANTIMICROBIAL RESISTANCE: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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ABSTRACT

PURPOSE:

This study was conducted to assess the Knowledge, Attitude, and Practice (KAP) of patients or their caregivers, and prescribers of antibiotics toward antimicrobial resistance in Bangladesh.

METHOD:

This was a mixed-method research study. Data were collected from pre-determined study areas using a sample survey of 583 respondents, 11 Focus Group Discussions (FGDs), 11 Key-Informant Interviews (KIIs), and 11 In-depth Interviews (IDIs). A scale of 11 points was used to measure attitudes.

RESULTS:

About 59% of the respondents (patients or carers) were between 1 to 20 years old. The difference of age of patients by sex was found statistically significant at .001 level (x2 = 39.82, def. = 8; Cramer's V = .49). About 25.7% of the respondents visited an MBBS doctor and 8.1% visited a BDS dentist, and 66.2% went to traditional healers and the pharmacy. Men take more antibiotics for treatment purposes compared to their female counterparts. The difference between men and women, with regard to the treatment of common diseases, was found to be statistically significant. (X2= 29.82; Cramer's V= .41, def. = 7; Sig; P= < .02). Usually, new graduate doctors and traditional healers prescribe antibiotics of longer duration. The duration of prescriptions for antibiotics and type of the physician was found statistically significant (x2= 19.22; Cramer's V= .28, def. = 8; Sig; P= < .02). Physicians prescribed common antibiotics for upper respiratory tract infections (26%), cold and fever (21%), diarrhea (12%), STDs (9%), HTN (8%), UTIs (7.5%), diabetes (5%), and lower respiratory infections (4%). Cephalosporin (31.4%), macrolides (27.6%), quinolones (17.8%), metronidazole (13%), and penicillin (10.10%) were used. About 65.8% of the caregivers did not have any knowledge about antimicrobial resistance and the negative effects of the overuse of antibiotics.

CONCLUSION:

The majority of the respondents had poor knowledge of antimicrobial resistance and the negative effects of the overuse of antibiotics. A community-based awareness program was found important to create awareness of antimicrobial resistance and the negative effects of the overuse of antibiotics.

KEYWORDS

antimicrobial resistance, traditional healer, KAP, antibiotics, Bangladesh.

INTRODUCTION

The use of antibiotics is alarming as about 50% of the drugs are prescribed without following any health guidelines [1]. These unhealthy and inappropriate practices related to antibiotics have created a major public health threat to the healthcare system and overall development of the country [2]. The reasons for antimicrobial resistance relate to inappropriate antibiotic prescribing by traditional physicians and healers, self-medication and uncontrolled use of antibiotics in agriculture and livestock [3]. The use of antibiotics has become a serious public health issue in developing countries due to lack of knowledge of there use, the absence of healthcare facilities and doctor visits, and the lack of strong regulations to control use [4]. The World Health Organization has played a key role in initiating to aware its member countries of antimicrobial resistance and developing a global action plan on Antimicrobial Resistance [5]. The aim of the action plan has been to minimize the use of antibiotics and antimicrobial agents to build a healthy earth.

Bangladesh has made remarkable achievement in reducing the child and maternal mortality rates through vaccination [6] program but the country remains weak in regulating physicians and traditional healers to stop prescribing inappropriate antibiotics without proper clinical tests and other relevant examinations. Patients' poor socioeconomic condition, the high cost of clinical examination, and the distance of treatment facility locations are often assigned as the causes of prescribing antibiotics by physicians in Bangladesh. Since healthcare providers' and patients' behaviors strongly influences the use of antibiotics, we have considered it important to understand the associated factors related to this menacing condition to develop an effective strategy to minimize the inappropriate prescribing and using antibiotics in the densely populated mega-city of Dhaka, Bangladesh.

There are many unlicensed drug stores, drug sellers, and drug buyers in the country who do not care about the dosage and intake duration of antibiotics. These practices are assumed as contributing to the rise of antimicrobial resistance levels among the population despite the Bangladesh government's adoption of the World Health Organization's antimicrobial resistance global action plans to reduce the use of antibiotics. Therefore, we have tried to understand the KAP and behaviors of patients, prescribers, buyers, caregivers, and sellers about the antimicrobial resistance.

METHOD

The study used mixed-method techniques whose data were collected from pre-determined study areas. The detailed study methodology is set out in the following sections. Four data collection techniques- Sample Survey, Focused Group Discussion (FGD), Key-Informant Interviews (KII), and Informal Discussion (ID) were used for the study.

THE SURVEY:

Data Collection Tools, Locations of the Study, and Respondents:

A sample survey was conducted for collecting quantitative data. Based on the literature review, and objectives of the study, a structured interview schedule was developed. It had five focused areas, which were: a) socio-economic and demographic characteristics of respondents, b) KAP of patients or their caregivers, and physicians on antimicrobial resistance c) knowledge about antibiotics, d) knowledge of common diseases, and e) people's awareness of healthcare facilities of antimicrobial resistance. We had developed a well-designed open ended and closed ended questionnaire. Knowledge attitude and practice questionnaire were included in the questionnaire and scoring of KAP were done. The

questionnaire was designed to capture five important aspects of KAP among the population in the study area. This includes respondents' attitude, knowledge about antimicrobial resistance and related to common diseases, risk factors, treatment by antibiotic and usual practices in daily life. To measure the levels of various aspects of Knowledge, Attitude and Practice (KAP), the questionnaire was divided into three distinct modules. In each module, relevant questions were asked from the respondents such as in Knowledge module the emphasis was given to assess the level of knowledge of respondents for antimicrobial resistance and common diseases. To assess knowledge, attitude and practices, 17, 10 and 16 questions were asked respectively. The interview schedule was pretested and revised on the recommendations of the patients, their caregivers, healthcare facilities personnel, and physicians. The study was conducted in 11 healthcare-providing locations of Dhaka city corporations. The respondents were patients (or guardians of those patients who could not talk or provide the correct information) or their caregivers who attend for treatment purposes in the healthcare facilities. All data collectors were trained for four days on interviewing techniques, rapport building with a respondent, and checking the consistency of responses. The principal investigator constantly monitored the field data collection.

The Sampling of Survey Respondents and Data Analyses:

The selection of samples was a difficult task, as there was no proper list of potential target populations. Hence, we decided to use systematic random sampling in 11 popular private hospitals or clinics in the Dhaka city corporation areas. The sample size of the study was determined using a formula [7]. According to this formula, the sample size should have been 384 but with the survey being conducted in different locations of the hospitals or clinics, the number of samples was increased by applying the 1.5 design effect. Thus, the final samples stood at 576. Since the samples required to be distributed equally among the 11 different locations, 7 more samples were added to 576 making it a total of 583. Therefore, 583 respondents were divided among the 11 sites with 53 respondents in each site.

All completed interview schedules were edited before inserting them into the computer. Data were analyzed with the help of the SPSS version 22 [8] statistical package. Univariate, bivariate, and multivariate analysis techniques were applied to the survey data. Efforts were made to go beyond simple descriptions to identify the factors affecting the antimicrobial resistance and the treatment of common diseases.

Qualitative Data Collection Techniques, Sampling of Respondents, Research Instruments, and Data Analyses:

Qualitative data were collected through three techniques—Focused Group Discussion (FGD), Key Informant Interview (KII), and Informal Discussion (ID). We conducted interviews with patients or their caregivers, allied health personnel, and policymakers. A total of 11 FGDs were conducted with patients or their caregivers, 11 IDs with allied health personnel, and 11 KIIs with health policymakers. Three separate interview guides were prepared for three qualitative data collection techniques, which were shared with public health and pharmacologist experts for their reviews. After getting back their feedbacks, the interview guides were finalized. Data collectors were oriented on the techniques of qualitative data collection and recording. All interviews were transcribed within 24 hours. Transcripts were read and coded on the basis of the objectives of the study by the principal researcher. Similar thematic codes were interpreted to link with the main objectives of the study. Qualitative data were analyzed manually by the principal researcher. Both quantitative and qualitative findings are presented together to supplement each other if need be.

METHOD OF DATA COLLECTION, QUALITY CONTROL, AND DATA MANAGEMENT:

The survey data were collected over a period of 30 days from January 2022 to February 2022. A total of 5% of the collected quantitative data was re-checked by the research team to ensure the quality and the accuracy of the survey data. The principal investigator was present in some qualitative interview sessions and double- checked the transcripts to ensure the quality of data.

ETHICAL CONSIDERATION:

Ethical clearance for the study was obtained from Ethical Review Committee (ERC) of Primeasia University (ERC no-2022/42). Written and verbal consent was obtained from each participant after explaining the purpose and the nature of the study. Participation in the study was on a voluntary basis and participants were informed of their right to quit/refuse their participation at any stage of the study if they did not want to participate.

RESULTS

Results showed that 52.5% of the respondents are female. Certainly, many of them are heads of the family and caregivers of their children. It could be that the interview of the respondent female took place in hospitals or clinics when most of the male family heads were away from home for occupational purposes. Thus, many female family members substituted their male family members for giving treatment information. Since women are overrepresented as respondents, a question may arise about the accuracy of data as women are often considered less informed. In fact, women possibly know more about the health of the family members as they are the most important persons to give non-medical care to sick family members. Therefore, their inclusion may positively affect the quality of data as they know family matters no less than their male folks. The mean age of the respondents was 14±1.05 and nearly 59% of the respondents are between 0 to 20 years old, which means the overwhelming majority of the respondents are of middle or young age who are suffering from different diseases. The age structure indicates that young or middle-aged people use antibiotics from childhood for common diseases and this may lead to long term antimicrobial resistance in their bodies. This is an alarming condition for Bangladeshi young and middle-aged people because it may increase the risk of health problems among them for a long time. Also, the patients were mostly female.

TABLE-1: PERCENTAGE DISTRIBUTION OF AGE OF THE RESPONDENTS (RESPONDENTS OR THEIR CARERS) BY SEX

Age categories	Male (n=277)	Female (n= 306)	Total (n= 583)
	Percentage	Percentage	Percentage
0-5 years	23.80	-	23.80
6-10 years	16.0	-	16.00
11-20 years	7.70	3.30	11.00
21-30 years	-	8.10	8.10
31-40 years	-	3.90	3.90
41-50 years	-	6.00	6.00
51-60 years	-	9.90	9.90
61-70 years	-	15.10	15.10
71-80 years	-	6.20	6.20
Total	47.50	52.50	100.0
x2= 39.82; Cramer's V= .49, df = 8; Sig; P= < .001			

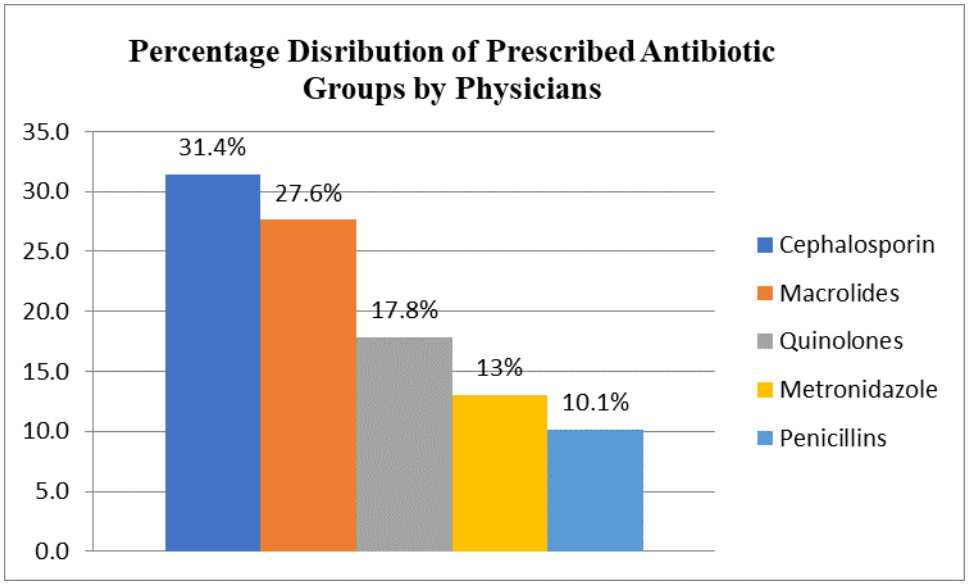
In response to the question of where the respondents sought treatment, 25.7% of the respondents opine to go to a graduate medical doctor, 8.1% attend graduate dental surgeons, and 66.2% go to traditional healers and pharmacies. Usually, the patients visit qualified doctors after getting the wrong treatment from traditional healers and pharmacies. This might be for lack of access to urban health facilities and the cost of treatment. Although common diseases are not extremely harmful to patients, about 33.8% of the patients seek treatment from qualified physicians while 66% go to the wrong persons like quacks and traditional healers. Sex-wise distribution of data reveals that the majority of female patients go to quacks, traditional healers, and informal healthcare persons like pharmacy salesman. This difference between men and women regarding the treatment of common diseases was found to be statistically significant. (X2= 29.82; Cramer's V= .41, df = 7; Sig; P= < .02). This means women do not get an equal opportunity of timely treatment from qualified physicians like men.

TABLE-2: PERCENTAGE DISTRIBUTION OF DURATION OF PRESCRIPTION OF ANTIBIOTICS BY TYPES OF PHYSICIANS

Types of Physicians	5 days	7 days	10 days	12 days	14 days	20 days	Total
	%	%	%	%	%e	%	%
MBBS	1.9%	7.2%	4.8%	0.2%	11.2%	0.3%	25.6%
BDS	0.5%	1.2%	2.2%	0.0%	4.1%	0.0%	8.1%
Pharmacy man	3.3%	20.8%	16.7%	0.3%	25.1%	0.0%	66.3%
Total	5.7%	29.3%	23.8%	0.5%	40.4%	0.3%	100.0%
x^2= 19.22; Cramer's V= .28, df = 8; Sig; P= < .02							

Earlier we have mentioned that a significant percentage of female patients seek treatment from pharmacy salesmen. Financial constraints, distance of the health care facility centers, and lack of knowledge are found to be related to seeking treatment from traditional healers according to FGD data. The main concern here is that the traditional healers prescribe long duration antibiotics than do qualified physicians perhaps because of having no formal training on it. These kinds of practices are public health threats for poor the urban women, and thus it may create a permanent health hazard in society. A cross table between the duration of prescribed antibiotics and the types of physicians prescribed them are found statistically significant (x2= 19.22; Cramer's V= .28, def. = 8; Sig; P= < .02) (Table 2). The majority of the respondents use antibiotics primarily for upper respiratory tract infections (26%), followed by cold and fever (21%), diarrhea (12%), STDs (9%), HTN (8%), UTIs (7.5%), diabetes (5%), lower respiratory infections 4%), and other diseases (7%). The number of antibiotics and duration of the prescribed drug are found statistically significant (x2= 16.78; Cramer's V= .35, def. = 6; Sig; P= < .003).

FIGURE 1: ANTIBIOTIC GROUPS PRESCRIBED BY PHYSICIANS



The highest prescribed antibiotic group is cephalosporin (31.4%), followed by macrolides (27.6%), quinolones (17.8%), metronidazole (13%), and penicillin (10.10%) (Figure-1). In order to make effective strategic planning, it is essential to know the level of respondents' knowledge of antimicrobial resistance and antibiotic use. About 34.2% of respondents know about antimicrobial resistance and its relationship with the use of antibiotics, but 65.8% do not have any knowledge about it. The above facts indicate that the majority of the respondents do not have adequate knowledge of the negative aspects of the overuse of antibiotics.

QUALITATIVE FINDINGS:

The majority of the FGD participants have opined that they do not know about antimicrobial resistance and for the first time they have heard about it in a FGD session. The KII participants have expressed their concerns about the poor level of knowledge of respondents about antimicrobial resistance and wrong attitudes toward the overuse of antibiotics. Therefore, most of the discussants feel that non-physicians shouldn't prescribe antibiotics based only on patients' oral statements. Participants of FGD and KII suggest antimicrobial resistance training for the health workers to help increase their knowledge about it and to change their attitudes toward prescribing antibiotics.

Assessment has been made through IDs to know what promotional activities would help changing health behaviors of people and motivate them to attend qualified doctors. Participants have suggested conducting awareness programs like courtyard meetings, disseminating information about negative health effects of antibiotic use, and hanging posters. Most of the participants of FGDs and IDs have said that they do not see antimicrobial resistance programs on TV or heard about them on the radio. Participants have also mentioned that service providers need specific training on antimicrobial resistance and the use of antibiotics to create awareness among the patient. The majority of FGD and ID participants do not have good knowledge of antibiotic drug and the duration of their use. Usually, they do not know about the regulation of antibiotics control and the community people are not aware of using antibiotics in the agriculture and animal husbandry sector.

Although the majority of FGD and ID participants believe that a long dose of antibiotics helps them to recover from their infection but do not know about its long-term side effects. Finally, they have opined that the awareness program on antimicrobial resistance and antibiotics at the community level should be multi-dimensional. The service recipients and community people believe that such an awareness campaign will improve the health status of the urban population, particularly the poor, women, and children.

DISCUSSIONS

Both quantitative and qualitative data was collected for the study. The majority of the respondents are young and middle-aged and a few are older. The primary goal of the study was to measure the KAP of the people about antimicrobial resistance and the trend of antibiotic use for the treatment of common diseases in Dhaka city. Nearly 59% of the respondents (or carers) are between 1 to 20 years old, which means the overwhelming majority of the respondents are children and young adults suffering from different diseases. The age structure further indicates that young or middle-aged people use antibiotics at their early ages for the treatment of common diseases and this may in the long run cause antimicrobial resistance in their bodies. It is a matter of serious concern for the vast majority of the patients (66%) as they easily collect antibiotic drugs from the pharmacies or local quacks. This could be for lack of access to urban health facilities and high cost of treatment. Similar findings are also reported by Palash et al., [9] who reveal that 65% of the women of Bangladesh seek treatment from the informal sector like pharmacy salesmen or quacks.

These results indicate that women even in urban locations are not free to select a qualified physician and primary health care professionals. The economic barriers, negative family attitude to quality treatment, distance of the health care facilities, and lack of knowledge are the causes of seeking services of a pharmacy salesman or a quack instead of qualified physicians. Since these groups of prescribers and traditional healers do not have any formal degree or training in antibiotic prescribing, they are probably causing serious health problems in society. This has been reflected in a cross table, which finds a significant relationship between types prescribed antibiotic drugs and kinds of physicians. The alarming fact is that the majority of the respondents use it for the cure of simple illnesses like upper respiratory tract infections, colds and fever, diarrhea, STDs, HTN, UTIs, diabetes, lower respiratory infections, and other diseases. Earlier similar findings were also reported by Noor et al., [10] which mean over the last 7 years no major change has taken place in the behaviors of patients in Bangladesh.

Our survey findings are consistent with our qualitative findings as both sets of data show that the majority of the respondents have demonstrated little or no knowledge of antimicrobial resistance. In fact, many have first time heard about it from some FGD and KII participants. However, having heard about it, they have expressed concerns for the poor knowledge of users of antimicrobial resistance and the consequences of the overuse of antibiotics.

Although most of the respondents know very little about the negative effects of indiscriminate use of antibiotics and regulations of antibiotic control, know the names of common antibiotic drugs, such as cephalosporin, macrolides, quinolones, metronidazole, and penicillin. Respondents know these names because these are common antibiotics that are prescribed by the physicians and others. The community people are also not aware of the negative effects of using antibiotics in the agriculture and animal husbandry sectors. The study findings based on qualitative and quantitative data suggest the need of developing an effective strategic plan for addressing the antimicrobial resistance and negative effect of the overuse of antibiotics. To implement the newly developed program, there should be campaigns to make people aware of the negative health effect of antibiotic use through courtyard meetings and hanging posters.

CONCLUSION

The study reveals that both qualified doctors and traditional healers prescribed antibiotics for common diseases in urban areas. Respondents have poor knowledge of antimicrobial resistance and the negative effect of the overuse of antibiotics. The study suggests a strong community-based awareness program to make people aware of negative effects of indiscriminate use of antibiotic drugs.

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RESEARCH ARTICLE

IMPROVING THE RECRUITMENT AND RETENTION OF HEALTHCARE PROFESSIONALS IN RURAL AREAS: EVIDENCE FROM THE MEDICAL DOCTORS OF SIX DISTRICTS OF INDIA

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ABSTRACT

BACKGROUND:

The Human Resource in Health (HRH) crisis is one of the most critical constraints to achieving health and development goals. In this study, the WHO's recommendations were used to highlight the health workforce issues in remote and rural areas with a prime focus on four major policy domains: education, regulatory, financial incentives, and professional and personal support.

OBJECTIVES:

Medical doctors are one of the essential frontline health workers for primary health care in rural India. This study adopted World Health Organization's (WHO's) human resource policy framework to evaluate doctors' responses in understanding the recruitment and retention of medical doctors in rural areas.

MATERIALS AND METHODS:

A cross-sectional, descriptive study was conducted in the rural and remote areas of Odisha state, India. A multistage sampling procedure was used to select the participants, who were all government medical doctors working in rural and remote locations. The primary outcome measure is percentage responses using WHO's Human Resource policy framework.

RESULTS:

Medical doctors working in rural and remote areas perceived the practice as challenging. They were mainly least satisfied with the items asked in the professional and personal support domain. However, more than half of the doctors (56.7%) are eager to work in remote and rural areas for the next three years.

CONCLUSION:

Public health administrators and policymakers should create an enabling environment and design interventions encouraging doctors to stay in remote areas. Most importantly, this includes a political and financial commitment to achieve targeted interventions.

KEYWORDS

Intention to stay, education, regulation, financial incentives, professional and personal support, rural areas.

INTRODUCTION

The world is witnessing a shortage of medical doctors, especially in remote and rural areas, which limits access to primary healthcare services. [1] The World Health Organization (WHO) has recognized human resources for health (HRH) as a significant challenge globally and, hence high priority area for intervention. [2] In 2013, the estimate showed a shortage of about 17.4 million global health workforces, of which 2.6 million are physicians worldwide. [3,4]. It is estimated that more than 44% of WHO member states do not meet the criteria of the WHO standard of one doctor per 1,000 people. [5]

India, a low and middle-income country with a population of 1.2 billion, faces a scarcity of medical professionals. [6] Many trained doctors leave India to work abroad, and the remaining prefer to work in urban and city areas. This results in an uneven distribution of physicians in rural versus urban areas in India. [7] The 2016 report on rural health statistics in India indicated that there is a shortfall of around 11.6% of physicians at primary health centre (PHC) and 81.2% of specialist doctors in the community health centres. [8,9]

A study in an industrialized country revealed that inadequate housing facilities, lack of children's education, social isolation, poor rural infrastructure, lack of career development, and fewer incentives were major barriers to working in rural areas. [9,10] In many studies, issues like electricity and drinking water facilities, financial incentives, and insufficient resources were primary deterrents for doctors to work in rural areas. [8,9,10]

Different countries have several strategies for retaining doctors in rural areas, which include financial benefits and non-financial benefits (such as education facilities for children, living condition improvement, and career growth opportunities). [10] The Indian government has also made numerous efforts to attract doctors to rural areas, such as the provision of rural incentives [11], preferential education for post-graduation studies after working a fixed period in rural areas [12], and compulsory field experience, and rural service after the completion of medical studies. [9, 12, 13] Further, limited research has been conducted in India to understand the factors that can improve rural practice. [7,9].

The HRH crisis is identified as one of the most critical constraints for achieving health and development goals. In 2016, WHO launched the Global Health force strategy 2030, to support member countries' recruitment plans in supporting the achievement of Universal Health Coverage. [14] In this study, the WHO's recommendations were used to highlight the health workforce issues in remote and rural areas with a prime focus on four major policy domains (a) education (b) regulatory (c) financial incentives, and (d) professional and personal support and 16 sub-domains. [10]. There needs to be more studies on the retention of the health workforce in rural areas in India, using the WHO policy framework. Therefore, this study aims to investigate medical doctors' preferences for retention in rural areas based on WHO's policy framework. The findings would play an essential role in guiding the development and implementation of a retention strategy and policy by the Indian government. In addition, other countries with similar contextual issues might find this equally helpful.

MATERIALS AND METHODS

STUDY SETTINGS

The study was conducted in Odisha state of India, with a population of 42.0 million. [15,16] There are 30 districts in Odisha, and it is classified into two regions (a) KBK+ regions (total of 11 districts comprise 25% of the population) and (b) non-KBK+ regions (total of 19 districts comprise 75% of the population). The KBK+ regions are situated in the southern part of Odisha, with low health indicators, poor living conditions, and weak economies. All KBK+ districts are well-known as tribal areas and face chronic shortages of doctors. [17] Nearly 30% of doctor posts in Odisha at different health facilities are vacant. [18,19,20] The acronym KBK is used widely to represent eight districts of the undivided Kalahandi, Balangir, and Koraput districts of Odisha, according to the Planning Commission Government of India. This classification is used in the development sector, including healthcare planning by the government and non-government agencies.

METHODS AND SAMPLING

The study was a cross-sectional survey, and the participants were medical doctors working in rural hospitals based in Odisha. A multistage sampling strategy was employed to select the study districts and respondents. Firstly, six districts were selected, three randomly from non-KBK+ districts (i.e. Bargarh, Balasore, and Dhenkanal) and another three randomly from KBK+ districts (i.e. Koraput, Kalahandi, and Bolangir). The final sample size of 255 was determined by calculating 50% of the total number of doctors in the six

sample districts and including a 10% non-response rate. The ethical approval of this study was granted by the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University, Bangkok (COA No. MUPH 2016-094). This study was also approved by the Research Committee of the Department of Health & Family Welfare (DoHFW), Government of Odisha (Letter No. 179/SHRMU).

INSTRUMENT MEASUREMENT

The data collection was done using a structured questionnaire that has three parts, as described below:

Part I Personal and general characteristics of doctors: It includes age, sex, marital status, religion, work experience, and distance of present residence from the workplace.

Part II WHO's four policy domains of increasing access to health professionals in rural and remote areas: It consists of four domains (i) education (ii) regulatory (iii) financial incentives, and (iv) personal and professional support.

Part III Intention to stay among doctors: It is defined as a stay and continues working in rural areas for at least three years.

The questionnaire was pretested among randomly selected 30 doctors working outside the study area in Odisha. Based on the findings of the pretest, the tool was modified, and finally, an English version of the questionnaire was administered.

DATA COLLECTION

Participants took between 30-40 minutes to complete the questionnaire. Data were collected from October 2016 - February 2017 at the study site.

DATA PROCESSING AND ANALYSIS

All data were cleaned, coded, and then entered into IBM SPSS software (version 18). The quantitative study used descriptive statistics such as frequencies, proportion, the mean and standard deviation to describe the characteristics of study participants and four domains of the WHO framework on increasing access to health workers in rural and remote areas.

RESULTS

There were 255 doctors approached with the questionnaire; only 233 doctors completed the questionnaire yielding a response rate of 91.37%. The doctors are found to be primarily young males, with an average of 7.66 years of experience.

EDUCATION DOMAIN

The details of the education of the doctors serving in rural are and their place of education s given in Table 1

TABLE 1: PERCENTAGE OF EDUCATION DOMAIN OF THE INVESTIGATED DOCTOR

Items	Number (%)
Home location belongs to	
City	43 (18.5)
District	44 (18.9)
Sub-district*	55 (23.6)
Village	91 (39.1)
Medical college located during studies	
City	171 (73.4)
District	38 (16.3)
Sub-district*	24 (10.3)
Inclusion of rural health topics in the medical curriculum	
Not at all	15 (6.4)
Hardly any	19 (8.2)
Briefly	115 (49.4)
Considerably	62 (26.6)
Extensively	22 (9.4)
Accessing in-service training on a regular basis	
Not at all	21 (9)
Rarely	35 (15)
Sometimes	87 (37)
Often	57 (24)
Most often	33 (14)

*There are 30 districts of Odisha. Each district has been subdivided into different sub-districts to streamline the governance process.

REGULATORY DOMAIN

The results revealed that 49.4% of doctors are not involved in private practice to offer health services beyond their assigned office hours. Further, 49.4% of doctors could take leave 'sometimes,' and about 43% of doctors indicated it was 'very difficult' to get transferred to the desired place. The details of the regulatory domain of doctors' socio-behavioural issues have been given in Table 2.

TABLE 2: PERCENTAGE OF THE REGULATORY DOMAIN OF THE INVESTIGATED DOCTOR

Items	Number (%)
Able to practice privately beyond your assigned office hours?	
Not at all	115 (49.4)
Rarely	47 (20.2)
Sometimes	50 (21.5)
Often	10 (4.3)
Most often	11 (4.7)
Able to take leave when desired or in emergencies?	
Not at all	21 (9.0)
Rarely	74 (31.8)
Sometimes	115 (49.4)
Often	10 (4.3)
Able to get transferred to the desired place?	
Not possible at all	68 (29.2)
Very difficult	100 (42.9)
Unsure	39 (16.7)
With efforts	15 (6.4)
Have you undergone any compulsory rural service in the past?	
Never	53 (22.7)
Started but dropped in the middle	11 (4.7)
No mandatory policy for rural service	18 (7.7)
Currently undergoing	66 (28.3)
Completed already	85 (36.5)

FINANCIAL INCENTIVE DOMAIN

The result showed that nearly 48% of doctors received their salary 'most of the time', and another 21% of doctors received their salary 'always' on time. Further, nearly 43% of physicians had not received any additional financial incentives for working in rural areas, whereas 57% of physicians received additional financial incentives for rural service. The details of the retention issues reported by the doctors for the financial incentive domain is in Table 3.

TABLE 3: PERCENTAGE OF FINANCIAL INCENTIVES OF THE INVESTIGATED DOCTOR

Items	Number (%)
Receiving salary on time	
Never	10 (4.3)
Rarely	14 (6.0)
Sometimes	48 (20.6)
Most of the time	112 (48.1)
Always	49 (21.0)
Additional financial incentives being given for working in rural area	
Not receiving at all	100 (42.9)
Very inadequate	30 (12.9)
Inadequate	29 (12.4)
Just acceptable	58 (24.9)
Sufficiently	16 (6.9)
Additional pay you are receiving for transportation allowance? *	

Not receiving at all	68 (29.2)
Very inadequate	17 (7.3)
Inadequate	8 (3.4)
Just acceptable	7 (3.0)
Sufficiently	1 (0.4)
Additional payment or subsidy received for the cost of continuing education? *	
Not receiving at all	97 (41.6)
Very inadequate	3 (1.3)
Inadequate	2 (0.9)
Just acceptable	3 (1.3)
Sufficiently	0
Additional pay you are receiving for housing allowance	
Not receiving at all	104 (44.6)
Very inadequate	37 (15.9)
Inadequate	19 (8.2)
Just acceptable	11 (4.7)
Sufficiently	0

*Items maximum number of respondents responded Not Applicable.

PROFESSIONAL AND PERSONAL SUPPORT DOMAIN

The results showed that doctors were moderately satisfied with support services (such as patient, personnel, clerks, transport etc.) provided to them for the patient quality care (n=81, 34.8%) and the availability of drugs, medical supplies, and the latest equipment for quality patient care (n=84, 36.1%) in rural hospitals. However, they were least satisfied with many more aspects of the professional and personal support domain, which are detailed in Table 4.

TABLE 4: PERCENTAGE OF PROFESSIONAL AND PERSONAL SUPPORT DOMAIN OF THE INVESTIGATED DOCTOR

Items	Number (%)
Satisfaction on infrastructure and amenities (like water, electricity etc.)	
Least satisfied	117 (50.2)
Slightly satisfied	61 (26.2)
Moderately satisfied	43 (18.5)
Very satisfied	12 (5.2)
Satisfaction in the provision of government house*	
Least satisfied	127 (54.5)
Slightly satisfied	44 (18.9)
Moderately satisfied	41 (17.6)
Very satisfied	13 (5.6)
Satisfaction in availability of childcare and school facilities*	
Least satisfied	142 (60.9)
Slightly satisfied	36 (15.5)
Moderately satisfied	33 (14.2)
Very satisfied	10 (4.3)
Satisfaction in prospects of your spouse employment*	
Least satisfied	129 (55.4)
Slightly satisfied	31 (13.3)
Moderately satisfied	16 (6.9)
Very satisfied	13 (5.6)

Satisfaction in support services (personnel, clerks, transport etc.)	
Least satisfied	65 (27.9)
Slightly satisfied	60 (25.8)
Moderately satisfied	81 (34.8)
Very satisfied	27 (11.6)
Satisfaction regarding timely discussion with more experienced doctors	
Least satisfied	92 (39.5)
Slightly satisfied	52 (22.3)
Moderately satisfied	59 (25.3)
Very satisfied	30 (12.9)
Satisfaction on availability of drugs, medical supplies and equipment	
Least satisfied	64 (27.5)
Slightly satisfied	72 (30.9)
Moderately satisfied	84 (36.1)
Very satisfied	13 (5.6)
Satisfaction on receiving support from seniors through Tele-health	
Least satisfied	96 (36.9)
Slightly satisfied	56 (24.0)
Moderately satisfied	58 (24.9)
Very satisfied	33 (14.2)
Satisfaction on accessing professional bodies/network	
Least satisfied	105 (45.1)
Slightly satisfied	62 (26.6)
Moderately satisfied	49 (21.0)
Very satisfied	17 (7.3)
Satisfaction with any recognition or award for rural services	
Least satisfied	152 (65.2)
Slightly satisfied	41 (17.6)
Moderately satisfied	24 (10.3)
Very satisfied	16 (6.9)

*Item 2, 3, 4, 8 many respondents indicated NA, NA = Not Applicable

DISCUSSION

Using the WHO's framework, the study highlighted medical doctors' perceptions in India, on recruitment and retention issues in rural areas. The findings are discussed below under the adapted framework comprised of four domains of education, regulatory, financial incentives, and professional and personal support.

EDUCATION

The study showed that most of the doctors from rural backgrounds worked in rural locations, which is consistent with other studies. In a systematic review, it was revealed that doctors who came from rural backgrounds showed more affinity to work in rural areas than those doctors from an urban background. [21] Studies in Australia [22] and South Africa [23] show that physicians from rural backgrounds were more likely (10 times) to work in challenging and rural areas. The study revealed that most doctors studied medicine in city areas where medical colleges are located. Similarly, the medical colleges in Odisha are mainly located in cities, which is corroborated by other studies. [24] Evidence shows that including rural health topics in the medical curriculum for doctors might enhance the understanding of rural needs, contributing to the willingness to engage in rural and underserved areas. [25] Therefore, developing rural health topics further improves retention in rural postings in Odisha.

REGULATORY

Compulsory rural services for three years are a requirement for doctors in Odisha. [12] However, this regulation of

doctors practicing in rural areas is not limited to India; some studies revealed several countries had instituted mandatory rural service periods. [26, 27] For example, there is a compulsory rural service scheme under which doctors must provide rural health services in Thailand. [28] There is a compulsory rural service period in Bangladesh for doctors to offer primary health care. [24] Frequent political interference, lack of solid leadership quality, and administrative lapses make doctors work beyond the required service period, all contributing to rural posting difficulties. [29] Further, the results showed that about half of the doctors could take leave 'sometimes' when desired or in emergencies. Literature suggests that a well-defined and clear transfer policy and increased leaves are essential incentives for doctors' retention in rural areas. [30]

FINANCIAL INCENTIVES

The study indicated that about half of the doctors received additional financial incentives working in rural and remote areas. However, they mentioned that these additional incentives were 'very inadequate' or 'inadequate' or 'just acceptable' to them. The WHO financial incentives recommendation suggests a combination of fiscally sustainable financial inducements that are adequate to mitigate rural living costs. [10] In India, an additional monetary incentive is a commonly used strategy to motivate and attract a large pool of doctors to work in rural and remote areas. [11,12] Research suggests that though financial incentives are one of the most important and preferred strategies, equal provision should be made for other benefits; schooling facilities, better housing, electricity and water supply, and transport access are equally important to retain medical professionals in rural areas. [7]

PROFESSIONAL AND PERSONAL SUPPORT

The study results indicated that doctors were mostly least satisfied with the professional and personal support domain. It is believed that rural life might be harmful, often linked to multiple factors such as children's schooling, housing, and safety being perceived as substandard. [10] In this study, doctors were also least satisfied with the spouse's employment, schooling, and housing allocated by the government, which is consistent with other studies. A study in Nepal shows that healthcare professionals consider their career paths clearly to decide where to work. Political interference sometimes unfairly influences the policies, limiting the promotion process's effectiveness. [12,29] Lastly, the provision of post-graduation studies for those doctors who complete specified rural service periods is believed to be another incentive. [30] Nevertheless, it would be essential to investigate different other variables that might positively or negatively affect doctors' retention in rural areas.

LIMITATION

The study provides an overview of the on-field reality of the retention of doctors in rural India. One limitation is that this is a cross-sectional descriptive study and might not present a long-term trend. However, as discussed above, it has provided insight into areas for further research. Additionally, due to cultural and political variations across countries and regions, differences might occur in the interpretation of personal and professional components of the WHO framework. In recognition of differences in settings and context-specific implications, WHO advocates that countries will ultimately need to ensure that applications and relevance of policy options should fit these realities. [31]

CONCLUSION

The scarcity of HRH, mainly medical doctors in rural and remote locations, pose a severe problem. The study highlighted the doctors' intention to work and stay in underserved locations and their responses to WHO's four policy domains. There is a need to address the uneven distribution of doctors in rural and remote areas. Providing basic facilities like accommodations, electricity, telephone, and water supply play an essential role in rural communities. To meet the goals of SDG, India needs to recruit and retain medical doctors in rural and remote areas. Hence, the analysis of the WHO framework for rural HRH paves the way for understanding the nuances of improving human resources shortages in rural Odisha.

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CONFLICTS OF INTEREST:

There is no conflict of interest of any of the authors.

ETHICAL COMMITTEE APPROVAL:

Approval for this study was received from the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University, Bangkok (COA No. MUPH 2016-094). This study was also approved by the Research

Committee, Department of Health & Family Welfare (DoHFW), Government of Odisha (Letter No. 179/SHRMU).

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RESEARCH ARTICLE

SEVEN ASPECTS OF HEALTHCARE CUSTOMER SATISFACTION AND FACTORS AFFECTING IT WITHIN EMERGENCY DEPARTMENT

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ABSTRACT

OBJECTIVES:

This study aimed at investigating seven aspects, which are believed to be critical for healthcare customer satisfaction level, as well as determining underlying factors affecting them within the emergency department.

DESIGN:

A quantitative and cross-sectional study design, with deductive reasoning, was applied to undertake this study.
Setting: The study site involves different tertiary care private and public hospitals in Karachi, Pakistan.

MAIN OUTCOME MEASURES:

General satisfaction perspective was measured involving satisfaction with technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience.

RESULTS:

Respondents were 61.6% male and 38.4% female with mean age 34.65±10.27 years. Most of the healthcare customers (54.6%) commuted to the healthcare facility by ambulance. 72.2% of respondents were from private and 27.8% were from public healthcare facilities while the majority (55.4%) visits to healthcare emergency services were due to injury or intoxication. In our study mean general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience were 3.11±0.34, 3.42±0.37, 3.42±0.43, 3.45±0.39, 3.31±0.42, 2.80±0.58 and 3.46±0.59 respectively. We found 52.6% of healthcare customers were satisfied with general aspects of service, 81.5% satisfied with technical quality, 80.50% satisfied with interpersonal manner, 82.5% satisfied with the communication, 66.3% satisfied with financial aspects, 20.4% satisfied with time spent with doctors and 75.7% satisfied with accessibility and convenience.

CONCLUSION:

General satisfaction with services was found to be at the lowest level, while the highest satisfaction level was with the "time spent with the doctor". Healthcare institutes need to be more attentive to the service encounter time spent with doctors and on general issues for healthcare customers visiting the ED.

KEYWORDS

healthcare management, healthcare quality, patient satisfaction, healthcare strategy, emergency department (ED).

INTRODUCTION

Patient satisfaction is considered to be vital for quality healthcare service delivery. [1] Therefore, the healthcare strategist has been preoccupied with improving the satisfaction level of patients. [2, 3] A critical and challenging domain of a tertiary care hospital to manage is the emergency department (ED). The other names of this department are emergency room (ER), accident and emergency department (A&E), emergency ward (EW), or accident ward (AW). It is a medical treatment facility that specializes in emergency medicine, and acute care of patients available without prior appointment, either by their own means or by ambulance. Hospital emergency departments (ED) are responsible for providing emergency healthcare services for anyone presenting with acute emergencies. Healthcare consumer satisfaction is an important issue for emergency services. Today, the number of inpatients in most emergency departments is greater than in outpatients. For many patients, the visit is the first visit to a specific emergency department. In addition, a quarter to half of all hospital patients usually comes through emergency departments. Therefore, emergency services are both the gateway and marketing vehicle for hospitals. [4] Regardless of the type of healthcare customer satisfaction, the emergency experience can influence decisions regarding the future use of a hospital and the hospital because the emergency encounter is brief, impersonal, and often emotionally charged. The nature of these interactions increases the potential risk of misapplication claims.

Healthcare customer satisfaction in the emergency department, therefore, becomes an important element in healthcare management, risk management and healthcare strategy as the competitiveness for the entire hospital requires the patients to be satisfied. It is generally accepted that satisfaction data plays an important role in the development of strategies and tactics by healthcare providers in providing healthcare to patients. In addition to the shortness and potential emotionality of the emergency visit, healthcare customers typically find the atmosphere and organization of the emergency department unfamiliar and often frightening. Critical and primary care patients share the same narrow spaces. Healthcare customer satisfaction and their families are not familiar with triage principles. [4,5]

Various instruments are used to measure patient satisfaction, such as SERVQUAL, EDQS, Press Ganey Survey, PSQ-III, and PSQ-18, which have been developed to measure the actual level of patient satisfaction.[3] This approach uses a system of questions and grades to assess the degree of satisfaction.

Healthcare customer satisfaction is a valuable tool and benchmark that is given due importance by both hospitals and policymakers in the western countries. Healthcare customer satisfaction depends on a number of factors and many studies have been conducted on this topic worldwide.[5] However, in Pakistan, the concept of healthcare customer satisfaction and health-care customer-centered care has emerged recently compared to other parts of the world and has failed to establish itself as a decisive factor in healthcare providers to date. It is generally accepted that satisfaction data plays an important role in the development of strategies and tactics by healthcare providers in providing healthcare to patients. In addition to its role in improving quality healthcare delivery, measuring patient satisfaction plays an important role in the increasing pressure for accountability among healthcare providers.

In recent years, there has been an increasing discussion on the participation of patients in the management and treatment of their problems. [3,6-7] Several studies have been conducted in Pakistan, some using standardized or tested PSQs and others using homemade criteria. [5, 7-10] and literature search revealed minimum amount of published material on this topic in Pakistan, especially among inpatients of an ED facility. The main objective of the current study is to determine the aspects of healthcare customer satisfaction level and factors affecting it for those visiting the emergency department by using a pre-validated PSQ-III. This study provides an opportunity for a broader generalization of results and is thus a useful tool for quality improvement policy.

METHODS

The objective of this study is to investigate seven aspects of healthcare customer satisfaction and determine the factors affecting them. Various tools are available for investigating customer satisfaction, such as SERVQUAL, EDQS, Press Ganey Survey, and PSQ-III. We chose to use PSQ-III due to its excellent validity, as reported by various

studies. In terms of factors affecting healthcare customer satisfaction, we employed the widely used Anderson model of healthcare satisfaction [12, 13]. This cross-sectional study was carried out with 834 healthcare customers of different healthcare institutes (hospitals) from 1st July 2021 to 15th January 2022 after approval from the board of advanced studies and research of the institute of business and health management (Approval# 304).

Data was collected after the oral consent of the patient/caregiver. Patients who are able to participate in interviews; be of both gender; and aged 18 years or above. Patients admitted via the emergency department were included in the study. Patients who were dead on arrival or patients died in the ED or who were in a serious condition and those who just arrived at the ED were excluded from the study. Moreover, if the patients were accompanied by different attendants, (as per Pakistani culture various relatives attend a single patient) such attendants were excluded in the study. Also, attendants not accompanying the patient at the time of ER treatment were not included in the study. Patients who were not emotionally of psychologically stable were excluded from the study.

The questionnaire used to collect the data was divided into two segments: Section A for demographic data and Section B for assessing satisfaction with the Patient Satisfaction Questionnaire (PSQ-III). PSQ-III is an internationally validated, self-directed; 51-question questionnaire form developed by the RAND Corporation and is freely available in the public domain.[11]. Each question requires the patient to reflect on how much he/she agrees or disagrees with a given statement, while their answers are graded on a scale from 1 to 5; 1 is very dissatisfied and 5 is very satisfied. PSQ-III assesses seven areas of satisfaction: general satisfaction, technical quality, interpersonal relationships, communication, financial aspects, time with a doctor, and affordability and convenience. For all points, the score ranges from 1 (very dissatisfied) to 5 (very satisfied). The average score for each item was calculated in such a way that the higher it is, the higher the level of satisfaction on all items of PSQ-III. Reverse coding was done for PSQ1, PSQ3, PSQ5, PSQ7, PSQ9, PSQ11, PSQ13, PSQ15, PSQ18, PSQ20, PSQ22, PSQ24, PSQ26, PSQ28, PSQ29, PSQ31, PSQ33, PSQ35, PSQ37, PSQ39, PSQ41, PSQ1, PSQ56, PSQ47, PSQ49, PSQ50. To calculate the overall score in each area, we calculated the average point scores assigned to each area according to PSQ-III guidelines, which are given below:

General Satisfaction: PSQ3, PSQ33, PSQ42, PSQ21, PSQ11, PSQ49

Technical Quality: PSQ15, PSQ2, PSQ8, PSQ12, PSQ23, PSQ36, PSQ50, PSQ45, PSQ31, PSQ41

Interpersonal Aspects: PSQ29, PSQ47, PSQ39, PSQ17, PSQ26, PSQ34, PSQ9

Communication: PSQ6, PSQ18, PSQ13, PSQ38, PSQ43

Financial Aspects: PSQ14, PSQ4, PSQ27, PSQ10, PSQ44, PSQ24, PSQ32, PSQ19

Time Spent with doctors: PSQ46, PSQ35

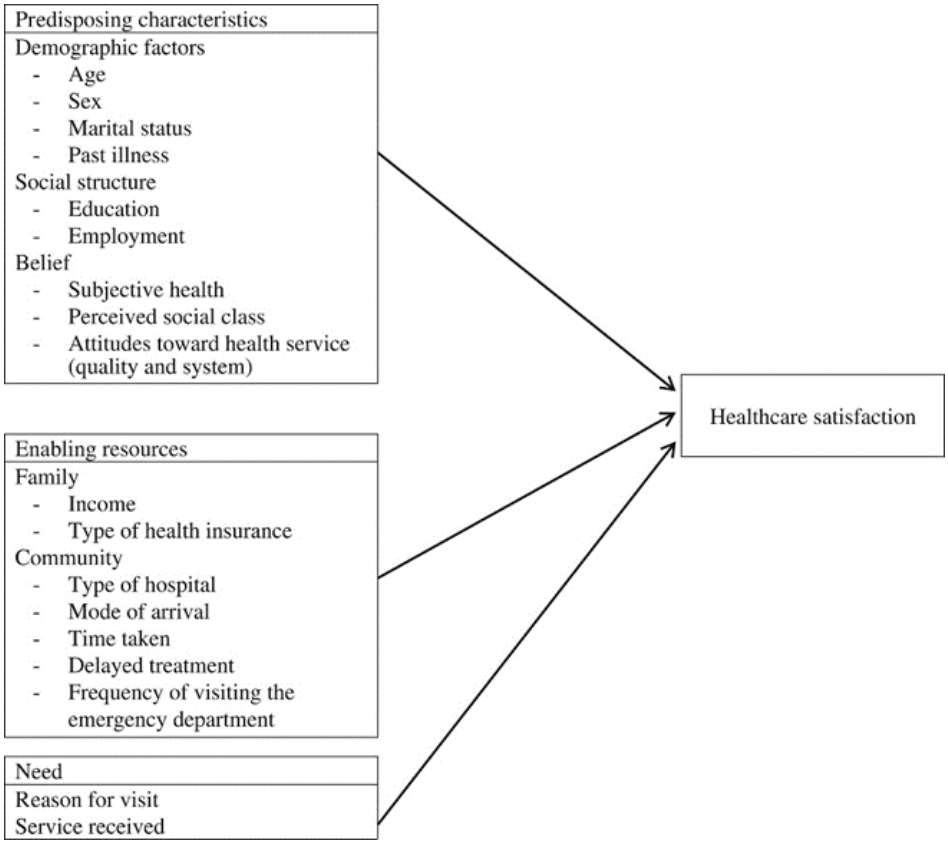
Access/Availability/Convenience:

PSQ1,PSQ16,PSQ5,PSQ22,PSQ37,PSQ28,PSQ40,PSQ48,PSQ20,PSQ7,PSQ25,PSQ51

THEORETICAL FRAMEWORK

Andersen's behavioral model was developed to investigate the use of health services and the factors that influence access to health care. In the initial behavioral model, three domains that affect the use of health services were defined. Predisposing characteristics include demographics, social structure, and health beliefs. Enabling resources consist of personal and family resources and community resources. As the most immediate cause of health service use, need includes the perceived needs that are related to experiences of symptoms, pain, and worries about health, as well as the evaluated needs that are judged and diagnosed by healthcare professionals For the final model that was revised in 1995, customer satisfaction was included in the outcome. [12] The model has been used in many studies that investigated variations in the use of health services [13, 14]. Figure 1 depicts the application of this model to the current study.

FIGURE 1: CONCEPTUAL FRAMEWORK BASED ON ANDERSEN'S MODEL



STATISTICAL ANALYSIS

Data was entered and analyzed by IBM SPSS Statistics. Mean and Standard Deviation were calculated for quantitative data. Frequency and percentage were calculated for qualitative data. Odds were calculated by binary logistic regression. A p-value of less than 0.05 was considered as significant.

RESULTS

There was 61.6% male and 38.4% female respondents with a mean age 34.65±10.27 years. The majority of respondents were married (70.1%). Most of these health-care customers (54.6%) visited to healthcare facility via ambulance. 72.2% of respondents were from private and 27.8% were from public healthcare facilities. A majority (55.4%) of visits to healthcare emergency facilities was due to injury or intoxication. Detailed descriptive statistics of predisposing characteristics, enabling factors and the needs of the study population are presented in Table 1. We evaluated healthcare customer satisfaction through the Patient Satisfaction Questionnaire (PSQ-III). PSQ-III evaluates the seven areas of satisfaction: overall satisfaction, technical quality, interpersonal relationships/manners, communication, financial aspects, time spent with doctors, and accessibility and convenience. The reliability of the item were checked by Cronbach's Alpha which was 0.92, 0.74, 0.65, 0.85, 0.78, 0.73, 0.89 for general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience respectively.

In our study, mean general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience was 3.11±0.34, 3.42±0.37, 3.42±0.43, 3.45±0.39, 3.31±0.42, 2.80±0.58 and 3.46±0.59 respectively. We found 52.6% of healthcare customers satisfied with general aspects of service, 81.5% satisfied with technical quality, 80.50% satisfied with interpersonal manner, 82.5% satisfied with communication, 66.3% satisfied with financial aspects, 20.4% satisfied with time spent with doctor and 75.7% satisfied with accessibility and convenience aspects as presented in Table 2.

Binary logistics regression for general satisfaction shows that male customers are less likely to have general satisfaction in comparison to female customers (OR=0.898, p-value=0.898). The results of the analysis also showed that

customers with past illnesses are more likely to have general satisfaction in comparison of those who haven't. (OR=2.021, p-value=0.002).

Health care customers of private hospitals are more likely to have general satisfaction of services in comparison of public hospitals (OR=1.270, p-value=0.130). Detailed results of odds for general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience are presented in Table 3 to Table 6.

TABLE 1: PREDISPOSING CHARACTERISTICS, ENABLING FACTORS AND NEED OF STUDY POPULATION (N=834)

Predisposing characteristics	**Demographic factors**	
	Age(years) ,mean±SD	34.65±10.27
	Sex	
	Male, n (%)	433 (51.9)
	Female, n (%)	401 (48.1)
	Marital status	
	Married, n (%)	585 (70.1)
	Unmarried, n (%)	249 (29.9)
	Past illness	
	Yes, n (%)	427 (51.2)
	No, n (%)	407 (48.8)
	Social structure	
	Education	
	No Formal Education, n (%)	72 (8.6)
	Middle, n (%)	202 (24.2)
	Matric, n (%)	247 (29.6)
	Intermediate, n (%)	205 (24.6)
	Graduate or above, n (%)	108 (12.9)
	Employment	
	Unemployed, n (%)	233 (27.9)
	Employed, n (%)	601 (72.1)
	Belief	
	Subjective health	
	Good, n (%)	574 (68.8)
	Bad, n (%)	260 (31.2)
	Perceived social class	
	Low, n (%)	159 (19.1)
	Middle, n (%)	429 (51.4)

	Upper, n (%)	246 (29.5)
	Attitudes toward health service (quality)	
	Excellent, n (%)	426 (51.1)
	Not Good, n (%)	408 (48.9)
	Attitudes toward health service (System)	
	Generally operated well, n (%)	426 (51.1)
	Has many problems, n (%)	408 (48.9)
Enabling resources	**Family**	
	Income/year (PKR), mean±SD	521,597.12±240,118.65
	Health insurance	
	Yes, n (%)	448 (53.7)
	No, n (%)	386 (46.3)
	Community	
	Type of hospital	
	Private, n (%)	602 (72.2)
	Public, n (%)	232 (27.8)
	Mode of arrival	
	Rescue Centre or Ambulance, n (%)	455 (54.6)
	Personal Transport, n (%)	379 (45.4)
	Time taken in arrival (min), mean±SD	119.49±38.87
	Delayed treatment	
	Yes, n (%)	142 (17)
	No, n (%)	692 (83)
	Frequency of visiting ED,mean±SD	1.74±0.99
Need	**Reason for visit**	
	Injury or intoxication, n (%)	462 (55.4)
	Illness, n (%)	372 (44.6)
	Service received	
	Surgery or test, n (%)	440 (52.8)
	Non-surgical treatment, n (%)	394 (47.2)

SD: Standard Deviation

TABLE 2: SEVEN ASPECTS OF HEALTHCARE CUSTOMER SATISFACTION

Satisfaction Aspects	Mean	Standard Deviation	% Satisfied (S.A+A)
General Satisfaction	3.11	0.34	52.60
Technical Quality	3.42	0.37	81.50
Interpersonal Manner	3.42	0.43	80.50
Communication	3.45	0.39	82.50
Financial Aspects	3.31	0.42	66.30
Time Spent with Doctor	2.80	0.58	20.40
Accessibility and Convenience	3.46	0.59	75.70

S. A=Strongly Agree, A=Agree

TABLE 3: LOGISTIC REGRESSION ANALYSES OF THE THREE DOMAINS OF THE ANDERSEN MODEL FOR THE VARIABLES PREDICTING GENERAL SATISFACTION WITH SERVICES IN THE EMERGENCY DEPARTMENT (ED)

		General Satisfaction		
		p-value	Odds Ratio	95% CI
Predisposing characteristics	**Demographic factors**			
	Age	0.02	1.026	1.004-1.048
	Sex			
	Male	0.482	0.898	0.666-1.212
	Female		1	
	Marital status			
	Married	0.810	1.049	1.049-0.712
	Unmarried		1	
	Past illness			
	Yes	0.002	2.021	1.287-3.174
	No		1	
	Social structure			
	Education			
	No Formal Education	0.528	1.222	0.655-2.282
	Middle	0.32	0.783	0.484-1.267
	Matric	0.625	1.123	0.705-1.788
	Intermediate	0.737	0.921	0.569-1.489
	Graduate or above		1	
	Employment			
	Unemployed	0.367	0.859	0.617-1.195
	Employed		1	
	Belief			
	Subjective health			
	Good	0.609	1.095	0.774-1.549
	Bad		1	
	Perceived social class			
	Low	0.567	1.129	0.744-1.714
	Middle	0.637	1.084	0.776-1.512

	Upper		1	
	Attitudes toward health service (quality)			
	Excellent	0.625	1.083	0.787-1.492
	Not Good		1	
	Attitudes toward health service (System)			
	Generally operated well	0.026	1.378	1.039-1.828
	Has many problems		1	
	Nagelkerke R^2 =0.045, p-value=0.012			
Enabling resources	**Family**			
	Income per year	0.038	1.000	1.000-1.000
	Health insurance			
	Yes	0.648	1.066	0.809-1.406
	No		1	
	Community			
	Type of hospital			
	Private	0.130	1.270	0.932-1.729
	Public		1	
	Mode of arrival			
	Rescue Centre or Ambulance	0.446	0.898	0.680-1.185
	Personal Transport		1	
	Time taken in arrival (min)	0.894	1.000	0.997-1.004
	Delayed treatment			
	Yes	0.196	1.277	0.881-1.849
	No		1	
	Frequency of visiting ED	<0.001	0.777	0.676-0.894
	Nagelkerke R^2 =0.031, p-value=0.006			
Need	**Reason for visit**			
	Injury or intoxication	0.029	1.358	1.032-1.786
	Illness		1	
	Service received			
	Surgery or test	0.465	0.903	0.687-1.187
	Non-surgical treatment		1	
	Nagelkerke R^2 =0.009, p-value=0.067			

TABLE 4: LOGISTIC REGRESSION ANALYSES OF THE THREE DOMAINS OF THE ANDERSEN MODEL FOR THE VARIABLES PREDICTING COMMUNICATION AND FINANCIAL ASPECTS OF SATISFACTION

		Communication			Financial Aspects		
		p-value	**Odds Ratio**	**95% CI**	**p-value**	**Odds Ratio**	**95% CI**
Predisposing characteristics	Age	0.976	1	0.973-1.028	0.035	0.975	0.953-0.998
	Sex						
	Male	0.399	0.84	0.561-1.259	0.11	0.771	0.560-1.061
	Female			1		1	
	Marital status						
	Married	0.02	2	1.113-3.594	0.47	0.86	0.570-1.296
	Unmarried			1		1	
	Past illness						

	Yes	<.001	3.95	2.084-7.488	<.001	0.425	0.261-0.692
	No			1		1	
	Education						
	No Formal Education	0.426	1.458	0.576-3.688	0.533	1.232	0.640-2.373
	Middle	0.929	0.971	0.501-1.879	0.948	1.017	0.618-1.674
	Matric	0.496	0.807	0.435-1.497	0.99	0.997	0.617-1.610
	Intermediate	0.359	0.743	0.393-1.403	0.005	2.127	1.260-3.589
	Graduate or above			1		1	
	Employment						
	Unemployed	0.061	1.567	0.98-2.506	0.972	0.994	0.697-1.417
	Employed			1		1	
	Subjective health						
	Good	0.464	0.835	0.515-1.354	0.379	0.844	0.579-1.231
	Bad			1		1	
	Perceived social class						
	Low	0.570	0.848	0.481-1.497	0.009	0.553	0.355-0.861
	Middle	0.587	0.882	0.561-1.387	0.242	0.805	0.560-1.157
	Upper			1		1	
	Attitudes toward health service (quality)						
	Excellent	0.269	0.78	0.502-1.211	0.01	0.641	0.456-0.901
	Not Good			1		1	
	Attitudes toward health service (System)						
	Generally operated well	0.016	0.619	0.420-0.913	0.86	1.028	0.760-1.390
	Has many problems			1		1	
	Nagelkerke R^2=0.093, p-value=0.000				**Nagelkerke R^2=0.075 ,p value=0.001**		
Enabling factors	Income per year	0.707	1	1.000-1.000	0.052	1	1.000-1.000
	Health insurance						
	Yes	0.054	1.409	0.995-1.997	0.718	0.948	0.707-1.270
	No			1		1	
	Type of hospital						
	Private	0.797	0.95	0.645-1.401	0.249	1.209	0.875-1.671
	Public		1		1		
	Mode of arrival						
	Rescue Centre/Ambulance	0.549	1.113	0.784-1.581	0.051	0.745	0.555-1.001
	Personal Transport		1		1		
	Time taken in arrival (min)	<.001	0.991	0.986-0.996	0.983	1	0.996-1.004
	Delayed treatment						
	Yes	0.826	0.949	0.598-1.507	0.033	0.665	0.458-0.967
	No		1		1		
	Frequency of visiting ED	0.006	0.793	0.671-0.937	0.003	1.26	1.080-1.469
	Nagelkerke R^2=0.045, p-value=0.001				**Nagelkerke R^2=0.035, p=0.003**		
Need	**Reason for visit**						
	Injury or intoxication	0.459	1.145	0.800-1.639	0.956	1.008	0.755-1.347
	Illness		1		1		
	Service received						
	Surgery or test	0.194	1.267	0.886-1.813	0.062	0.759	0.568-1.014
	Non-surgical treatment		1		1		
	Nagelkerke R^2=0.004, p-value=0.335				**Nagelkerke R^2=0.006, p value=0.173**		

TABLE 5: LOGISTIC REGRESSION ANALYSES OF THE THREE DOMAINS OF THE ANDERSEN MODEL FOR THE VARIABLES PREDICTING ACCESSIBILITY/ACCESS AND INTERPERSONAL ASPECTS OF SATISFACTION

		Accessibility and Convenience			Interpersonal Manner		
		p-value	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI
Predisposing characteristics	**Demographic factors**						
	Age	0.296	0.987	0.962-1.012	0.926	0.999	0.973-1.026
	Sex						
	Male	0.270	1.222	0.856-1.744	0.073	0.705	0.481-1.033
	Female		1			1	
	Marital status						
	Married	0.943	0.983	0.621-1.558	0.503	1.175	0.732-1.886
	Unmarried		1			1	
	Past illness						
	Yes	0.750	0.917	0.538-1.563	0.173	0.681	0.391-1.184
	No		1			1	
	Social structure						
	Education						
	No Formal Education	0.606	1.243	0.544-2.840	0.745	1.125	0.554-2.284
	Middle	0.875	0.952	0.520-1.745	0.096	1.624	0.917-2.875
	Matric	0.030	0.536	0.306-0.940	0.087	1.615	0.933-2.795
	Intermediate	0.128	0.636	0.355-1.140	0.007	2.267	1.254-4.098
	Graduate or above		1			1	
	Employment						
	Unemployed	0.361	0.832	0.560-1.235	0.001	0.523	0.353-0.773
	Employed		1			1	
	Belief						
	Subjective health						
	Good	0.217	1.305	0.855-1.991	0.986	0.996	0.645-1.538
	Bad		1			1	
	Perceived social class						
	Low	0.002	0.486	0.307-0.771	0.644	1.133	0.668-1.921
	Middle	0.239	1.272	0.853-1.898	0.832	1.046	0.688-1.590
	Upper		1			1	
	Attitudes toward health service (quality)						
	Excellent	<.001	0.46	0.310-0.681	0.627	0.906	0.609-1.348
	Not Good		1			1	
	Attitudes toward health service (System)						
	Generally operated well	0.28	0.832	0.595-1.162	0.499	0.884	0.619-1.263
	Has many problems		1			1	
	Nagelkerke R^2=0.083, p-value=0.083				**Nagelkerke R^2=0.060, P value=0.004**		
Enabling resources	**Family**						
	Income per year	0.001	1	1.000-1.000	0.707	1	1.000-1.000
	Health insurance						
	Yes	0.994	1.001	0.725-1.383	0.054	1.409	0.995-1.997
	No						
	Type of health insurance						

	Community						
	Type of hospital						
	Private	0.545	1.116	0.781-1.596	0.797	0.95	0.645-1.401
	Public		1			1	
	Mode of arrival						
	Rescue Centre/ Ambulance	<.001	0.531	0.380-0.740	0.549	1.113	0.784-1.581
	Personal Transport		1			1	
	Time taken in arrival (min)	0.666	1.001	0.997-1.005	<.001	0.991	0.986-0.996
	Delayed treatment						
	Yes	0.31	0.808	0.536-1.219	0.826	0.949	0.598-1.507
	No		1			1	
	Frequency of visiting ED	0.502	1.057	0.899-1.243	0.006	0.793	0.671-0.937
	Nagelkerke R^2=0.047, p-value=0.000				**Nagelkerke R^2=0.045, P-value=0.001**		
Need	**Reason for visit**						
	Injury or intoxication	0.217	0.817	0.593-1.126	0.801	0.956	0.677-1.352
	Illness		1			1	
	Service received						
	Surgery or test	0.619	0.923	0.672-1.267	0.037	1.442	1.022-2.033
	Non-surgical treatment		1			1	
	Nagelkerke R^2=0.003,p-value=0.416				**Nagelkerke R^2=0.008, p-value=0.107**		

TABLE 6: LOGISTIC REGRESSION ANALYSES OF THE THREE DOMAINS OF THE ANDERSEN MODEL FOR THE VARIABLES PREDICTING TIME SPENT WITH DOCTOR AND TECHNICAL QUALITY ASPECTS OF SATISFACTION

		Time Spent with Doctor			Technical Quality		
		p-value	**Odds Ratio**	**95% CI**	**p-value**	**Odds Ratio**	**95% CI**
Predisposing characteristics	**Demographic factors**						
	Age	0.963	1.001	0.976-1.026	<.001	1.058	1.029-1.089
	Sex						
	Male	0.613	0.907	0.622-1.323	0.001	2.01	1.324-3.05
	Female		1			1	
	Marital status						
	Married	0.075	1.642	0.952-2.831	<.001	2.576	1.525-4.353
	Unmarried		1			1	
	Past illness						
	Yes	0.035	0.551	0.317-0.958	<.001	4.125	2.209-7.702
	No		1			1	
	Social structure						
	Education						
	No Formal Education	0.569	1.242	0.589-2.618	0.761	1.133	0.506-2.539
	Middle	0.65	1.149	0.630-2.095	0.887	1.045	0.571-1.914
	Matric	0.277	1.376	0.774-2.446	0.085	1.733	0.928-3.238
	Intermediate	0.286	0.705	0.372-1.339	0.765	1.099	0.592-2.04
	Graduate or above		1			1	
	Employment						
	Unemployed	0.96	0.99	0.653-1.499	0.003	0.523	0.343-0.796

	Employed		1			1	
	Belief						
	Subjective health						
	Good	0.048	0.653	0.428-0.996	0.98	0.994	0.629-1.571
	Bad		1			1	
	Perceived social class						
	Low	0.799	0.928	0.523-1.648	0.07	1.653	0.96-2.846
	Middle	0.052	1.525	0.996-2.336	0.032	1.614	1.042-2.500
	Upper		1			1	
	Attitudes toward health service (quality)						
	Excellent	0.805	1.053	0.700-1.582	0.908	0.976	0.643-1.480
	Not Good		1			1	
	Attitudes toward health service (System)						
	Generally operated well	0.708	0.935	0.656-1.332	0.079	1.401	0.962-2.040
	Has many problems		1			1	
	Nagelkerke R^2=0.093, p-value=0.000				**Nagelkerke R^2=0.119, p-value=0.000**		
Enabling resources	**Family**						
	Income per year	0.757	1	1.000-1.000	0.049	1	1.000-1.000
	Health insurance						
	Yes	0.601	0.913	0.650-1.283	0.606	1.097	0.771-1.562
	No		1			1	
	Community						
	Type of hospital						
	Private	0.303	1.228	0.831-1.817	0.949	1.013	0.681-1.507
	Public		1			1	
	Mode of arrival						
	Rescue Centre/Ambulance	0.842	1.035	0.736-1.457	0.098	0.737	0.514-1.058
	Personal Transport		1			1	
	Time taken in arrival (min)	0.685	1.001	0.996-1.005	0.834	1	0.996-1.005
	Delayed treatment						
	Yes	0.043	0.591	0.356-0.983	0.096	0.69	0.445-1.068
	No		1			1	
	Frequency of visiting ED	0.438	0.933	0.782-1.112	0.807	0.978	0.819-1.168
	Nagelkerke R2=0.013, p-value=0.434				**Nagelkerke R2=0.020, p-value=0.178**		
Need	**Reason for visit**						
	Injury or intoxication	0.974	0.994	0.709-1.396	0.194	1.262	0.889-1.791
	Illness		1			1	
	Service received						
	Surgery or test	0.905	0.98	0.699-1.373	0.644	0.92	0.648-1.308
	Non-surgical treatment		1			1	
	Nagelkerke R2=0.000, p-value=0.992				**Nagelkerke R2=0.004, p-value=0.381**		

DISCUSSION

This research was undertaken in order to examine healthcare customer satisfaction and factors that affect healthcare customer satisfaction within emergency department (ED) services and their attendance from the viewpoint of patients. The current study was pursued in order to inspect how demographic factors (for instance age, gender, marital status, and past illness), and social structure (for instance education and employment status)

have a relationship with satisfaction level. Furthermore, we investigated the beliefs (for instance patient health, perceived social class, attitude towards health service) in association with family resources (such as income and health insurance) by considering, as an effective factor measure, customer (patient) satisfaction in conjunction with general satisfaction, technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, and accessibility and convenience of patient's visiting the ED of hospitals .

The extracted results from this research show that patient satisfaction was extremely affected by the technical quality, interpersonal manner, communication, and financial aspects of a hospital. In the context of Pakistan, the emergency department holds less technical quality, a common lack of professionalism, a lack of awareness concerning the ED's rules and responsibilities, a lack of interpersonal communication, and the execution of the attendants' duties.[12] When results are compared with Sultan et al., [16], it can be seen that attitude and behavior of the healthcare providers were good but some basic facilities in the emergency department, such as safe drinking water, general sanitary, and lacking availability of telephone, were some of the necessities missing.

These are the core aspects that negatively influenced the quality of ED's service provided by Hospitals. Although by focusing on tertiary care hospitals it can be stated that the overall patient satisfaction level was comparable with the hospitals existing in European countries. Although, the results as per the domain of responsiveness in the survey, the majority of patients reported that they never asked regarding the quality of provided care services. Also mention these as major factors which are responsible for patient dissatisfaction within the private tertiary care hospital in Karachi, Pakistan.[17] This provided evidence that there is no conception of patient involvement and autonomy in the treatment decisions in both private as well as public hospitals. The information that ED attendants deliver to the patients is inadequate, which directs to deficient communication among doctors and patients. This is the reason that patients investigated in this study are extremely concerned with finding good ED services instead of public hospitals. Supporting the results, was Sughra et al., who claimed that patients satisfaction was lowest in terms of technical quality and time spent with doctors. Therefore, they need to focus on these perspectives to improve patient satisfaction. [18]

For several years, technology has been employed in the practices of health care especially in ED which involves as a method of new diagnostic tools (for instance stethoscopes) or laboratory investigations. However, the research of Messina et al., reported that two characteristics significantly influence the overall satisfaction of the patients that include receiving continuous information from healthcare providers about the delay and waiting time for examination as the second one. Hence, these results are different from this one, where quality staff came out to be an important parameter.[19] Regarding the emergency services available in a tertiary care hospital, patients encounter problems, for instance in the environment which is non-hygienic, fake or late results, uncompetitive attendants, and a significant communication gap. It is these causes that ED services and their associated factors directly affect patient satisfaction. The dominant concerns are further emphasized and discussed about other hospitals of the country. The current research study fulfills the gap that was identified in the review of the literature through assessing patient satisfaction in relation to emergency services, physical facilities and communication among doctors and patients. Physical facilities and communication among doctors and patients have an influence on the level of patient satisfaction but not much as emergency services in Pakistan.[20] The patient's satisfaction in the ED holds a much smaller influence on satisfaction levels which is evidenced through different earlier studies conducted in Pakistan and India. Those earlier research shows that physical facilities do have not a significant connection with the patient's satisfaction. For example, the systematic literature review of Salehi et al., revealed that patient attribute factors, such as expectations, health status, and socio-economic and demographic influence their satisfaction. [21]

In terms of sustainability within the relevant healthcare industry, the hospital should have to make severe decisions in order to solve these issues regarding the physical infrastructure of Eds. This involves the formation of transparent policies, an endowment of increased funding for technology and the physical infrastructure of ED also involve all the allied stakeholders in the making of a decision. The administration of the hospital should collaborate with the ED and its attendants for making the inclusion of technology as much as possible in emergency room. [20]

Contradicting with the results, Salehi A et al., [21] claimed that patient satisfaction depends on many things. For example patients were found to be satisfied with general facility amenity, good quality services, availability of laboratories and rooms and dietary services provided to them. Moreover, digitized records of the hospital in order to reduce any kind of delays and congestion within the emergency services. [22] Through the survey conducted, it has resulted in understanding that patient experience and factors influencing satisfaction are further related to the structure of the hospital's ED measured through depending on the immediate availability of treatment, room cleanliness, and bed's availability. These influence the patient's satisfaction Pakistan.[20] Inaccessibility of beds, long waiting and arrival time for treatment, unavailability of attendants and doctors, and deficiency of basic amenities are the main components that lead to patient dissatisfaction.[23]

Patient-centeredness is associated with several factors such as technical quality, interpersonal manner, communication, financial aspects, time spent with the doctor, accessibility, a lack of attendants, and convenience were measured and discovered to be positively allied with their satisfaction. Supporting these results, Farooq et al., claimed that patient satisfaction was found better in CMH Hospital in 6 out of 7 domains. Those were, general satisfaction, communication, time spent with doctors, convenience, interpersonal manner, financial aspects, and accessibility. [24]

Therefore, the results highlight some other perspectives in this study that should be investigated in the future. Interventional research was executed in Karachi which displayed that 34 % of patient's level of satisfaction at the standard increased to up to 80 % within the period of one year after interventions. [23] This essentially aimed at enhancing doctors' and attendants' skills of communication, knowledge, and institution of the concept of quality care in the provision of healthcare services. In association with these results and through this present research determines that analysts of patient dissatisfaction with emergency services specify that technical quality, interpersonal manner, communication, financial constraints, time spent with the doctor, accessibility, blackness of attendants, and convenience are the main predictors.

CONCLUSION

General satisfaction with services was at the lowest level while the highest satisfaction level was found in relation to the time spent with the doctor. We would suggest to hospitals and healthcare managers that they have more focus on emergency services as EDs are gateways to hospitals for most of the healthcare customers or their attendants. We suggest healthcare institutes be more attentive to time spent with doctors and on general issues of healthcare customers visiting ED.

LIMITATIONS AND FUTURE RESEARCH DIRECTION

The current study was conducted using a pre-validated tool e.i. PSQ-III. However, the same study may be extended to use other quality and patient satisfaction measurement tools, especially in Pakistani or other emerging economies' context. Also, a more insightful study may be undertaken with a quality research design in the future. The limited study duration was a limitation of our study. Therefore, the rigor may be improved using an extended time frame.

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RESEARCH ARTICLE

RELATIONSHIP BETWEEN THE TRUST IN A HEALTH CARE SYSTEM AND ADHERENCE TO COVID-19 PREVENTIVE BEHAVIORS AMONG THE GENERAL POPULATION IN 2021

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ABSTRACT

INTRODUCTION:

Identifying the factors affecting the adoption of COVID-19 preventive behaviors can be helpful in designing various interventions related to the promotion of this index. Therefore, the aim of this study was to investigate the relationship between trust in a healthcare system and adherence to COVID-19 preventive behaviors among the general population.

METHODS:

This cross-sectional study was conducted during September 2021 and simultaneously with the fifth wave of COVID-19 in Urmia, Iran. The study's statistical population was for all people older than 18 years living in Urmia who had access to cyberspace. In this study, 504 samples were included using the snowball and convenience sampling method. Data were collected using an electronic questionnaire that consisted of three sections: demographic information, Whole Health System Trust Scale, and a researcher-made questionnaire to measure COVID-19 preventive behaviors. Data were collected through WhatsApp and analyzed using SPSS 16.

RESULTS:

The quality of care ($\beta = 0.178$, $p = 0.003$), patient focus of providers ($\beta = 0.140$, $p = 0.010$), policies at the macro level will be without consequences for the patient ($\beta = -0.112$, $p = 0.027$), and the quality of cooperation between health care services providers ($\beta = 0.106$, $p = 0.026$), were significant predictors of COVID-19 preventive behaviors.

CONCLUSION:

In order to promote adherence to COVID-19 preventive behaviors among the general public, it is suggested to improve the quality of care provided for the prevention and control of COVID-19; provide customer-centered cares relating to prevention and control of COVID-19; attract public trust to the macro level policies relating to prevention and control of COVID-19; and create cooperation and coordination among services providers working in the field of prevention and control of COVID-19.

KEYWORDS

trust, health system, adherence, behavior, prevention, COVID-19

INTRODUCTION

Preventive behavior is the main way to control and prevent COVID-19 [1]. The most important preventative behaviors of COVID-19 include wearing a mask; covering the mouth and nose when sneezing and coughing; washing hands with soap and water for at least 20 seconds; using disinfectants if water and soap are not available; avoiding touching eyes, nose, and mouth with contaminated hands; using personal utensils for eating; disinfection of surfaces; maintaining social distance of at least 1 meter; and avoiding crowds and travel [2].

Adherence to COVID-19 preventive behaviors by individuals in society is affected by various individual, social, cultural, and economic factors [3]. Trust in the health care system is a determinant of this index [4,5]. Investigating the issue of trust in the health care system is important because the citizens' sufficient trust in the instructions of physicians and medical institutions will improve their health but the effectiveness of health institutions will be impaired in the absence of this component in society [6]. Public trust plays a key role in supporting citizens to formulate and implement public policies. The role of trust in the prevention and eradication of the disease has been proven to everyone. Low levels of trust in the health care system eventually led to poor health outcomes and the lack of use of health services [5].

Trust in the health care system is an important and effective factor in adhering to COVID-19 preventive behaviors. Findings of studies by Chan et al. indicated that people, who had more trust in the health care system, were more likely to follow COVID-19 preventive behaviors [4]. Wong et al. also found a statistically significant positive relationship between trust in the government and the health care system with the degree of adherence to COVID-19 preventive behaviors [5].

Addressing trust in the field of COVID-19 is especially important for two reasons. First, even after nearly two years since the outbreak of this disease, there are still many unknowns about the nature of the disease, its lethality, treatment, the best ways to control and prevent it, etc [7] that can create mistrust among people in society and negatively affect the adoption of preventive behaviors. Second, the advice by governments and health care systems to people to fight the disease is obviously in contrast to our daily lives and nature as human beings and requires major and profound changes in our behavior; hence, it needs a high level of public trust so that they can deviate from their daily routine [8].

Given the above-mentioned issues, and the importance of identifying the determinants of preventive behaviors of COVID-19, the present study aimed to investigate the relationship between trust in the health care system and adherence to the COVID-19 preventive behaviors among the general public of Urmia. Based on the literature review completed, it seems that no study was conducted with the same title in Iran; hence, the findings of the present study can increase the awareness and knowledge of health decision-makers and policy-makers about determinants of COVID-19 preventive behaviors. It also leads to a positive step towards overcoming and controlling COVID-19 by the implementation of appropriate interventions to increase public trust in the health care system.

METHODS

In the present study, the minimum number of necessary samples was equal to 469 according to the previous similar study, a standard deviation of 8.4 for the mean score of trust in the health care system [9], a statistical confidence level of 99% (z=2.576), maximum acceptable error or accuracy of d=1, and using the formula for estimating the mean of a quantitative trait in society. 504 individuals were included in the study to increase the research power.

$$n = \frac{Z^2_{1-\alpha/2}\, S^2}{d^2} = \frac{2.576^2\, 8.4^2}{1^2} = 469$$

Samples were included in the study using the snowball sampling method, and data was collected online. Snowball sampling starts with a small pool of initial participants to nominate, through their social networks, other participants who meet the inclusion criteria and could potentially participate in the study. Inclusion criteria were as follows: age over 18 years, having a minimum education level of secondary school, access to the WhatsApp messenger program, being able to complete the questionnaire physically and mentally and having the consent to participate in the study. Exclusion criterion: an incomplete questionnaire.

This descriptive-analytical cross-sectional study was conducted during September of 2021 and simultaneously with the fifth wave of Covid-19 in Urmia, Iran. The study's statistical population was all people older than 18 years old living in Urmia who had access to cyberspace.

The questionnaire was designed electronically and its direct link was published via the WhatsApp social network. At the beginning of the electronic questionnaire, sufficient explanations were given to the participants about the research purpose and inclusion criteria. They were assured that their participation in the study would be completely voluntary and they would be able to leave the study if they wanted, and their information would be kept confidential, and the results would be reported generally. Before completing the questionnaires, coordination was done with the samples so that if they had any questions related to the items in the questionnaire, they could contact with researcher and the researcher was committed to answer. In this way, the questionnaires were completed with the guidance of the interviewer using self-report.

The data collection tool consisted of three parts. The first part included the demographic information of the participants. The second part included the Whole Health System Trust Scale. The questionnaire was designed, and its validity and reliability were obtained by Straten et al. to measure the level of public trust in the health care system [10]. In Iran, the validity and reliability of the Persian version of the questionnaire were studied by Ebrahimipour et al., and the results indicated that the questionnaire had acceptable validity and reliability [11]. The Persian version of the tool consisted of 33 questions with 6 dimensions, including patient focus of providers (6 questions), policies at the macro level will be without consequences for the patient (6 questions), health care providers' expertise (4 questions), quality of care (9 questions), information supply and communication by care providers (6 questions), and quality of cooperation between service providers (2 questions). The tool was scored in a 5-point Likert range (very low=1, low=2, neutral=3, high=4, and very high=5). High scores in this questionnaire indicated a higher level of trust in the health care system. According to the cut-off point used by Ebrahimipour et al., If the score obtained by a participant is from zero to 20 out of 100% of the total score, it indicates very low trust in the health care system, the score of 20 to 40 indicates low trust, 40-60: moderate trust, 60-80: high trusts, and 80-100: very high trust [11].

The third part included the COVID-19 Preventive Behaviors Questionnaire. This questionnaire was designed by the research team of the present study to measure the level of adhere to COVID-19 preventive behaviors. The final version of this questionnaire contains 16 questions and all questions are scored on a 4-point Likert scale, including Never (1), Sometimes (2), Often (3), and Always (4). There is no reverse scoring. The total score was converted into a percentile. A score ≥ 75% was designated as high, 50–75% as moderate, and ≤ 50% as low level of behavior. The questions about covid-19 preventive behaviors were designed based on the health protocols by the World Health Organization, as well as the Ministry of Health and Medical Education, Iran, and then its validity and reliability were measured and approved. It had two dimensions including individual such as frequent hand washing and social such as social distancing. Face validity (qualitative) and content validity (quantitative) were used to determine the validity. In qualitative face validity, 10 members of the target group were interviewed face to face, and were asked about the appropriateness and relationship of items, the existence of ambiguity, and misconceptions of items and words in the questionnaire, and also difficulty in understanding the items and words in the questionnaire, and if there was any problem, their opinions were taken and included in the questionnaire [12, 13]. In quantitative content validity, the questionnaire was given to 10 experts in fields related to research and instrumentation, and the content validity ratio (using the criterion of necessity) and the content validity index (using the criteria of relevance, clarity, and simplicity) were calculated. The questions with a content validity ratio of greater than 0.62 and a content validity index of greater than 0.79 were accepted [12, 13]. Cronbach's alpha coefficient measured reliability. To this end, the pilot questionnaires were given to 30 individuals in the target group. After completing the questionnaires, Cronbach's alpha coefficient was calculated to be 0.89; hence, the reliability of the tool was optimal [12, 13].

Data were analyzed in SPSS 16 using descriptive statistics (mean, standard deviation, frequency, and percentage) and analytical statistics, including Kolmogorov-Simonov test (to check the data normality), Independent t-test, One-way ANOVA, Pearson correlation, and Multiple linear regression with the Enter method. Results were considered significant at a statistical level of ($P<0.05$).

RESULTS

Based on the research results, the mean age of the participants was 32.76±13.04 years. The average household size was four people. The majority of research units were female (53%), single (53.4%), with a bachelor's degree (35.7%), college students (28%), had medium economic status (50.2%), and owned houses (72%), and the majority

of them also reported that they had no history of COVID-19 (58.5%) (Table 1).

TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Variable		n (%)	Variable		n (%)
Gender	Male	237(47.0)	Employment status	Housewife	64(12.7)
	Female	267(53.0)		Government employee	103(20.4)
Marital status	Single	269(53.4)		Self-employed	100(19.8)
	Married	235(46.6)		Retired	30(6.0)
Educational status	Middle school	27(5.4)		College student	141(28.0)
	High school	49(9.7)		Worker	45(8.9)
	Diploma	86(17.1)		Unemployed	21(4.2)
	Associate degree	70(13.9)	Housing situation	Tenant	141(28.0)
	Bachelor degree	180(35.7)		Homeowner	363(72.0)
	Master degree	57(11.3)	History of Covid-19	Yes	209(41.5)
	Doctorate	35(6.9)		No	295(58.5)
Economic status	Low	44(8.7)	Age(year)	**Mean**	**SD**
	Medium	253(50.2)		32.76	13.04
	Good	169(33.5)	Household size	4.01	1.47
	Excellent	38(7.6)			

Abbreviations: n, number; SD, standard deviation

Table 2 presents the mean score of trust in the health care system and its dimensions, as well as the mean score of adherence to COVID-19 preventive behaviors. Among the 6 dimensions of trust in the health care system, the lowest mean score belonged to policies at the macro level will be without consequences for the patient (score of about 57.65 out of 100), and the maximum score belonged to the quality of cooperation between service providers (score of about 66.38 out of 100). The participants obtained about 62.93% of the total score of trust in the health care system, and it was at a moderate level. Furthermore, the mean score of COVID-19 preventive behaviors among the participants was about 76.74%, and it was at a moderate level based on the cut-off point suggested by Bloom[1] for health behavior performance [14].

Based on the findings of the present study, a statistically significant relationship was found between the COVID-19 preventive behaviors and all demographic variables. The mean scores of COVID-19 preventive behaviors were higher in women compared to men, in single participants compared to married ones, in those with bachelor's, master's, and doctoral degrees than those with diploma and lower degrees, in government employees and college students compared to housewives, workers, and unemployed participants, in homeowners compared to tenants, and among participants without a history of COVID-19 than those who had been infected before. It was also significantly lower among participants with poor economic status than other economic groups. Based on the findings, there was a significant negative correlation between COVID-19 preventive behaviors with age and household size, so that with increasing age and household size, so that scores of preventive behaviors decreased by aging (Table 3).

[1]According to Bloom's suggested cut-off point, if participants' scores are less than 60% out of 100% of the total performance score, their performance levels are poor, the score of 60-79 percent: moderate performance, and 80-100 percent: good performance [14].

TABLE 2. MEAN SCORES OF TRUST IN HEALTH CARE SYSTEM AND COVID-19 PREVENTIVE BEHAVIORS AMONG THE PARTICIPANTS

Variable		Mean±SD	Scale range[a]	Min-Max[b]	Mean score (Out of 100)
Trust in health care system	Patient focus of providers	18.87±5.04	6-30	6-30	62.92±16.82
	Policies at the macro level will be without consequences for the patient	17.29±5.09	6-30	6-30	57.65±16.97
	Health care providers' expertise	12.94±3.45	4-20	4-20	64.71±17.25
	Quality of care	29.43±6.22	9-45	9-45	65.41±13.82
	Information supply and communication by care providers	18.64±5.20	6-30	6-30	62.14±17.34
	Quality of cooperation	6.63±1.93	2-10	2-10	66.38±19.37
	Total	103.83±20.66	33-165	35-165	62.93±12.52
COVID-19 preventive behaviors		49.11±8.88	16-64	16-64	76.74±13.88

Abbreviations: SD, standard deviation

a,The lowest and highest values that can be obtained from the original scale.

b,The lowest and highest values obtained in this study.

TABLE 3: MEAN SCORE OF COVID-19 PREVENTIVE BEHAVIORS ACCORDING TO SELECTED DEMOGRAPHIC VARIABLES OF THE PARTICIPANTS

Mean±SD		Variable	p	Mean±SD		Variable	p
Gender	Male	48.24±8.80	0.038†	Employment status	Housewife	45.26±7.31^{ab}	0.001‡
	Female	49.89±8.90			Government employee	51.16±7.95^{acd}	
Marital status	Single	49.87±9.30	0.041†		Self-employed	48.96±8.65	
	Married	48.25±8.32			Retired	47.26±5.36	
Educational status	Middle school	44.14±8.42^{abc}	0.001‡		College student	51.69±9.65^{bef}	
	High school	46.38±9.11^{def}			Worker	43.09±6.93^{ce}	
	Diploma	47.40±9.58^{ghi}			Unemployed	46.22±9.65^{df}	
	Associate degree	48.22±8.63		Housing situation	Tenant	47.60±8.18	0.013†
	Bachelor degree	50.82±8.31^{adg}			Homeowner	49.70±9.09	

	Master degree	50.43±7.57[beh]		History of Covid-19	Yes	47.94±8.48	0.012[†]
	Doctorate	51.80±9.64[cfi]			No	49.94±9.08	
Economic status	Low	45.61±8.44[abc]	0.047[‡]	Age(year)	r (-0.174)	p (0.001)[*]	
	Medium	49.36±9.07[a]					
	Good	49.73±8.53[b]		Household size	r (-0.096)	p (0.031)[*]	
	Excellent	48.76±9.07[c]					

Abbreviations: SD, standard deviation

†, Independent T-test; ‡, One-way ANOVA; *, Pearson correlation

Same alphabet letters demonstrate a statistically significant difference between the two groups based on the Bonferroni correction method.

Based on results of the present study, there was a statistically significant relationship between trust in the health care system with marital status, economic status, employment status, and age so that the mean scores of trust in the health care system were higher among married participants compared to single people, in those with high economic status compared to weak and medium participants, in retirees than college students and the unemployed participants. There was also a significant negative correlation between trust in the health care system and age so that the trust score decreased by aging (Table 4).

Tables 5 and 6 present the regression coefficients of the predictors of COVID-19 preventive behaviors based on dimensions of trust in the health care system. Based on the findings of the tables, adapted regression coefficients, quality of care (β=0.178, p<0.003), patient focus of providers (β=0.140, p<0.10), policies at the macro level will be without consequences for the patient (β=-0.112, p<0.027), and the quality of cooperation between service providers (β=0.106, p<0.026) were respectively the most effective predictors of preventive behaviors among the general public of Urmia so that for one unit increase in scores of quality of care, patient focus of providers, and quality of cooperation between service providers increased the score of COVID-19 preventive behavior by about 0.178, 0.40, and 0.106 points respectively. Furthermore, one unit increase in scores of policies at the macro level will be without consequences for the patient decreased the score of COVID-19 preventive behavior by about 0.112 points (Table 6).

The dimensions of trust in the health care system predicted about 11.5% of the variance of COVID-19 preventive behaviors among the general public of Urmia. According to the classification of the coefficient of determination (R2) by Cohen, it was at the moderate level according to the classification of weak (0.02), moderate (0.13), and strong (0.26) [15] (Table 5).

TABLE 4: MEAN SCORE OF TRUST IN HEALTH CARE SYSTEM ACCORDING TO SELECTED DEMOGRAPHIC VARIABLES OF THE PARTICIPANTS

Mean±SD		Variable	p	Mean±SD		Variable	P
Gender	Male	104.76±22.81	0.324[†]	Employment status	Housewife	103.43±15.00	0.031[‡]
	Female	103.01±8.56			Government employee	106.74±21.74	
Marital status	Single	102.05±20.98	0.38[†]		Self-employed	103.68 ±23.65	
	Married	105.88±20.14			Retired	114.36±17.23[ab]	
Educational status	Middle school	103.55±17.57	0.701[‡]		College student	101.21 ±21.14[a]	
	High school	104.16±18.07			Worker	102.23 ±15.99	
	Diploma	101.18±18.55			Unemployed	100.04±18.39[b]	
	Associate degree	106.85±19.06		Housing situation	Tenant	105.03±17.77	0.378[†]

	Bachelor degree	103.18±22.65			Homeowner	103.37±21.69	
	Master degree	106.17±20.18		History of Covid-19	Yes	104.99±20.07	0.291†
	Doctorate	103.62±24.54			No	103.02±21.07	
Economic status	Low	97.20±16.67^{ab}	0.001‡	Age(year)	r (-0.157)	P (0.001)*	
	Medium	101.15±21.26^{cd}					
	Good	107.15±18.30^{ac}		Household size	r (0.078)	P (0.079)*	
	Excellent	114.63±24.74^{bd}					

Abbreviations: SD, standard deviation

†, Independent T-test; ‡, One-way ANOVA; *, Pearson correlation

Same alphabet letters demonstrate a statistically significant difference between the two groups based on the Bonferroni correction method

TABLE 5. PREDICTORS OF COVID-19 PREVENTIVE BEHAVIORS AMONG THE PARTICIPANTS ACCORDING TO THE DIMENSIONS OF TRUST IN HEALTH CARE SYSTEM

Dimensions of trust in health care system	Unstandardized coefficients		Standardized coefficients	t	p	R^2
	B	SE	β			
Patient focus of providers	0.357	0.096	0.203	3.711	0.001	0.115
Policies at the macro level will be without consequences for the patient	-0.297	0.090	-0.170	-3.312	0.001	
Health care providers' expertise	0.004	0.145	0.002	0.031	0.975	
Quality of care	0.335	0.086	0.234	3.900	0.001	
Information supply and communication by care providers	-0.093	0.104	-0.054	-0.889	0.374	
Quality of cooperation	0.362	0.227	0.079	1.597	0.111	

TABLE 6. PREDICTORS OF COVID-19 PREVENTIVE BEHAVIORS* AMONG THE PARTICIPANTS ACCORDING TO THE DIMENSIONS OF TRUST IN HEALTH CARE SYSTEM

Dimensions of trust in health care system	Unstandardized coefficients		Standardized coefficients	t	p	R^2
	B	SE	β			
Patient focus of providers	0.246	0.096	0.140	20574	0.010	0.196
Policies at the macro level will be without consequences for the patient	-0.195	0.088	-0.112	-2.218	0.027	
Health care providers' expertise	0.053	0.141	0.021	0.379	0.705	
Quality of care	0.254	0.084	0.178	3.015	0.003	
Information supply and communication by care providers	-0.021	0.101	-0.013	-0.211	0.833	
Quality of cooperation	0.488	0.219	0.106	2-227	0.026	

* Adjusted variables: age, gender, marital status, educational status, employment status, economic status, history of Covid-19, and household size

DISCUSSION

According to the research results, the people in Urmia were slightly above average in terms of trust in the health care system and also in terms of adherence to COVID-19 preventive behaviors. Consistent with the results of the present study, the majority of people in Shiraz were at a moderate level in terms of trust in the health care system in a study by Movahed et al. [9]. In a study by Molavi Vardanjani et al. in 15 provinces of Iran [16], public trust in the health care system was low during the outbreak of COVID-19 in Iran. In Molavi Vardanjani et al.'s study, the reason for the low level of public trust in the health system compared to other studies is attributed to the Covid-19 crisis. Because the Molavi Vardanjani et al.'s study was conducted during the Covid-19, while the studies that were used to compare their findings were not conducted during a public health crisis. A study in China indicated that only about 28% of Chinese had full trust in their health care system [17], and in a study conducted during the covid-19 pandemic among the health care workers of Pakistan, the findings showed that 50% of the participants did not trust the health care system [18]. Also, studies in various countries also indicated that public trust in national health care systems was decreasing [16].

According to the above-mentioned comparisons, people in Urmia were at a higher level of trust in the health care system than the national average and compared to the findings of other studies but given the importance of trust in the health care system, efforts should be made to increase it among the general public.

Given the positive and direct correlation between trust in the government and the health care system, the Iran Ministry of Health and Medical Education must seriously lobby to strengthen the general increase in the health care system and receive support from all levels of

government.16 In the current status of the COVID-19 epidemic, rumors and misinformation spread by individuals, groups, or other countries with political-economic purposes are the main reasons for the decline in public trust in the health care system; hence, policymakers must carefully examine the quality of information published from various sources (especially social networks). They should also use different and reliable sources of information when immediate health information is spread to ensure that different populations have access to this information timely, and thus prevent the spread of misinformation [16, 19].

In critical situations, it is necessary to communicate clearly and honestly with people and clarify the reasons for the decisions made about the crisis, establish two-way communication, and listen to the public voice to help increase public trust in the health care system [16].

Different statistics have been reported in different studies on the degree of adherence to COVID-19 preventive behaviors among the general public. For example, in a study by Abbasi Kanguri et al. [20], Tavassoli et al. [21], and Baghernejad Hesari [22], participants were respectively scored about 86.20, 63.12, and 65.96 out of 100 for COVID-19 preventive behaviors. Given that the adoption of preventive behaviors is the main way to control and prevent COVID-19, there is a need to design and implement a variety of interventions, especially health education interventions to improve this index regardless of the individuals' levels of adherence to these behaviors.

Based on the findings of the present study, the quality of care was the strongest predictor of COVID-19 preventive behaviors, and the adherence to COVID-19 preventive behaviors increased among people of Urmia by increasing their trust in the quality of cares provided by the health system. Consistent with the present study, Amuta-Jimenez et al. found that trust in the quality of cares provided by the health care system was a positive and significant predictor of routine medical screenings [23]. Therefore, it is suggested to integrate strategies related to the improvement of quality of services in all interventions that are designed and implemented to increase public trust in the health care system and promote COVID-19 preventive behaviors. These strategies include providing correct and up-to-date hygienic instructions of COVID-19, teaching the correct method of performing COVID-19 preventive behaviors, providing timely services for the prevention and control of COVID-19, and observing existing standards in the field of prevention and control of COVID-19 [10].

Patient focus of providers was another predictor of COVID-19 preventive behaviors. The individuals' adherence to COVID-19 preventive behaviors increased by enhancing their trust and belief that the care provided by the health care system was patient-centered. In patient-centered care, patients (care recipients) are more involved in decisions about the care they receive. Consistent with the

present findings, Kahn et al. found that patient-centered care was a positive and significant predictor of adherence to treatment among patients with breast cancer [24]. Treatment adherence was lower in patients who received less support from service providers and were less involved in their treatment decisions and were less informed about side effects of medications. It can be expected that increasing public participation in decisions and policies about the prevention and control of COVID-19 will increase the adherence to COVID-19 preventive behaviors.

Based on the findings of the present study, policies at the macro level will be without consequences for the patient were negative and significant predictors of COVID-19 preventive behaviors. Increasing the participants' trust in macro-level health policies decreased their adherence to COVID-19 preventive behaviors. A possible reason for this finding is that higher trust in macro-level policies to control COVID-19 (including quarantine of infected patients, disease detection, punishment for violation of the COVID-19 rules, and closure of schools and universities), leads to a misconception that the implementation of these policies by the government and the health care system is enough to control the disease, and there is no need to observe individual behaviors such as wearing masks, observing social distance, and regular hand washing.

Therefore, it is suggested to use strategies and methods in health education to correct misconceptions and attitudes towards control and prevention of COVID-19 in designing and implementing interventions about the promotion of COVID-19 preventive behaviors among the general public. These strategies include holding group discussions and resolving existing misunderstandings in this field [25].

The quality of cooperation between service providers was another predictor of COVID-19 preventive behaviors, and thus the adherence to COVID-19 preventive behaviors increased among people by increasing their belief and trust in good cooperation and coordination of health care service providers. Cooperation and coordination among health care service providers are essential to provide high-quality services [26], and as mentioned in previous discussions, high-quality services can increase public trust in the health care system, leading to adherence to health orders [23,27].

Therefore, cooperation and coordination between service providers working in the field of COVID-19 control and prevention are essential to promote COVID-19 preventive behaviors among the general public (an example of coordination is that conflicting information is not available to the public) [10].

Consistent with the findings of the present study, Chan et al. studied those who had higher trust in the health care system and found that they had a higher resilience to adherence to COVID-19 preventive behaviors, including preventive behavior of staying at home [4]. Furthermore, Wong et al. conducted a study in Hubei province of China and found that people with higher trust in the information published about COVID-19 (such as definitively diagnosed, deaths, etc.), and preventive instructions (including quarantine) provided by local, provincial, and central governments also had higher adherence to preventive behaviors and searched for treatment during the COVID-19 epidemic [5].

Due to the lack of studies on the current subject, the present study can be a basis for future studies, especially intervention studies that will be designed and implemented to promote COVID-19 preventive behaviors in the general public. A limitation of the present study was that the data were collected by the self-reported method and there was the possibility of unreal answers from the participants. Due to the cross-sectional nature of the study, the relationships between the variables did not necessarily indicate a causal relationship.

CONCLUSION

Based on the research results, four dimensions of trust in the health care system, including quality of care, patient focus of providers, policies at the macro level will be without consequences for the patient, and the quality of cooperation between service providers, were the most effective predictors of COVID-19 preventive behaviors among the general public of Urmia.

In order to promote adherence to COVID-19 preventive behaviors among the general public, it is suggested to improve the quality of care provided for the prevention and control of COVID-19 in the society; provide customer-centered cares relating to prevention and control of COVID-19; attract public trust to the macro level policies relating to prevention and control of COVID-19; and create cooperation and coordination among services providers working in the field of prevention and control of COVID-19.

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CONFLICT OF INTEREST:

The authors declare no conflict of interest.

ETHICAL CONSIDERATION:

The ethical approval for the study was obtained from the Research Ethics Committee of the Vice-Chancellor of Research and Technology of Urmia University of Medical Sciences (IR.UMSU.REC.1400.202).

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RESEARCH ARTICLE

IMPACT OF THE COVID-19 PANDEMIC ON BLOOD TRANSFUSION SERVICE: A CASE STUDY FROM KOLKATA, INDIA

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ABSTRACT

BACKGROUND:

The emergence of coronavirus disease (COVID-19) has posed a significant threat to public health all over the world and it has been a difficult challenge for blood banks in India to cope with the situation. In this study, the effect of the COVID-19 pandemic on the blood transfusion service of India has been assessed.

METHOD:

The present study is conducted in a stand-alone community blood bank situated in the city of Kolkata, India. A comparative evaluation of supply, demand, and utilization of blood components by analysing pre-pandemic and post-pandemic data from 2017 to 2020 has been presented.

RESULT:

As no blood donation camp could be organized due to the country-wide lockdown along with restrictions in mobility and large gatherings during the initial period after the outbreak of the pandemic, a significant reduction of 80.35% in blood collection was observed. The demand for the Packed Red Blood Cell was decreased by 75% due to the postponement of elective surgeries and non-urgent clinical interventions. Blood utilization patterns also changed as 40% of the Packed Red Blood Cell was issued to thalassemia patients during this period.

CONCLUSION:

Based on the evaluation of blood bank performance under pre-pandemic and post-pandemic conditions, recommendations such as spreading public awareness, maintaining sufficient safety stock, proper training of blood banking staff, communicating with nearby hospitals, donors, and medical professionals have been identified to be helpful to mitigate the adverse effects of extreme situations such as a pandemic.

KEYWORDS

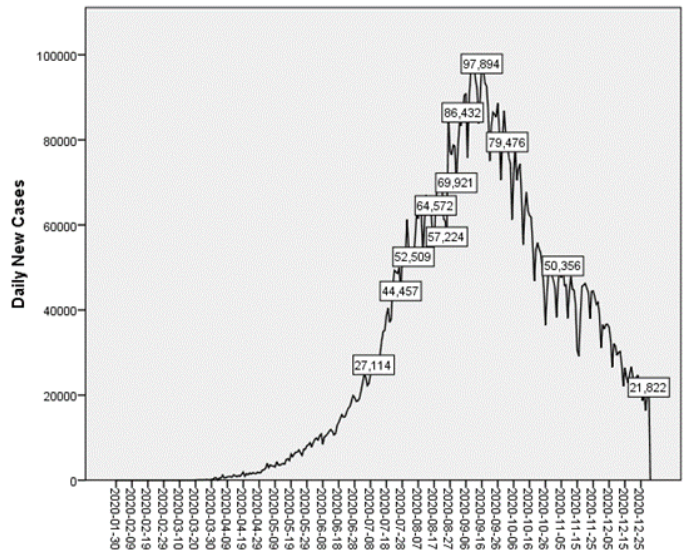
blood bank, pandemic, COVID-19, blood transfusion, healthcare policies.

INTRODUCTION

Coronavirus disease (COVID-19), caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), was first reported on 31st December 2019 at Wuhan city of Hubei province in China [1]. COVID-19 was identified as a public health emergency of international concern on 30th January 2020, and it was declared a global pandemic on 11th March 2020 by World Health Organization (WHO) [1, 2]. COVID-19 affected 231 countries and territories, with over 685 million confirmed cases worldwide. The first case

of COVID-19 in India was identified in Kerala on 27th January 2020. The government of India took a number of measures in an attempt to restrict the spread of the virus. A country-wide 21-day lockdown was announced on 25th March 2020, extending until 31st May 2020 in four phases [3]. Despite taking all possible restrictions, the virus transmitted rapidly, affecting 10 million people during 2020. Figure 1 displays the number of daily new COVID-19 cases in India during 2020.

FIGURE 1: NUMBER OF DAILY NEW CASES OF COVID-19 IN INDIA DURING 2020



The onset of the COVID-19 pandemic disrupted the social and economic system of India and created panic among the population [4]. Most importantly, it has a severe detrimental effect on the healthcare system of the country [5].

A blood bank is an integral part of any healthcare facility, ensuring the smooth functioning of the entire system. Blood transfusion therapy is vital for various blood disorders like thalassemia, sickle cell anaemia, haemophilia, along with cancer, postpartum haemorrhage, and different surgical procedures. Rapid improvement in blood banking in the last few decades has led to a sharp increase in demand for blood components [6]. Blood is treated as a 'drug' in India under the Drug and Cosmetics Act 1940. Unlike central blood banking system of some countries, India has a mixed blood banking system with a total of 3321 licensed blood banks, including central blood banks, hospital blood banks, and stand-alone community blood banks catering to a diverse population [7]. Although the availability of safe blood increased from 4.4 million units in 2007 to 12.5 million units by 2019-20, the annual clinical requirement is estimated at 14.6 million units of blood components [8]. The uncertain nature of supply and demand, variation of blood groups in the population, perishability, and different therapeutic usage of different blood components make the blood banking system very complicated [6]. The COVID-19 pandemic added more complexity to an already complex system creating a major imbalance in the supply and demand of blood, causing frequent shortages in various parts of the country [9-11].

This study aims to identify the problems being faced by a blood bank situated in the city of Kolkata, India, and the policies being taken to maintain a steady supply of blood while ensuring the safety of the blood donors, patients, and the blood bank staff during the COVID-19 pandemic. The findings will be advantageous for suggesting potential measures to address any such emergency situation in future. This study is intended to answer the following research questions (RQs)

RQ1. What is the impact of the COVID-19 pandemic on the supply, demand, and utilization pattern of blood products?
RQ2. What strategies were followed by the blood bank to ensure the continuous supply of safe blood during the pandemic?
RQ3. What measures were taken by the blood bank management to ensure safety in the blood bank during the pandemic?

In order to address the aforementioned research questions, pre-pandemic and post-pandemic data is collected for comparative analysis, and discussions are carried out with the blood bank management officials and medical officers of a stand-alone blood bank located in Kolkata, India.

LITERATURE REVIEW

As blood banks all over the world faced adversity caused by a pandemic for the first time, researchers analysed its impact on the blood banking systems of different countries. American Red Cross, the single blood supplier in the United States, estimated that 4,600 blood drives were cancelled with a loss of 143,600 units of blood [12]. Loua et al conducted a survey in 37 countries of the WHO African region and reported a drop of 12.1% in blood donation in 21 countries [13]. Another survey conducted by Al-Riyami et al in 15 countries in eastern Mediterranean region showed that the blood supply decreased by 10-75% during the first month of the pandemic [14]. In China, Wang reported a 67% decrease in the number of whole blood

donors in Zhejiang province, whereas Leung and Lee observed a noticeable drop in blood collection at a regional blood centre [15, 16]. Similar studies reported a significant reduction in the supply of blood at King Abdulla Hospital in Saudi Arabia, Iranian Blood Transfusion Organization, the Brazilian blood bank network, and blood banks in Italy and India [17-20, 9]. Senapati et al reported a 56% reduction in transfusion sessions in a haematology centre in India [21]. Pál et al also observed a decrease in blood product usage during the first months of the pandemic in a blood centre in Hungary [22]. Vasconcelos et al reviewed research papers related to the impact of natural disasters and pandemics and highlighted the lack of emergency plans for any extreme situation [23]. However, researchers recommended various preventive measures and discussed the best practices that have emerged in blood transfusion services during the pandemic by presenting contingency planning in the event of predicted shortage, types of blood supply interventions, and blood campaigns using bloodmobiles [24-27].

No study has been found to have considered the impact of the COVID-19 pandemic on all aspects of the blood banking system. A holistic approach is taken in this paper to capture the changes in the blood supply, demand, and utilization of blood components of an Indian blood bank during the pandemic.

PROCESS MAP OF BLOOD BANK SYSTEM

In a typical Indian blood bank, blood is collected from voluntary non-remunerated healthy donors in blood donation camps, blood mobile, and in the blood bank after fulfilling a number of eligibility criteria set by the National Blood Transfusion Council of India. The collected blood is then transferred to the blood bank, and recommended tests are performed to screen out the contaminated blood units. The useful Whole Blood (WB) units are then typed into a particular blood group (A+, B+, O+, AB+, A-, B-, O-, AB-), and blood components, i.e. Packed Red Blood Cell (PRBC), Fresh Frozen Plasma (FFP) and Platelet are prepared, to be stored under appropriate conditions. Upon receiving a request from the physician, the compatible blood component is issued to the patient after cross-matching and blood grouping following the FIFO (First In First Out) issuing policy. Figure 2 displays the process map of a typical blood bank in India.

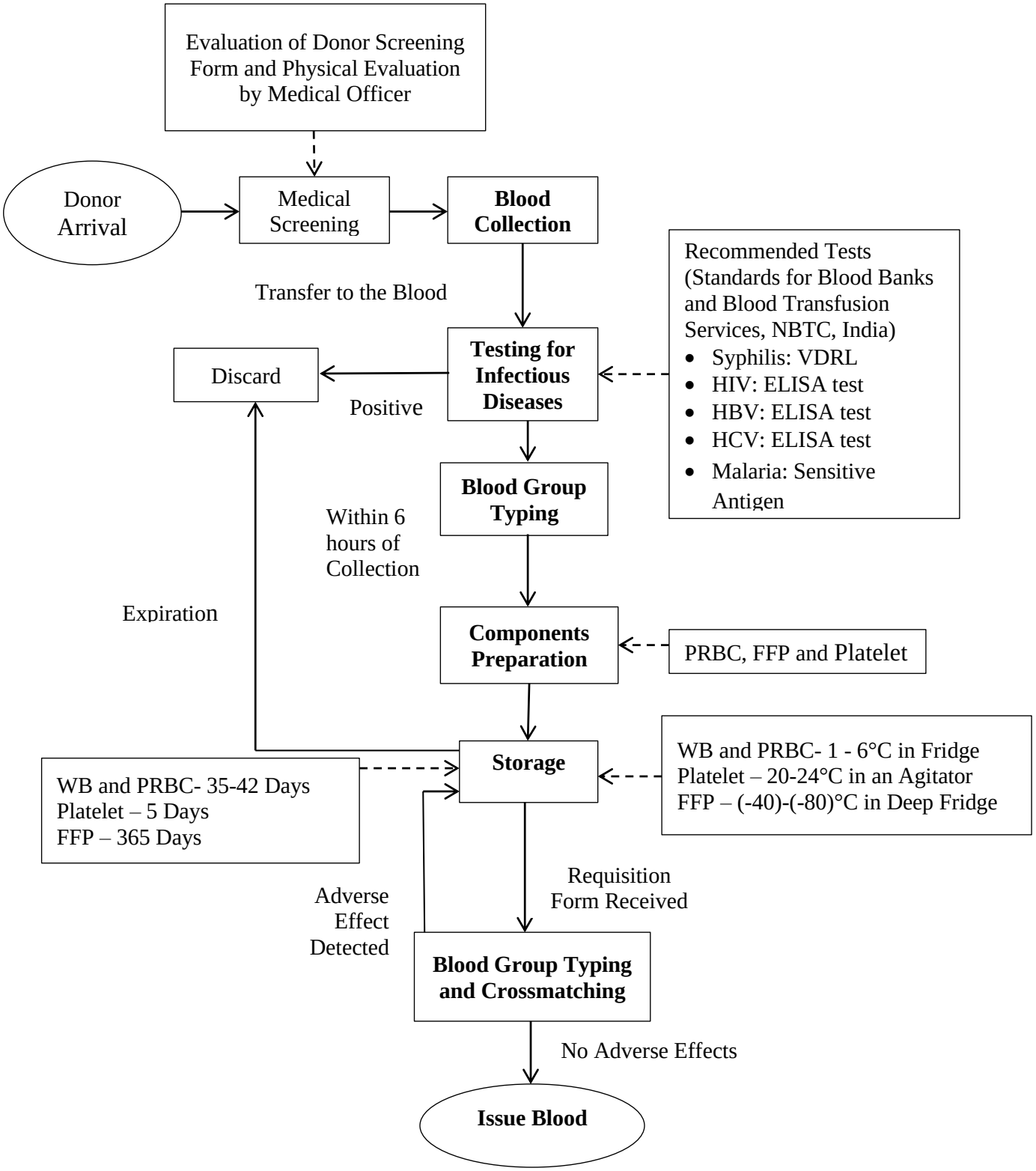
MATERIALS AND METHODOLOGY

Case study method is used in this research to identify the consequences of COVID-19 pandemic on the blood banking sector of India. A systematic approach was taken to collect data regarding various activities of blood banking and draw meaningful insights about the effect of the pandemic using numerical and graphical descriptive statistical methods [17, 19, 22].

The study was conducted in a well-known stand-alone community blood bank located in Kolkata, India. The blood bank acts as a common inventory to many hospitals in the region and has provided blood components to 5,319 patients in 2019. Additionally, the blood bank supplies blood to more than 100 thalassemia patients on a regular basis. Data regarding blood collection, blood component processing, testing, and daily demand for different therapeutic practices have been collected from the blood bank registry books from 2017 to 2020. The data regarding supply and demand is aggregated on monthly basis and described using time series graphs, means, and standard deviation, whereas different categorical data is described using percentages and frequencies with the help of SPSS version 22.0.

Discussions were carried out with management officials and medical officers about the preventive measures that were taken to contain the spread of the COVID-19 virus at each stage of blood banking and to ensure the timely availability of safe blood during the pandemic. Permission for conducting the study and collecting data for academic and research purposes was obtained from the authority of blood bank. In order to maintain confidentiality, the name of the studied blood bank is not mentioned in the paper. Moreover, data regarding daily stocks of blood components of all blood banks of India are available in the Centralized Blood Bank Management System of India at eRaktKosh (https://www.eraktkosh.in). This work does not involve any human research subjects or human participants.

FIGURE 2: PROCESS MAP OF BLOOD BANK SYSTEM (SOURCE: AUTHOR CREATED)



RESULTS

The onset of COVID-19 pandemic and the rapid increase in the number of infected people have significantly affected the entire healthcare industry in India. Challenges faced by the blood bank under study at the time of the pandemic is discussed in detail, and related data has been presented in this section.

IMPACT ON BLOOD COLLECTION

Figure 3 displays the monthly collected units of blood from 2017 to 2020. It shows a sharp reduction in blood donation after the outbreak of the pandemic in the blood bank under study. Total blood collection decreased by 20.90% in 2020 compared to 2019, with a significant reduction of 80.35% during April 2020 (first month of lockdown) compared to March 2020.

Figure 4 displays the expected number of donors to the actual number of blood donors to the useful blood units from 2017 to 2020. Out of 7,016 expected donors from 97 planned blood donation camps during 2020, only 5,395 donors turned up for the blood donation. Notably, 80.5% of the donor is male, whereas only 19.5% is female. 197 blood units were discarded due to the presence of different reactive agents in the blood, making 96% of the collected blood units safe to be transfused to the patients.

The blood bank encouraged the blood recipients to get a donor from their family or friends. A total instance of 174 replacement donations was noted during the pandemic in 2020 in the blood bank under study. Blood was collected by only replacement donation in the blood bank itself during April 2020.

Table 1 shows group-wise distribution of collected blood from 2017 to 2020. In 2020, 36.92% of the collected blood is of type B+, followed by 28.85% with type O+, which is similar to previous years.

FIGURE 3: MONTHLY BLOOD COLLECTION

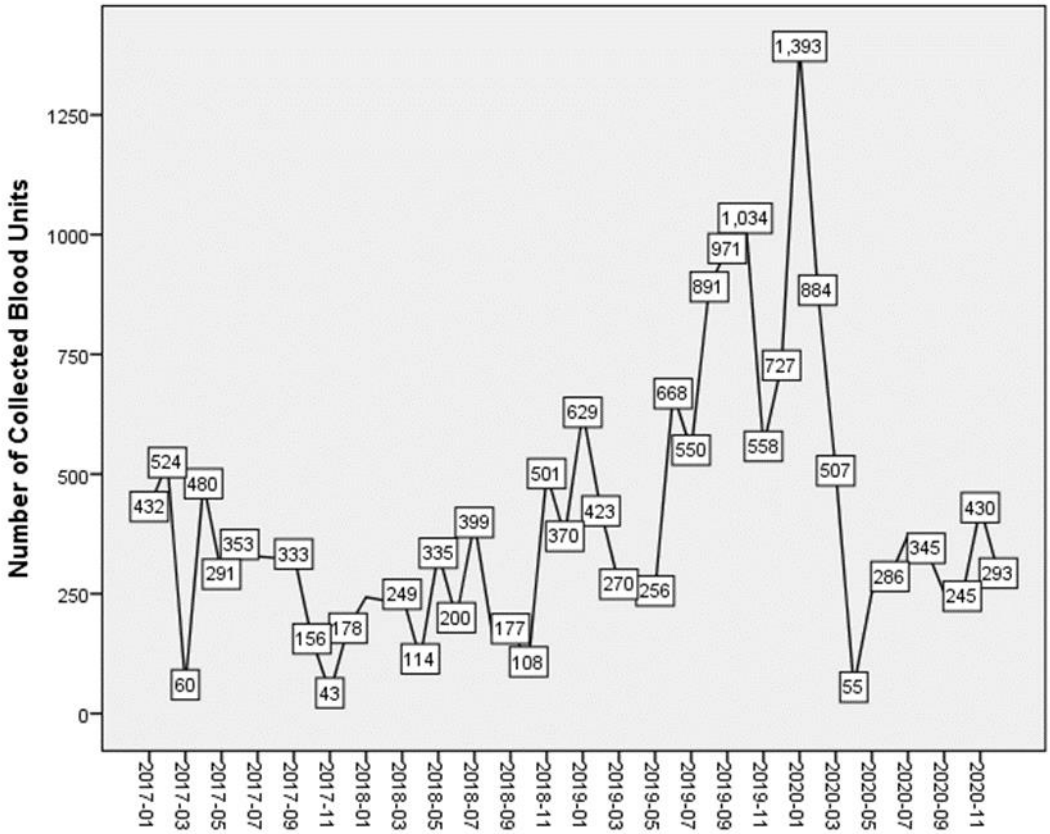


FIGURE 4: EXPECTED VS ACTUAL VS SAFE BLOOD DONATION

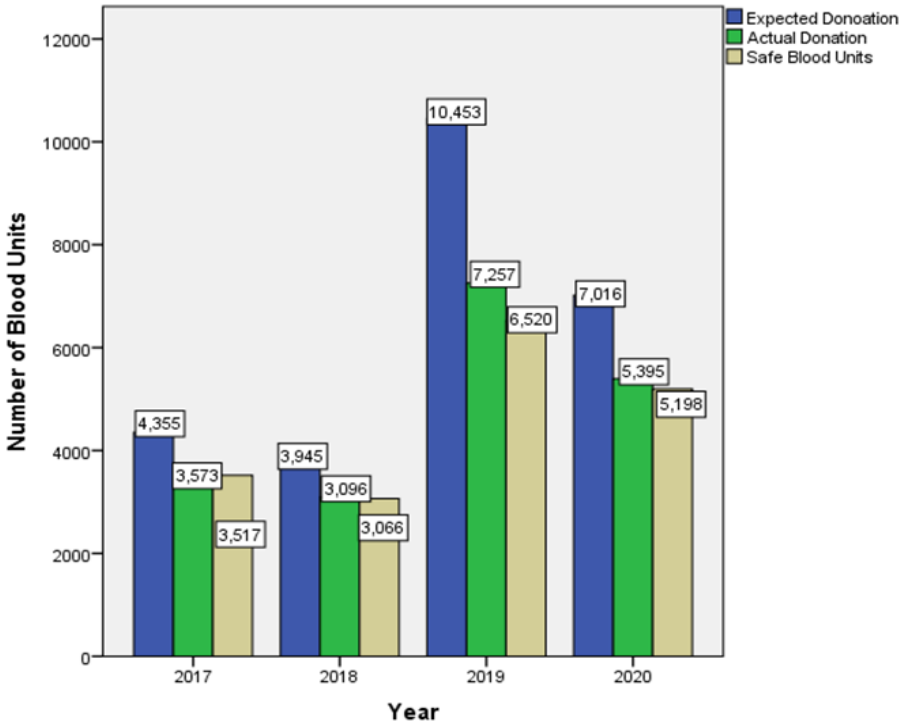


TABLE 1: GROUP-WISE DISTRIBUTION OF COLLECTED BLOOD DURING 2017 TO 2020

Year	Blood Units Collected	Group-Wise Distribution of Collected Blood (in %)							
		A+	B+	AB+	O+	A-	B-	AB-	O-
2017	3540	21.97	38.92	9.93	30.32	0.68	1.03	0.29	0.85
2018	2967	22.89	37.78	8.32	30.39	0.69	1.17	0.28	0.93
2019	7098	20.93	37.75	9.34	29.38	0.64	1.07	0.16	0.74
2020	5227	21.52	36.92	10.06	28.85	0.69	0.96	0.27	0.73

Deficiency in blood supply affected the inventory levels of the blood components. The stock level of PRBC dropped by 92.59%, and that of FFP dropped by 43.17% in April 2020 compared to March 2020. It is noteworthy that there was no stock of PRBC for 3 days, and the stock was lower than ten units for 13 days in 2020. Shortage of rare blood groups was also a major concern during this period.

IMPACT ON DEMAND OF BLOOD COMPONENTS

The demand for different blood components is usually very uncertain in nature. During the pandemic, the demand pattern became even more unpredictable and an overall decrease in demand for blood components was observed. Figure 5-8 displays the monthly demand of WB, PRBC, FFP, and Platelets from 2017 to 2020. Figure 6 shows a 75% reduction in demand for PRBC, and Figure 7 shows an 80% reduction in the demand for FFP in April 2020 compared to March 2020.

In the blood bank under study, 5,162 units of PRBC, which is 89% of the acquired blood components, were issued to the patients in 2020. Table 2 shows the mean daily demand and the standard deviation of the daily demand of PRBC. The high standard deviation of daily demand of PRBC shows the highly uncertain nature of demand.

Table 3 displays the PRBC demanded by the blood group from 2017 to 2020. It can be observed 35.54% of the demanded PRBC is for B+ blood group, followed by 29.5% for O+ blood group during 2020, which is similar to previous years.

FIGURE 5: MONTHLY DEMAND OF WB

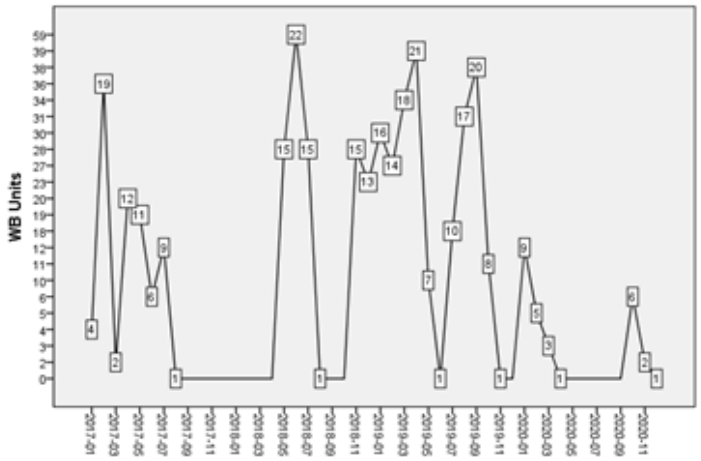


FIGURE 6: MONTHLY DEMAND OF PRBC

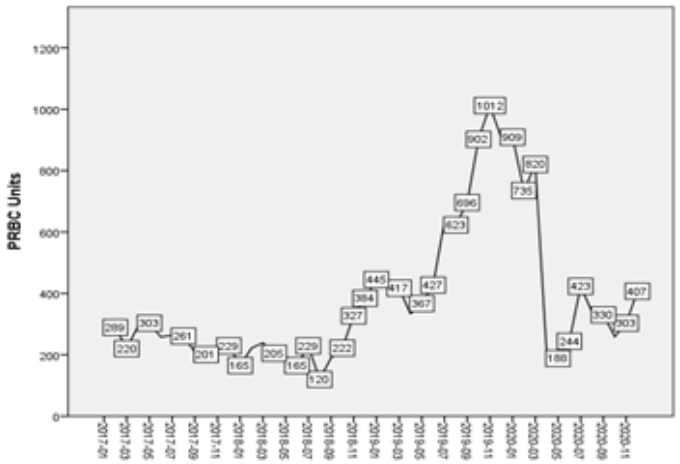


FIGURE 7: MONTHLY DEMAND OF FFP

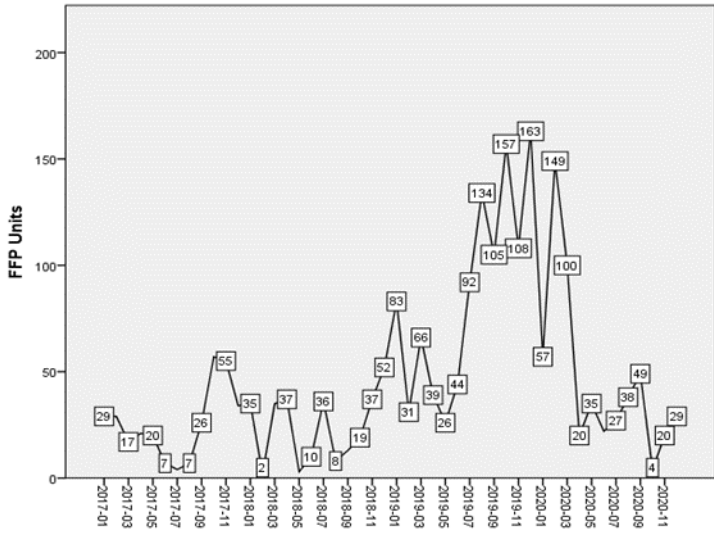


FIGURE 8: MONTHLY DEMAND OF PLATELET

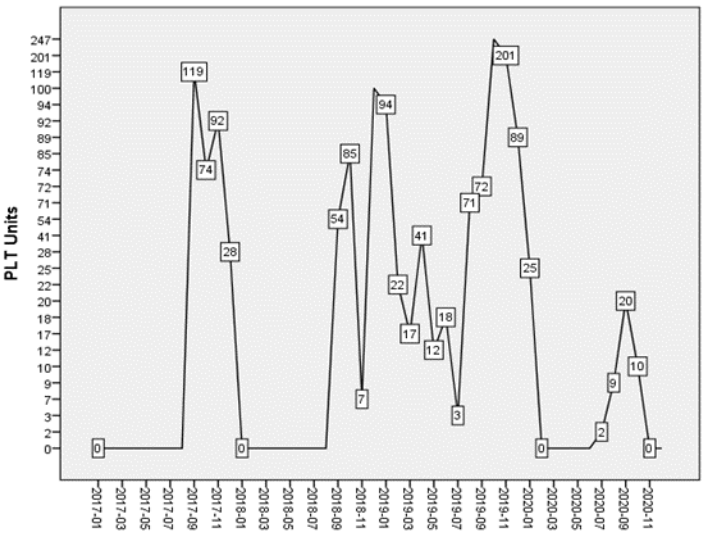


TABLE 2: VARIATION OF DEMAND OF PRBC ACCORDING TO BLOOD GROUPS DURING 2020

	A+	B+	O+	AB+	A-	B-	O-	AB-
Mean of Daily Demand of PRBC	3.16	5.03	4.18	1.4	0.11	0.14	0.11	0.02
Standard Deviation Daily Demand of PRBC	3.521	4.576	4.019	2.02	0.376	0.408	0.383	0.146

TABLE 3: BLOOD GROUP-WISE DEMAND OF PRBC DURING 2017 TO 2020

Year	Group-Wise Distribution of Demanded PRBC (%)							
	A+	B+	O+	AB+	A-	B-	O-	AB-
2017	21.22	35.36	30.54	9.68	0.77	1.16	1.00	0.27
2018	22.28	34.96	31.57	8.33	0.56	1.31	0.81	0.28
2019	21.31	36.02	30.49	9.80	0.61	0.98	0.60	0.20
2020	22.31	35.54	29.50	9.87	0.77	1.00	0.77	0.23

UTILIZATION PATTERN OF BLOOD COMPONENTS

Figure 9 displays the percentage of different clinical reasons for which blood was issued to patients from the blood bank under study during 2020. Out of 3,810 blood recipients, 50.95% of the patients were male, and 49.05% are female. 31.13% of the demanded blood component was issued to patients with chronic anaemia followed by 30.29% for thalassemia patients.

FIGURE 9: PERCENTAGE OF BLOOD DEMANDED BY CLINICAL REASON DURING 2020

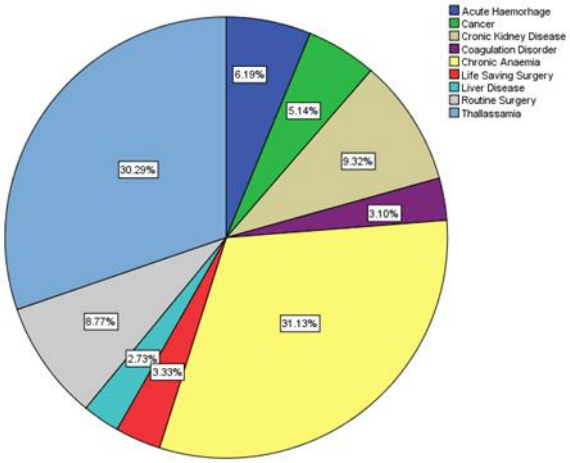
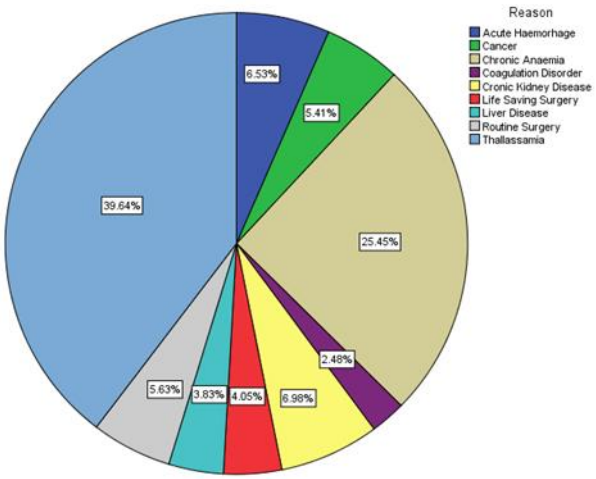


Figure 10 displays the blood component demanded for different clinical reasons during the complete lockdown period in India (April-May 2020). 40% of blood was acquired by thalassemia patients, followed by 25% for patients with chronic anaemia.

FIGURE 10: PERCENTAGE OF BLOOD DEMANDED BY CLINICAL REASON DURING APRIL-MAY 2020



DISCUSSION

Reduction of blood donations was observed all over the world during the first few months after the outbreak of the pandemic [12-22]. Collection of blood is not very easy, and it is even more difficult during the pandemic [28]. In India, the country-wide lockdown and subsequent restriction of mobility and large gatherings led to the cancellation of planned blood drives. No blood donation camp could be arranged during the first month of the lockdown (April 2020) because of the closed educational institutes and workplaces. Moreover, several newly imposed deferral criteria and the fear of getting infected during the blood donation process led to an acute shortage of blood supply [29]. Donors were encouraged to donate blood in the blood bank with appointments to ensure safety and avoid gathering. Although voluntary blood donation is considered to be the safest practice for blood collection, replacement donation plays an important role in maintaining a sufficient inventory level of blood in this circumstance [30]. During the pandemic, the cost of personal protective equipment, face shield, face mask for the medical officers and the blood banking staff, in addition to sanitization equipment increased the cost of blood collection. Disrupted supply of consumable products was observed during this period because of the limited production, restricted transportation, and closed international borders.

To avoid any possible transmission of COVID-19 from blood donation and blood transfusion, the apex body of the blood banking system in India, the National Blood Transfusion Council (NTBC), the Ministry of Health and Family Welfare, Government of India, developed some policies. Considering the specific condition of the blood bank, the management also took suitable measures to keep the healthcare workers safe amidst the pandemic. The studied blood bank was operated by a limited number of medical officers, laboratory technicians, and nurses. Less numbers of laboratory technicians were assigned to various tasks of the blood bank to avoid any gathering. The working hours of the blood bank were reduced by closing the blood bank services at night. Transportation was provided to the blood bank employees so that they were less exposed to any asymptomatic carrier of COVID-19. If any blood bank staff developed any symptoms of COVID-19, they were tested and quarantined for 14 days. The blood bank staff were vaccinated as soon as the COVID-19 vaccine was available.

After the initial period of the pandemic, blood donation camps were organized in a large open area, which increased the blood supply. Thermal checking, wearing of protective masks, maintaining hand hygiene for blood donors and blood bank staff, safe disposal of bio-medical waste, maintaining social distancing, and repeated sanitization of the donation area were made compulsory by the blood bank management [29]. Donors with symptoms of COVID-19 were automatically deferred in the donor screening process [1]. To avoid the spread of the virus from asymptomatic and pre-symptomatic donors during the blood donation process, donors with international travel history, possible exposure to a confirmed or suspected case of COVID-19, and donors who recovered or got vaccinated were deferred for 28 days [29].

During the pandemic, the demand for blood decreased due to the postponement of elective surgeries and non-urgent clinical interventions as per the directive from the Government of India, and reduction in the number of road traffic accidents due to the lockdown [21, 24]. The blood bank medical officials were communicating with the physicians and the blood component was acquired only if it is absolutely necessary. Preoperative anaemia management was encouraged to reduce to demand for PRBC. The blood bank strictly followed FIFO issuing policy during this period. As delay or unavailability of blood may deteriorate the health of patients, who needs regular blood transfusion, the studied blood bank prioritized the thalassemia patients. Only after ensuring sufficient stock for such patients the blood bank accepted the request for blood requisition in an emergency condition.

CONCLUSION AND RECOMMENDATION

The world faced an unprecedented challenge when COVID-19 started to spread rapidly, affecting millions of people. Years of planning to face an unforeseen pandemic failed as the healthcare industry struggled to cope with the situation. As a developing and the second-most populous country in the world, India was hit by the abruptness of the outbreak. As healthcare professionals struggled to provide appropriate care to patients affected by COVID-19, patients with other severe medical conditions strived to survive. Being one of the most essential healthcare inputs, a continuous blood supply is necessary all the time. To manage this unforeseen challenge, several policies were taken by the blood bank as well as the Government of India to avoid any undesirable events and balance the supply and demand of safe blood. In this paper, a comparative analysis pre-pandemic and post-pandemic data captures the impact of the pandemic in a decentralized community blood bank in Kolkata, India.

A number of potential ways to ensure a continuous supply of safe blood during emergency situation have been acknowledged in this study. Spreading public awareness about different deferral criteria, the importance of blood donation, and the shortage of blood supply through different media is very important during a crisis. The blood bank must always remain informed about the local epidemiology, the health situation of the country, the policies taken by the government, and the shortage of blood components in other blood banks. Training regarding maintaining safety in blood donation camps and the blood bank should be provided to the employees. Maintaining a robust inventory level with safety stock by analysing the utilization pattern is very important in order to reduce shortages in an emergency situation. Systemic application of these methods may reduce the consequence of any future disastrous situation in the blood banking sector.

Finally, the findings presented in this study can be used to prepare a planning strategy for blood collection, considering the insights of the blood donors during any disastrous situation. Future research could also consider formulating inventory models and issuing policies reflecting the drastic change in blood supply and demand during such a period.

LIMITATION OF THE STUDY

As India is a country with diverse population, the data will vary for other blood banks depending upon its location and associated hospitals. The findings of the analysis should be interpreted carefully to identify changes so that a robust system can be formulated for any future emergency situation.

DECLARATION OF CONFLICTING INTERESTS

The Authors declare that there is no conflict of interest.

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RESEARCH ARTICLE

AN EMPIRICAL STUDY OF PARADIGM SHIFT IN PATIENT LOYALTY TOWARDS HOSPITALS IN THE WAKE OF THE COVID-19 PANDEMIC

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ABSTRACT

PURPOSE:

This research paper aims to identify the factors that have influenced patients' loyalty towards hospitals, doctors, or healthcare providers during the COVID-19 pandemic. The study seeks to create a comprehensive model that takes all these factors into account.

DESIGN/ METHODOLOGY/APPROACH:

The study collected primary data from 400 valid responses using a Google Form, and a non-probability, convenient sampling technique was used. The sample size was calculated using G*Power software. [21] The respondents were mostly from Bhopal or nearby areas in Madhya Pradesh, India. SmartPLS software [22] was used to conduct partial least square structural equation modelling. The study used confirmatory composite analysis to observe interrelationships in terms of linear compounds, and tested research hypotheses using a structural model.

FINDINGS:

The COVID-19 pandemic has had a profound impact on the healthcare industry, including patient loyalty and expectations. The research highlighted that patients are increasingly looking for a more human-centered approach from medical staff, which includes better communication and more personalized care. This means that healthcare providers need to focus on building strong patient relationships based on trust, empathy, and respect.

ORIGINALITY VALUE:

The present research work will help in identifying the key drivers of patient loyalty so that hospitals can focus on improving the areas that matter most to their patients, such as the quality of care, staff communication, accessibility, and overall patient experience. This, in turn, can increase patient satisfaction and ultimately lead to higher levels of patient loyalty.

KEYWORDS

human resources, patients' experiences, patients' satisfaction, patients trust, patient's loyalty.

INTRODUCTION

Patient expectations of health care are growing, and this is an issue that has to be addressed properly. Patients come to healthcare consultations with a variety of expectations that can be influenced by their cultural background, health beliefs, previous experiences, and level of understanding of their condition.[1] Patients may have expectations about the type and quality of care they will get, the level of communication and information they will get from healthcare providers, and the outcome of their treatment. Managing patients is basically customer management for the healthcare industry.

While there are some similarities between managing patients in healthcare and customer management in other industries, there are also significant differences. Unlike in other industries, where customers may be seeking a product or service for personal or recreational reasons, healthcare patients are seeking treatment for medical conditions that can have significant impacts on their well-being and even their lives. In cases where patients are critically ill and have urgent and time-dependent concerns, the pressure on healthcare providers can be even greater. In such situations, it's important for healthcare providers to communicate clearly and effectively with patients and their families, providing them with information about the patient's condition and the steps being taken to address it. The degree of understanding between the practitioner and the patient is a critical aspect of the consultation process, and it can significantly impact the progress of the visit. Effective communication and mutual understanding between the practitioner and the patient can help build trust, establish rapport, and improve patient satisfaction and health outcomes.

Patient demographics, such as age, gender, ethnicity, education level, and cultural background, can influence how patients perceive and respond to healthcare communication.[2] For example, some patients may prefer a more direct and assertive style of communication, while others may respond better to a more understanding and supportive style. Visit factors such as the purpose of the visit, the length of the consultation, and the patient's emotional state can also affect the degree of understanding between the practitioner and the patient.

A hospital is a place where everyone has high hopes and expectations. It is a medical aid institution that is appropriately created with a task force of specialized human resources (such as doctors, surgeons, nurses, administrative staff) that provide special treatments for patients, the situation has changed dramatically, not just as a result of COVID-19, but also because patients are now more educated and aware of the latest treatments and other accessible options. Every hospital strives to offer the best possible care for its patients. The COVID-19 pandemic has certainly put a lot of stress on healthcare systems around the world. The sheer scale of the pandemic and the number of people who have become infected have tested the capacity of hospitals, clinics, and other medical facilities to their limits. This has, in turn, led to a lot of frustration and anxiety among people who may have been unable to access the care they need or who may have had to wait longer for treatment than they would have in non-pandemic times.

The COVID-19 pandemic has had a significant impact on the healthcare infrastructure in India, leading to a shortage of medical facilities and resources, including ICU beds, ambulances, doctors, support staff, oxygen concentrators, and ventilators. This shortage has resulted in long queues and wait times outside hospitals, causing anxiety among patients and their families. The situation was particularly dire during the second wave of the pandemic in India, which saw a sharp rise in the number of cases and deaths. The surge in cases overwhelmed the healthcare system, leading to a shortage of critical resources such as medical oxygen, hospital beds, and life-saving drugs. The shortage of medical facilities also led to a rise in the number of deaths, and crematoriums were overwhelmed, leading to delays in cremations and funerals. In fact, marriage halls, hotels, community halls, and all other possible venues have been converted into isolation and health care centers. The situation was further exacerbated by the lack of coordination and communication between the government, healthcare providers, and citizens.[3] Also, patients do not have the freedom of choice to opt for medical facilities and services due to the outbreak of the pandemic like they used to. Many cases have come to light in which hospitals were caught red-handed charging patients' extra fees. This, no doubt, has shaken the trust of the common man, who cannot afford basic medical health care facilities during this pandemic.

Patient satisfaction is a key driver of patient loyalty, and there are many different factors that can influence a patient's satisfaction with their healthcare experience. It can be the quality of care, communication, timeliness,

access to care, cleanliness and comfort, empathy and compassion, cost, and value. In the current pandemic of COVID-19, many concepts and management theories either failed or were made to change. Therefore, in the present research, an attempt has been made to identify whether there has been a change in loyalty in the wake of the COVID-19 pandemic, as the canvas on which factors like human resources and patient experience impacted patient satisfaction and patient trust leading to loyalty was totally different prior to the pandemic. This study aims to record COVID patients' experiences with health-care attributes (access, physician care, and staff care) that impacted their overall satisfaction with care and service quality (overall satisfaction). This research work attempts to contribute to the healthcare sector and government agencies to understand that different approaches need to be followed for different situations.

LITERATURE REVIEW

HUMAN RESOURCES (PATIENTS RELATIONSHIP MANAGEMENT)

Positive patient relationships management were related to decreased levels of malpractice fears after errors. When physicians have a positive relationship with their patients, they are less likely to fear malpractice claims and more eager to reveal errors. In contrast, physicians with poor patient relationships are more likely to fear malpractice claims and be less eager to reveal errors. Improving patient relationship management may be an effective method for lowering malpractice fears and encouraging error reporting, ensuring patient safety, and mitigating the negative effects of medical errors. [4]

HUMAN RESOURCES (PATIENTS RELATIONSHIP MANAGEMENT) AND PATIENTS EXPERIENCES

The article "The effect of patient relationship management on patient satisfaction in private hospitals," by Ghorbanian and Asadi [5], explores the impact of patient relationship management (PRM) on patient satisfaction in private hospitals. The study aims to understand how private hospitals can enhance the patient experience and increase patient satisfaction by improving their patient relationship management practices. The results of the study showed that patient relationship management practices have a significant positive effect on patient satisfaction in private hospitals. Specifically, the study found that communication, empathy, and responsiveness were the most important factors in patient relationship management that influence patient satisfaction. Furthermore, the study revealed that patients who received better patient relationship management were more likely to recommend the hospital to others. The study concludes that private hospitals should focus on improving their patient relationship management practices to enhance patient satisfaction and loyalty. By developing effective communication channels, showing empathy, and being responsive to patient needs, private hospitals can build stronger relationships with patients and create a positive patient experience. This, in turn, can lead to improved patient satisfaction and loyalty, which can have significant benefits for private hospitals in terms of reputation and financial performance. [5]

PATIENTS' EXPERIENCES AND PATIENTS' SATISFACTION

Patients' experiences and satisfaction with healthcare services are influenced by various factors, including communication, empathy, respect, trust, involvement in care, accessibility, affordability, quality of care, and outcomes. Patient-centred care is important because it puts the patient's needs and preferences at the center of healthcare. This can help patients have better experiences and be happier with the services they receive. [6] Telehealth visits in primary care are generally well received by patients and may offer advantages in terms of convenience, accessibility, and efficiency of telehealth visits. However, there are still some concerns and challenges to be addressed to ensure the quality and effectiveness of telehealth visits, such as concerns about the quality of care, a lack of physical examination, and technical difficulties. The review also found that patient satisfaction with telehealth visits was not significantly different from in-person visits in most cases. In some cases, patients reported higher satisfaction with telehealth visits compared to in-person visits.[7]

A cross-sectional study in Quebec found that patients who had better access to primary care reported higher satisfaction with their healthcare experience, and factors such as availability of appointments and shorter wait times were important for improving access to primary care.[8] The article "Defining patient experience," by Wolfe et al, provides a comprehensive definition of patient experience as the sum of all interactions, shaped by an organization's culture, that influence patient perceptions across the continuum of care. [9]

PATIENTS EXPERIENCES AND PATIENTS TRUST

"Patients' experiences of trust in primary care: a systematic review" is a research paper that examines patients'

experiences of trust in primary care. The review finds that trust is a crucial aspect of patient relationship management and is linked to better health outcomes, increased patient satisfaction, and higher levels of adherence to treatment. The study identifies several factors that influence patients' trust in their primary care providers, including communication, empathy, shared decision-making, and continuity of care. However, the review also identifies challenges in establishing and maintaining trust, such as cultural differences, power dynamics, and lack of time. The research also highlights the need for further research to better understand how trust develops over time and how it can be effectively measured and improved in primary care settings. [10]

The article "Patients' experiences of trust in healthcare professionals: a systematic review and thematic synthesis of qualitative research" presents a comprehensive synthesis of qualitative research on patients' experiences of trust in healthcare professionals. The review found that patients' experiences of trust are shaped by a variety of factors, including communication, competence, empathy, honesty, continuity of care, and respect for patients' values and preferences. Patients' trust in healthcare professionals is influenced by both personal and contextual factors, including past experiences, cultural background, and healthcare system characteristics. The article concludes that developing and maintaining trust in healthcare relationships is critical to improving the quality of care and patient outcomes. [11] "Patients' experiences of trust in healthcare professionals in a multicultural context: a systematic review of qualitative studies" explores patients' experiences of trust in healthcare professionals in a multicultural context. The review identifies common themes across the studies, including the importance of communication, empathy, cultural sensitivity, and a non-judgmental attitude in building trust between patients and healthcare professionals. The study shows how important it is for health care workers to be aware of and sensitive to their patients' cultural backgrounds and experiences in order to build trust and give care that is culturally appropriate. [12]

PATIENTS SATISFACTION AND PATIENTS' LOYALTY

The article "Patient satisfaction and loyalty: A literature review" by Khan and Khan provides an overview of research on the relationship between patient satisfaction and loyalty. The author suggests that patient satisfaction is strongly linked to patient loyalty and that healthcare organizations should prioritize improving patient satisfaction in order to increase patient retention and positive word-of-mouth. Putting the spotlight on the fact that patient satisfaction and loyalty are important parts of good healthcare management and should be a top priority for healthcare organizations. [13] "The effect of patient satisfaction on loyalty to healthcare services: Evidence from China" is a research article that examines the relationship between patient satisfaction and loyalty in the context of healthcare services in China. The authors conducted a survey of patients from five different hospitals in China and analyzed the data to determine the impact of patient satisfaction on loyalty. The study found a strong positive correlation between patient satisfaction and loyalty to healthcare services. This suggests that improving patient satisfaction can lead to more loyalty and better health outcomes in the long run. [14]

"The relationship between patient satisfaction and patient loyalty in healthcare services: A systematic review" is a research article that provides a comprehensive review of the existing literature on the relationship between patient satisfaction and patient loyalty in healthcare services. The study aims to investigate the extent to which patient satisfaction impacts patient loyalty and the factors that influence this relationship. The authors conducted a systematic review of 21 studies, and their findings suggest a strong positive correlation between patient satisfaction and patient loyalty in healthcare services. Factors such as quality of care, communication, empathy, and trust were identified as important determinants of patient satisfaction and loyalty. The authors conclude that healthcare providers should focus on improving patient satisfaction in order to enhance patient loyalty and that further research is needed to better understand the mechanisms underlying this relationship. [15]

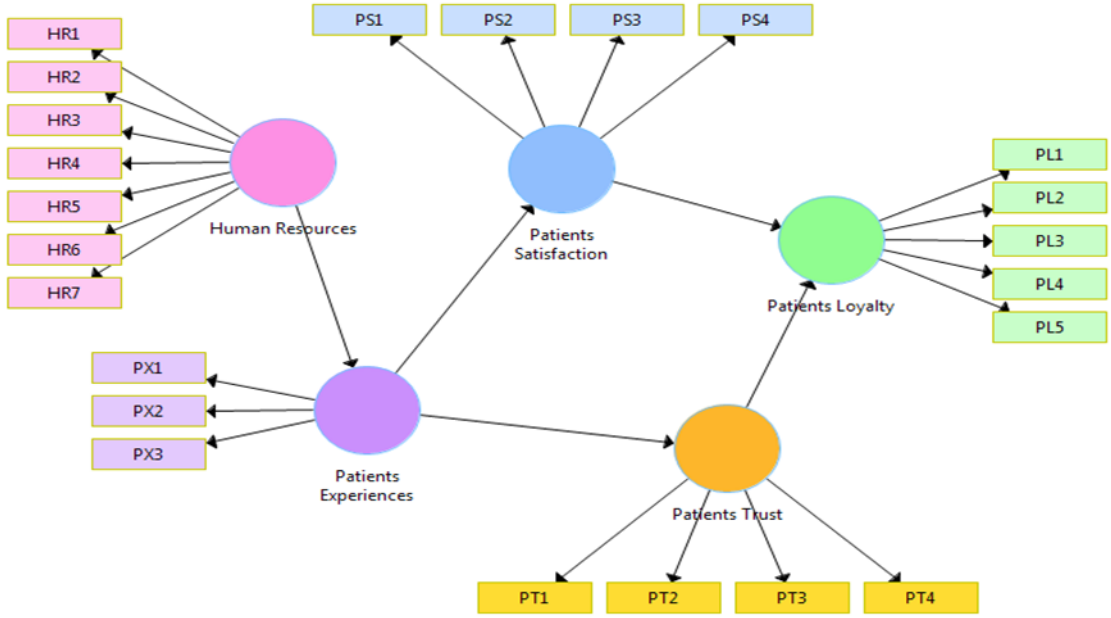
PATIENTS TRUST AND PATIENTS' LOYALTY TOWARDS SERVICE PROVIDER/ HOSPITALS

Patients who trust their healthcare service providers are more likely to exhibit loyalty toward them. Trust is a key factor in patient loyalty and can be built through consistent, high-quality care and effective communication. Research has shown that patient trust is positively associated with patient loyalty, and that trust and loyalty are critical for maintaining a long-term relationship between patients and healthcare providers. It is important for healthcare providers to build loyalty among their patients if they want to keep their patients and improve health outcomes. [16]

CONCEPTUAL FRAMEWORK

COVID-19 has had a major impact on people's outlook on life, especially their standard of living, expectations from the government in the face of such pandemics and uncertainty, threats posed by the virus, the financial situation, availability of resources, and, most importantly, human psychology. With these considerations in mind, this study tried to establish whether the medical industry is successfully fulfilling or failing to satisfy the expectations of its patients. An attempt has been made to see what the average person has gone through during this pandemic. A comprehensive study is being conducted to see how human resources in the medical profession impact patients' experiences, which are interlinked with their satisfaction level, trust, and loyalty.

FIGURE-1: CONCEPTUAL FRAMEWORK



Based on the conceptual framework the following hypotheses are proposed:

- H1: Human resources has no significant impact on the patients' experience.
- H2: Patients' experience has no significant impact on the patients' satisfaction.
- H3: Patients' experience has no significant impact on the patients' trust.
- H4: Patients' satisfaction has no significant impact on the patients' loyalty.
- H5: Patients' trust has no significant impact on the patients' loyalty.

RESEARCH METHODOLOGY

The purpose of this study was to examine the variables affecting the patient's loyalty towards hospitals in Bhopal and nearby areas of Bhopal, but it was narrowly limited to Madhya Pradesh (M.P.), India. According to the literature review and conceptual framework, patients' loyalty towards hospitals is influenced by four independent variables: human resources (patient relationship management), patients' experiences, patient satisfaction, and patients' trust. Patients' satisfaction and trust variables were used as mediators between patients' experiences and their loyalty. The primary data was collected via a questionnaire using a non-probability, convenience sampling technique. A Google form that was distributed online was used to collect data. The researchers distributed the questionnaire to a group of individuals consisting of friends and acquaintances who themselves were either hospitalized or their relatives were hospitalized. Participants were then asked to distribute the survey to their friends and colleagues in their respective locations, and the procedure was repeated.

While collecting data, utmost care has been taken not to violate the privacy policy law in India (Information Technology Act 2009 Amendment), and therefore a disclosure was used in the questionnaire stating sensitive personal information will not be shared without the prior consent of the respondents.

The researcher created survey questions based on the factors' definitions in the concept of each variable and then chose some dimensions of the question to represent representatives of the key variables. The total of 33 questions in the questionnaire are shown in the following:

Part I: The first part incorporated the screening questions, which used yes-or-no questions to screen the respondents who themselves or their family members were either hospitalized or had consultations done with a particular hospital or clinic during COVID-19. The screening questions started with "Are you from Bhopal or nearby locality of Bhopal" "Did any of your family members get infected by COVID-19?" and "Did the COVID-19 patient get hospitalized or consulted with any particular hospital or clinic?" All questions ask respondents to answer only "yes" to filter the respondents before continuing to the next question.

Part II: The second part of the questionnaire was about demographic information for gender, age, education level, income per month, and health care facilities available.

Part III: The variables were measured in this section by using a five-point Likert scale. The dependent variable was the patient's loyalty, and four independent variables consisted of patient relationship management, patient experiences, patient satisfaction, and patient trust. This part of the questionnaire incorporated five sub-parts and had a total of 23 questions. The scales range was from strongly disagree to strongly agree: strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, and strongly agree = 5.

Part IV: In this section, there were two open-ended questions that asked the respondent to talk about their experiences while they were in the hospital or at a clinic (hints were provided for this open-ended question in terms of availability of beds, timely oxygen supply, and availability of facilities such as ventilators and lifesaving drugs at a reasonable price). The second open-ended question was related to government/Insurance companies' assistance during the COVID period.

Since the questionnaire was self-developed and self-administered, the researcher tested the reliability of each variable (N = 30) by using Cronbach's alpha in the Jamovi software. [17, 18]

PRETESTING OF INSTRUMENT

Using 30 surveys and Cronbach's alpha test, the researcher determined the internal consistency of the measurement scale. A Cronbach's alpha value above 0.6 suggests that the factor's reliability is adequate. [19] [20] The results of the preliminary examination are presented in the table below.

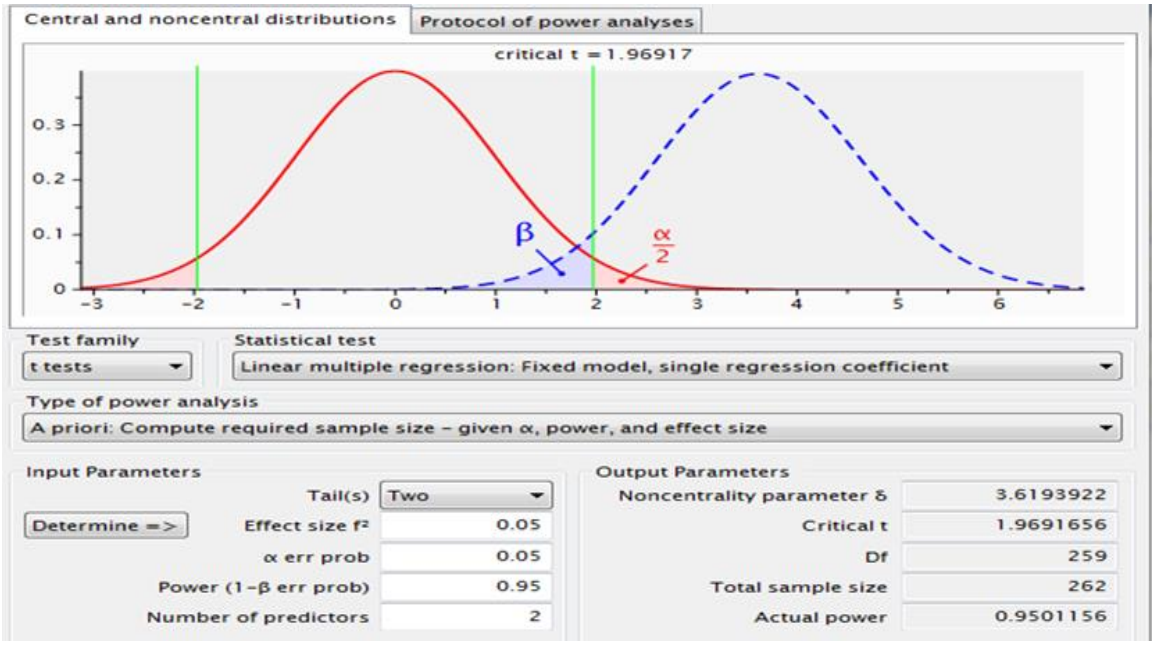
According to Table 1, the reliability test for the measurement scales was successful, and as a result, the designed instrument can be used for further investigation.

Descriptive analysis was performed to examine and explain the respondents' demographic information, such as age, gender, educational level, monthly income, and health care facilities availed. A total of 427 people responded to the survey. The sample size was calculated using G*Power software. [21] Since the software calculated a minimum sample size of 262, the responses of the first 400 respondents were considered for this study. Figure 2 depicts the estimation of the minimum necessary sample size. SmartPLS software [22] was used to investigate partial least squares structural equation modeling. As the software provides extreme flexibility, particularly when the model is complex, it was given due consideration for this research work.

TABLE 1 RESULT FROM PRETESTING USING JAMOVI SOFTWARE [17, 18]

Scale	No. of Items	Cronbach's Alpha	Results
Human Resources (Patients Relationship Management)	7	0.913	Pass
Patients Experience	3	0.837	Pass
Patients Satisfaction	4	0.896	Pass
Patients Trust	4	0.873	Pass
Patients Loyalty	5	0.908	Pass

FIGURE 2: G* POWER ANALYSIS



Source: Authors own calculations using G*Power Software [21]

FINDINGS AND DISCUSSION

TABLE 2: SUMMARY ANALYSIS OF THE DEMOGRAPHIC FEATURES USING FREQUENCY, PERCENTAGE, AND CUMULATIVE PERCENTAGE

Demographic Factors	Frequency	Percent	Cumulative Percent
Gender			
Male	187	46.75	46.75
Female	213	53.25	100
Total	**400**	**100**	
Age			
Below 18 years	13	3.25	3.05
18-30 years	46	11.5	43.51
31-40 years	103	25.75	71.37
41-50 years	154	38.5	89.69
51-60 years	53	13.25	100
Total	**400**	**100**	
Educational Level			
Below high school	3	0.75	0.75
High school or equivalent	21	5.25	6
Bachelor's degree	242	60.5	66.50
Master's degree	111	27.75	94.25
Doctoral degree	23	5.75	100
Total	**400**	**100**	
Household income (monthly) (In INR)			
Less than 25,000	81	20.25	20.25
25,001-50,000	112	28	48.25
50,001-100,000	130	32.5	80.75

More than 100,000	77	19.25	100
Total	**400**	**100**	
Type of Healthcare Facility			
Public hospital	106	26.5	26.5
Private hospital	283	70.75	97.25
Clinic	6	1.5	98.75
Other	5	1.25	100
Total	**400**	**100**	

Source: Authors own calculations using JAMOVI software. [17, 18]

As set out in Table 2, out of the total of 400 respondents, 187 (46.75 percent) were male. Female respondents account for 213 (53.25 percent) of the total 400 respondents. The majority of the respondents are between the ages of 41 and 50, accounting for 154 people (38.5 percent). The 31–40-year-old age group came in second with 103 people (25.75 percent). 53 respondents in the survey were over the age of 50. (13.25 percent). The smallest group consists of 13 people under the age of 18 (3.25 percent). The majority of the respondents (242 people) have a bachelor's degree (60.50 percent). There were 111 respondents with a master's degree, accounting for 27.75% of the overall sample size. There are 3 people in the smallest category, which includes those with educational levels below high school (0.75 percent). The majority of the respondents had a monthly income of between 50,001 and 100,000 INR (130 respondents), followed by 112 respondents (28%), who had a monthly income between 25,001 and 50,000 INR. Only 77 respondents (19.25%) had a monthly income above 100,000 INR. The demographic profile also revealed that the majority of the respondents (283 respondents) (70.75%) preferred private hospitals for their treatment, indicating the highest level of trust and loyalty towards private service providers. Out of the total respondents, 106 (26.5%) preferred public hospitals, and 6 respondents (1.5%) preferred clinics for their treatment.

CONFIRMATORY COMPOSITE ANALYSIS

The study used confirmatory composite analysis to examine the interrelationship between linear compounds. As part of the convergent validation process, the researchers evaluated the measurement model using composite reliability (CR) and average variance extracted (AVE). Composite reliability (CR) is a measure of internal consistency and reliability of a set of items or indicators used to measure a construct. It considers the intercorrelations among the indicators and is considered a more accurate measure of reliability than Cronbach's alpha because it is less affected by the number of items in the scale. A value of 0.70 or higher is generally considered to be acceptable for CR. [23]

Average variance extracted (AVE) is a measure of convergent validity, which assesses the extent to which a set of indicators measure the same construct. AVE represents the amount of variance in the indicators that is captured by the construct they are intended to measure. A value of 0.50 or higher is generally considered to be acceptable for AVE.

Therefore, in this study, the researchers likely used CR and AVE to assess the reliability and validity of the measurement model. A CR value of 0.70 or higher is expected for the measurement model to be considered reliable, and an AVE value of 0.50 or higher is expected for the measurement model to be considered valid. [24]

DISCRIMINANT VALIDITY

To examine discriminant validity, the Fornell-Larcker criterion was used. [25] The Fornell-Larcker criterion assesses discriminant validity by comparing the square root of the average variance extracted (AVE) for each latent variable with the correlations between those variable and other variables in the model. The AVE measures the proportion of variance in the indicators that is captured by the latent variable, and a higher AVE indicates that the variable explains more of the variance in its indicators. If the square root of the AVE for a latent variable is larger than its correlation with other variables in the model, then it is considered to have good discriminant validity, since it captures more unique variance than shared variance.

Table 3 shows that the square root of the average variance extracted (AVE) was higher than all the crossed construct correlation values. This suggests that the research is ready for final analysis.

TABLE 3: RESULTS OF CONFIRMATORY COMPOSITE ANALYSIS, CRONBACH'S ALPHA, CONSTRUCT RELIABILITY AND AVERAGE VARIANCE EXTRACTED

Constructs and Indicators	Codes	Factor Loadings	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Human Resources (Patients Relationship Management)						
The healthcare staff at the hospital/clinic were wearing proper kit and were sanitizing themselves and the workplace timely.	**HR1**	0.793				
The hospital's or clinic's medical staff were courteous and had empathy.	**HR2**	0.764				
Professionalism characterizes this hospital or clinic's medical personnel.	**HR3**	0.867				
I/We am/are satisfied with how quickly the healthcare providers attend to my/our needs.	**HR4**	0.770	0.912	0.914	0.930	0.655
Healthcare professionals were constantly eager to assist patients and kept motivating them for speedy recovery.	**HR5**	0.863				
During my/our medical treatment with the health workers, I/We had a sense of being in a safe environment.	**HR6**	0.791				
The hospital or clinic provides the necessary support for healthcare providers, allowing them to perform their jobs effectively.	**HR7**	0.809				
Patients Experiences						
The hospital/clinic provided a positive inpatient experience. Provided timely facilities at reasonable prices.	**PX1**	0.925				
I/We felt good because of the way I/we was/were treated by the health care workers.	**PX2**	0.913	0.913	0.914	0.945	0.852
I'm/We are pleased with the overall service experience I/we had at this hospital/clinic.	**PX3**	0.931				
Patients Loyalty						
I/We will only go to this hospital or clinic.	**PL1**	0.827				
I/We never even notice rival medical facilities when I/we visited this hospital or clinic.	**PL2**	0.705	0.890	0.907	0.920	0.698
I'll/We'll extol the virtues of this medical facility to others.	**PL3**	0.914				

I'm/We are prepared to spend more to visit this hospital or clinic.	**PL4**	0.915				
In the future, I/we will refer others to this hospital or clinic.	**PL5**	0.798				
Patients Satisfaction						
It was a wise decision for me/us to visit this hospital or clinic.	**PS1**	0.895	0.936	0.936	0.954	0.839
This hospital/clinic lives up to my/our expectations.	**PS2**	0.926				
The overall service quality given by this hospital/clinic is outstanding.	**PS3**	0.937				
Overall, I'm/we are satisfied with this hospital/clinic.	**PS4**	0.906				
Patients Trust						
This hospital/clinic would be truthful and sincere in dealing with my/our concerns.	**PT1**	0.899	0.921	0.924	0.944	0.809
I/We have faith in this clinic or hospital.	**PT2**	0.908				
Never in my/our experience has this hospital or clinic let me/us down.	**PT3**	0.868				
I/We knew that if I/we needed medical attention, I/We could trust on this hospital or clinic.	**PT4**	0.921				

Source: Authors own work

FIGURE 3: CONFIRMATORY COMPOSITE ANALYSIS

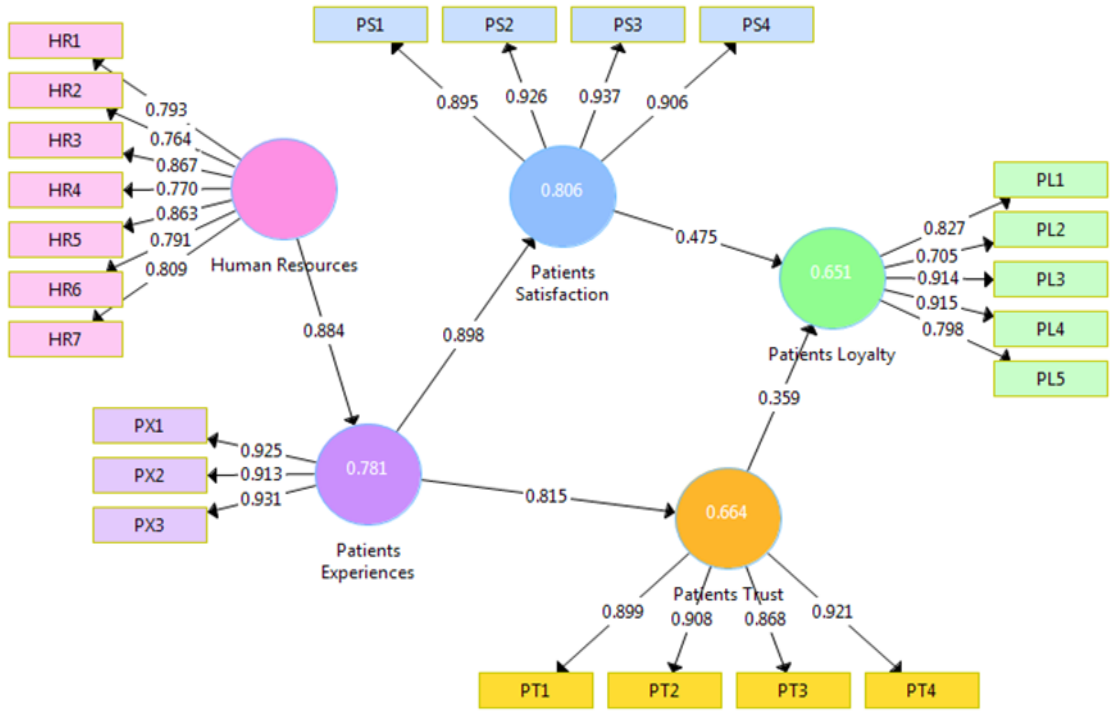


TABLE 4: DISCRIMINANT VALIDITY

Constructs	Human Resources	Patients Experiences	Patients Loyalty	Patients Satisfaction	Patients Trust
Human Resources (Patients Relationship Management)	**0.809**				
Patients Experiences	0.884	**0.923**			
Patients Loyalty	0.719	0.742	**0.836**		
Patients Satisfaction	0.858	0.898	0.787	**0.916**	
Patients Trust	0.799	0.815	0.772	0.870	**0.899**

Source: Authors own work.

Notes: Figures in bold represents Square Root of Average Variance Extracted (AVE) and signifies discriminant validity. Other figures are correlation coefficients

TABLE 5: MODEL FIT

	Saturated Model	Estimated Model
SRMR	0.053	0.068
d_ULS	0.784	1.275
d_G	0.529	0.630
Chi-Square	1176.834	1291.308
NFI	0.875	0.863

FIGURE 4: STRUCTURAL MODEL

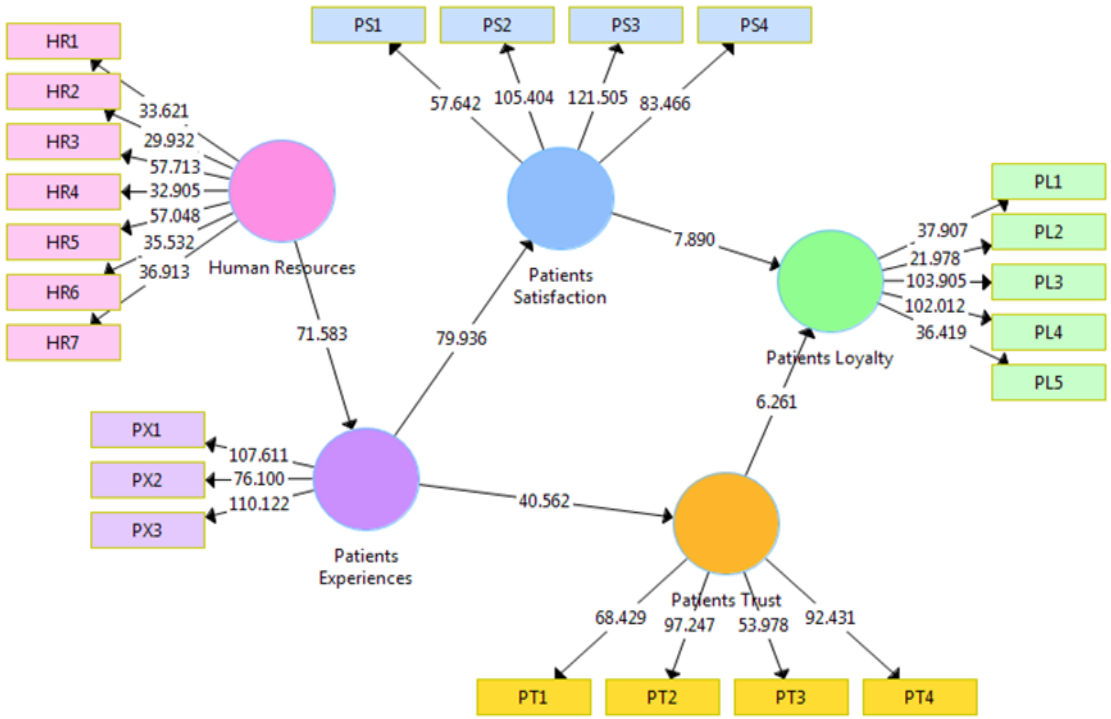


TABLE 6: HYPOTHESES TESTING RESULTS OF THE STRUCTURAL MODEL

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P Values	Supported
H1: Human resources has no significant impact on the patients' experience.	0.884	0.884	0.012	71.583	0.000	No
H2: Patients' experience has no significant impact on the patients' satisfaction.	0.898	0.898	0.011	79.936	0.000	No
H3: Patients' experience has no significant impact on the patients' trust.	0.815	0.815	0.020	40.562	0.000	No
H4: Patients' satisfaction has no significant impact on the patients' loyalty.	0.475	0.474	0.060	7.890	0.000	No
H5: Patients' trust has no significant impact on the patients' loyalty.	0.359	0.361	0.057	6.261	0.000	No

Source: Authors own work

TABLE 7: EFFECTS OF VARIOUS CONSTRUCTS CONSIDERING PARAMETERS SUCH AS STANDARDIZED DIRECT, INDIRECT, AND TOTAL EFFECTS

Dependent Variables		Independent Variables↓			
↓		Human Resources (Patients Relationship Management)	Patients Experiences	Patients Satisfaction	Patients Trust
Patients Experiences	DE	0.884			
	IE	-			
	TE	**0.884**			
Patients Satisfaction	DE	-	0.898		
	IE	0.793	-		
	TE	**0.793**	**0.898**		
Patients Trust	DE	-	0.815		
	IE	0.720	-		
	TE	**0.720**	**0.815**		
Patients Loyalty	DE	-	-	0.475	0.359
	IE	0.635	0.719	-	-
	TE	**0.635**	**0.719**	**0.475**	**0.359**

Source: Authors own work.

Notes: DE (Direct Effects), IE (Indirect Effects), and TE (Total Effects)

Table 5 shows model fit values. A lower SRMR value indicates a better model fit, as it means that the observed covariance matrix is better approximated by the model-implied covariance matrix. The cut off of 0.08 for the SRMR value as suggested by Hu and Bentler (1999) is commonly used in the literature as a guideline for a good model fit. [26]

ASSESSMENT OF STRUCTURAL MODEL

The present study used bootstrapped SEM estimates to calculate p-values for their study's hypotheses. The authors performed 5000 bootstraps, which means they resampled their data 5000 times and calculated the SEM for each bootstrap sample. A p-value less than 0.05 (or a chosen significance level) would suggest that the results are statistically significant and not due to chance.

On analyzing the impact of various constructs (Table 6), the study highlighted those human resources (Patients Relationship Management) strongly impacted patients' experiences strongly (β= 0.884). The indirect impact of human resources on patients' satisfaction, trust, and loyalty was also strong, with values of (β = 0.793), (β = 0.720) and (β = 0.635) respectively. The impact of patients' experiences on their satisfaction was also significant (β = 0.898). Their personal experiences had the greatest impact on loyalty (β = 0.719), indicating that they realized they could seek treatment at other hospitals as well. Patients' satisfaction had a greater impact on loyalty (β = 0.475) as compared to patients' trust (β = 0.359).

CONCLUSIONS AND RECOMMENDATIONS

The research findings indicate that the COVID-19 pandemic has had a significant impact on patient loyalty towards the medical system. Patients have lost faith in the healthcare system due to the unavailability of necessary medical resources, the overpricing of medications and medical products, the black marketing of life-saving drugs, and delays in resolving insurance claims. These issues have led to patient dissatisfaction and distrust, which has negatively impacted their loyalty towards the medical system. The research also highlights that patients' expectations of the medical system have changed due to the pandemic. Patients not only demand the best medical treatment but also expect well-dressed and well-groomed healthcare staff who are courteous and professional. Patients also seek fast service and want to feel secure in their medical care. They prefer hospitals with high levels of interaction among personnel and want their issues addressed in an open and real manner. These factors, such as human resources and patient experience, have a significant impact on customer satisfaction and trust, which ultimately affect patient loyalty towards the medical system.

The COVID-19 pandemic has further emphasized the need for a strong and responsive healthcare system. The pandemic showed how important it is for the healthcare industry to manage its human resources well. Therefore, the following recommendations are made:

1. Financial support and packages for patients: Governments and hospitals (private and public) should provide financial support and packages to both COVID and general patients at all levels. This will reduce the financial burden on patients and ensure they receive timely and appropriate healthcare.
2. Short turn-around time (TAT) for claim settlements: The Insurance Regulatory Development Authority of India (IRDA) should keep a close eye on claim settlements with a short turn-around time.
3. Patient satisfaction: Patient satisfaction is critical to the success of the healthcare sector. Hospitals need to understand patient behavior and provide high-quality service to attract and retain patients. This will help hospitals win patients' confidence, which ultimately guarantees the hospital's success.
4. Efficiency and effectiveness of human resources: The success of the healthcare sector depends solely on the efficiency and effectiveness of human resources. Hospitals need to have a well-equipped human resource system that can handle patients in an efficient and effective manner. This will not only create new patients but also help retain existing ones and ensure maximum market share and profit.

The healthcare sector must prioritize patient satisfaction and efficient human resource management to provide timely and appropriate healthcare services. Governments, hospitals, and the IRDA should work together to provide financial support, reduce the financial burden on patients, and ensure timely claim settlements. Overall, the research suggests that the COVID-19 pandemic has led to a paradigm shift in patient loyalty towards the medical system. Patients are now more aware of the importance of high-quality medical care and expect a more human-centred approach from the medical staff. The medical system will need to address these expectations to rebuild patient trust and loyalty. To rebuild patient trust and loyalty,

healthcare providers will need to invest in patient-centred care models that prioritize patient experience and satisfaction. This may involve rethinking traditional healthcare delivery models, such as telemedicine and virtual care, to provide more convenient and accessible care.

Additionally, healthcare providers should prioritize transparency and open communication with patients, including providing clear information about treatment options, costs, and potential risks and benefits. This will help patients feel more informed and involved in their own care.

LIMITATIONS AND FUTURE RESEARCH

It is important to acknowledge the limitations of any study to ensure that the results are not overgeneralized or misinterpreted. The limitations of this present research work highlight some of the potential areas for improvement in future studies on healthcare marketing. First, there may be other factors beyond patient satisfaction and trust that impact patient loyalty. Future research could consider exploring additional factors that could influence patients' decisions to stay loyal to a particular healthcare provider. Second, as the study's data was collected over a specific period (from December 2020 to June 2021), it may not reflect the current situation accurately. Healthcare marketing strategies are subject to change over time, and new trends may emerge that could impact patient loyalty. Thus, it would be important to replicate the study with updated data to evaluate any potential changes in the findings. Third, the study was limited to patients in a particular region (Bhopal or nearby areas of Bhopal, M.P., India), which may limit the generalizability of the results. Future research could aim to sample more diverse populations to ensure that the findings are representative of a broader patient population. Lastly, the study relied on a self-administered questionnaire, which may have limitations in terms of data collection. A focus group interview could provide more in-depth insights into patients' experiences and perceptions. Therefore, researchers may consider using a mixed-method approach to collect both quantitative and qualitative data to obtain a more comprehensive understanding of patients' loyalty to healthcare providers.

AUTHORSHIP

Both the authors Dr. Amit Kumar Nag and Dr. Bhumiphat Gilitwala have contributed equally in this research paper.

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CONFLICTS OF INTEREST

This is to certify that that the present research work titled "An Empirical Study of Paradigm Shift in Patients Loyalty Towards Hospitals in Wake of Covid-19 Pandemic" is an original piece of research work which we have undertaken for APJHM. The contents of this research article are purely based on our interpretation of primary data. Neither the contents of the paper nor any other matter related to the manuscript has any conflict of interest.

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RESEARCH ARTICLE

DEVELOPING AND EVALUATING AN AUTOMATED BED ASSIGNMENT ALGORITHM IN A TERTIARY HOSPITAL: A CASE STUDY IN SINGAPORE

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ABSTRACT

OBJECTIVES

The primary aim of this quality improvement project was to develop, implement and evaluate an automated bed assignment algorithm (ABAA) which can offer objective and consistent bed assignment recommendations that comply with the unique operational constraints and prioritization rules of a tertiary hospital in Singapore.

METHODS

Using the classical process improvement framework of Plan-Do-Study-Act (PDSA), the quality circle workgroup first developed and tested the ABAA prototype to confirm its feasibility and reliability to meet all hospital operational constraints and prioritization rules. PDSA framework was then also employed in the user interface design and integration of ABAA into existing system setup. The staff satisfaction level of the ABAA was subsequently assessed via an anonymized online survey.

RESULTS

In the prototype development phase, the workgroup was able to conclude after nine rounds of review meetings that the ABAA prototype was able to perform bed assignments like hospital staff using data in 64 operational scenarios. Among the 10 eligible staff who completed the online survey, up to 90% of them reported that ABAA was able to generate bed assignment recommendations which met the hospital operational requirements. 90% of these staff also reported that ABAA was easy to use and navigate, while all respondents reported using ABAA before attempting to assign beds manually. 80% of staff felt ABAA was able to reduce human error, while 50% of staff felt ABAA had reduced their time taken for bed assignments by 30 minutes to 2 hours per shift.

CONCLUSIONS

Evidently, the user-centric design of ABAA has enabled its high adoption and acceptance rate among staff. Overall, it has allowed the staff to make faster, consistent and objective bed assignment decisions which complied with hospital operational constraints and prioritization rules so that newly admitted patients received the most appropriate care at their point of admission.

KEYWORDS

decision support, bed assignment, heuristic.

INTRODUCTION

Ensuring timely patient care in the right location with the right clinical team is paramount in any acute hospital so that patients are not at risk receiving suboptimal care and potential harm. Inevitably, bed management is an important function of acute hospital since it has downstream impact [1] on patient care, patient flow, patient and staff satisfaction. A key challenge in bed management is optimizing the bed-assignment process in a complex and dynamic operating environment. To ensure patients are sited at the right locations with the right clinical teams, bed assignment decisions need to take into consideration of multiple factors relating to patients and bed resources. A patient bed assignment problem (PBAP) in a hospital entails assignment of available inpatient beds to newly admitted patients in the hospital with multiple goals in mind. These goals may include minimization of internal movements among patients and staff to optimize patient care and maximization of hospital bed utilization according to the patients' [2] acuity levels. Operational constraints which typically need to be accounted for in a PBAP include patients' gender, clinical needs and choice of bed class.

Due to its underlying complexity, the best solution to a PBAP is difficult and laborious to determine if it is addressed manually by hospital staff. Empirical evidence [3] has reported that human intuitive judgment and decision making can be far from optimal, and that they deteriorate in complex and (or) stressful situations. Clearly, hospital bed assignment practices that entail manual searches and manual interventions for bed assignments are prone to human errors and result in suboptimal care for patients.

Public hospital bed management in Singapore is characterized by a proactive and coordinated approach, leveraging technology, data, and community care services to optimize bed utilization, improve patient flow, and ensure timely access to healthcare services for the population. One key aspect of bed management among public hospitals in Singapore is adopting of IT systems that allow hospitals to share patient information, including bed availability, in real-time internally. This enables hospitals to coordinate and optimize the utilization of beds across the system, ensuring that patients are admitted to the most appropriate facility based on their medical condition and urgency of care, rather than their physical location within the hospital. This allows hospitals to flexibly manage bed capacity and ensure that patients receive appropriate care in a timely manner, even during peak periods of high demand.

Overall, the Ministry of Health (MOH) in Singapore is responsible for overseeing and regulating the allocation and utilization of more than 9,500 hospital beds in the public healthcare sector. MOH conducts regular reviews of hospital bed capacity and utilization to ensure that resources are allocated optimally across the public healthcare system. This includes monitoring bed occupancy rates, patient flow, and admission patterns, and making adjustments as necessary to ensure that hospitals are operating efficiently and effectively. Overall, the public hospital bed management by MOH has helped Singapore achieve high standards of healthcare delivery and outcomes, with relatively short waiting times for hospital beds and efficient patient flow across the healthcare system. Over the years, public hospital bed demand in Singapore has been rising due to the duo effect of ageing population and post-pandemic where more patients with more complex needs are admitted to inpatient wards with longer length of stay [4]. To cope with this rising demand, the island state has not only made plan to build more tertiary hospitals. It has also been actively developing a network [5] of patient care outside of acute hospitals to mitigate the hospital bed demand in the coming years. Such network includes step-down care facilities, community hospitals and nursing homes, caregivers who can take care of patients at homes as well as community based programmes such as Healthier SG which aim to keep the resident population healthy [6].

Changi General Hospital (CGH) is a public hospital in Singapore with over 1,000 beds; it serves a community of 1.4 million people in the eastern part of the island state. In CGH, hospital beds are broadly classified in 4 dimensions, namely bed type, clinical specialty, class, and gender. Based on these bed classifications, and together with the account of patient acuity, current bed waiting time of patient, and patient's preferred choice of class, the PBAP in CGH has to account for the constraints listed in Table 1 before any bed assignment is performed by the Bed Management Unit (BMU) staff. A newly admitted patient cannot be assigned to an available bed if another bed of higher priority (in terms of clinical specialty and/or class) is available for the same patient.

It is a major operational challenge for BMU staff to apply all relevant prioritization rules (see Tables 2 and 3) consistently

when BMU staff can be placed under stressful conditions whenever there is a surge in bed demand and a lack of available beds for assignments. Unfortunately, none of the approaches reported in the existing literature which aim to address PBAPs can be readily adopted in CGH. A quality circle [7] team was thus formed to embark on this quality improvement initiative which has two primary aims.

- Develop an automated bed assignment algorithm (ABAA) which can offer bed assignment recommendations that comply with the unique operational constraints and prioritization rules of the CGH PBAP
- Integrate the abovementioned algorithm into existing CGH BMS so that BMU staff can operate the tool in the existing system using real-time hospital data on bed requests and statuses of beds in service.

TABLE 1: OPERATING CONSTRAINTS WHICH BMU STAFF NEED TO CONSIDER IN ADDRESSING PBAP IN CGH

Constraint	Description
Bed type	Patients with Vancomycin-resistant Enterococcus (VRE) are only to be assigned to either beds which are designated for such patients or to single-bed rooms in general wards. Patients with Methicillin-resistant Staphylococcus aureus (MRSA) are only to be assigned to either beds which are designated for such patients or to beds in general wards where other patients with MRSA are grouped together in proximity and are adequately distanced from other beds occupied by patients without MRSA and open wounds.
Clinical Specialty	All patients who require inpatient admission will be assigned to one of the nine broad clinical specialties in CGH. Similarly, all beds in CGH which are under BMU's purview in the PBAP, are categorized into one of the aforementioned nine clinical specialties. There is a matrix of bed assignment prioritization rules which BMU staff need to adhere to as shown in Table 2 and Table 3 based on clinical specialties and preferred choice of bed classes by patients.
Class	All newly admitted patients to CGH are allowed to indicate their preferred choice of class (i.e. four options: A, B1, B2, C) of beds which will determine the amount of government subsidies (if any) after accounting for the patients' eligibilities. Similarly, all CGH inpatient beds which are under BMU's purview are categorized into these four classes and there is a matrix of bed assignment prioritization rules which BMU staff need to adhere to as shown in Table 3 based on bed classes.
Gender	All beds in in a CGH ward cubicle or room are to be reserved to either female or male patients only. This means that if a current ward cubicle or room is occupied by at least one patient of a particular gender, only patients of the same gender can be assigned to an available bed in the same cubicle or room.
Patient Acuity	Every CGH Accident and Emergency (A&E) patient who requires inpatient admission will be assigned to an acuity level (one to five) based on patient's acuity assessed by the A&E physicians. Available beds will be assigned to patients based on the following descending prioritization:

	1. Patients at acuity level of 1 or 2 2. Patients with bed waiting time of >= 16 hours 3. Patients at acuity level of 3 to 5
Bed waiting time	Bed waiting time is defined as the duration between an A&E physician decides to admit an A&E patient till the instant when the patient has occupied a bed in the ward. Waiting time is considered together with patient acuity in prioritization of available beds to patients who are waiting to be assigned with beds (see above).

TABLE 2: PRIORITIZATION OF BED ASSIGNMENTS TO PATIENTS BASED ON CLINICAL SPECIALTIES

		Clinical Specialty of Bed Assigned								
		CVM	**GAS**	**GRM**	**MED**	**OTO**	**PSY**	**RES**	**RMD**	**SUR**
Clinical Specialty of Bed Requested	**CVM**	1	2		2	3		2		3
	GAS	2	1		1	3		1		3
	GRM	3	2	1	2	3		2		3
	MED	2	1		1	3		1		3
	OTO	3	3		3	1		3		2
	PSY	3	2		2	3	1	2		3
	RES	2	1		1	3		1		3
	RMD	3	2		2	3		2	1	3
	SUR	3	3		3	2		3		1

Numbers in the cells refer to the priority levels (1 to 3 in decreasing order) of bed assignments with reference to the clinical specialty of bed requested. Cells with white and blue background are bed assignment combinations which are considered by BMU staff only when there is bed-crunch situation while those with black background are prohibited bed assignments at all times. In non-bed-crunch situation, BMU staff will consider only bed assignments which correspond to cells with white background. Note that bed-crunch situation is defined based on hospital-imposed threshold on bed occupancy rate.

Abbreviation: CVM = cardiovascular medicine; GAS = gastroenterology; GRM = Geriatric Medicine; MED = general medicine, OTO = orthopedic; PSY = psychiatric medicine; RES = respiratory; RMD = rehabilitation; SUR = general surgery

TABLE 3: PRIORITIZATION OF BED ASSIGNMENTS TO PATIENTS BASED ON BED CLASSES

		Class of Bed Assigned			
		A1	B1	B2	C
Class of Bed Requested	A	1	2		
	B1*	2	1		
	B2		3	1	2
	C		3	2	1

Numbers in the cells refer to the priority levels (1 to 3 in decreasing order) of bed assignments with reference to the clinical specialty of bed requested. Cells with white and blue background are bed assignment combinations which are considered by

BMU staff only when there is bed-crunch situation while those with black background are prohibited bed assignments at all times. In non-bed-crunch situation, BMU staff will consider only bed assignments which correspond to cells with white background. Note that bed-crunch situation is defined based on hospital-imposed threshold on bed occupancy rate.

*Only B1 CVM patients can be assigned to B2 CVM beds when there is not enough B1 beds for CVM patients who request for such beds.
Abbreviation: A = air-conditioned single room; B1 = air-conditioned 4-bedded room; B2 = natural ventilated 4-6 bedded room; C = natural ventilated 8-bedded open ward

METHODS

Using the classical process improvement framework of Plan-Do-Study-Act (PDSA) [8], the quality circle workgroup developed a ABAA prototype which could meet all hospital operational constraints and prioritization rules prior. PDSA framework was then also employed in the integration of ABAA into existing hospital BMS to realize manpower productivity gain via the adoption of the ABAA operationally. After ABAA was rolled-out at the hospital, the staff satisfaction level with ABAA was then assessed using an anonymized online survey in the post-implementation evaluation exercise. Staff participation in this online survey was entirely voluntary and no identifiable information of study participants were collected. The set of questions in this survey and their respective purposes are listed in Appendix A.

DEVELOPMENT OF ABAA PROTOTYPE

The PDSA framework in this phase entailed planning for the algorithm to be tested; doing or developing the algorithm prototype; studying the operational validity of this algorithm prototype; acting to plan the next change cycle or full implementation. In the "Plan" phase, the team first performed a literature review of publications on PBAPs and assessed if any of the published solution frameworks could be adopted and adapted to address the PBAP in CGH. On the whole, PBAP has received a fair amount of attention in the literature [9-14] with the aim of reducing reliance on hospital staff to address it manually. The PBAPs in these studies can be characterized in terms of the operating constraints (e.g., gender policies, mandatory equipment, preferred equipment, age policies, etc.) being considered, whether these constraints are hard or soft, whether these PBAPs are solved offline or online and the techniques adopted to solve these problems. Techniques which have been reported include solving PBAP as a mixed-integer linear programming (ILP) model [2] or using a heuristic which is based on solving a sequence of hierarchical optimization subproblems [15] or autonomous bat algorithm [14]. Apparently, there is no one size fit all solution to PBAPs as the operational constraints which need to be accounted for and prioritized usually vary across hospitals. After it was ascertained that it was necessary to develop a heuristic customized to suit CGH operational context, the team proceeded to the "Do" phase which involved algorithm prototype development using Microsoft Excel Visual Basic for Applications (VBA). A VBA program was developed so the CGH PBAP could be addressed with the following features:

- ABAA operates in a hierarchical manner so that available beds are prioritized at three tiers (from high to low) for assignments to bed requests according to acuity levels and bed awaiting time of admitting patients (see Table 1)
- At each aforementioned priority tier level of bed requests, ABAA assesses the operational feasibility of every possible assignment of available bed to each of the bed requests in the same priority tier level using a composite scoring mechanism.
- The composite scoring mechanism is calibrated according to a matrix of clinical specialty and bed class combinations (bed request versus bed assigned) as shown in Tables 2 and 3 so that a bed assignment which can better meet the operational constraints and priority rules will yield a higher score.
- ABAA offers the combination of bed assignments which yield the best total composite scores with these assignments meeting the operating constraints and prioritization rules as stated in Tables 1 to 3

The "Study" phase entailed experimentation and evaluation of the ABAA prototype using sampled and de-identified sets of retrospective operational data where 64 scenarios of hypothetical PBAPs were generated. Based on these sampled sets of data, the ABAA prototype was run to generate recommended bed assignments before the latter were reviewed by the BMU team (one team leader, one executive, two senior patient service associates and one senior manager). At this point, a qualitative approach [16] was iteratively employed by the quality circle team which met regularly to have focus group discussion on how to design ABAA that could better meet CGH operational constraints and prioritization rules as stated in Tables 1 to 3. Essentially, the topics covered in these discussions entailed BMU team highlighting how the specific bed assignment decisions proposed by the ABAA prototype in specific experimental scenarios were not in line with their current practice, what should be the correct bed assignment assignments in these scenarios. In each iteration, the algorithm developer then acted in response to the feedback collated by recalibrating the composite scoring mechanism in ABAA and/or refining the underlying algorithm based on feedback from the BMU staff before new bed assignments recommended by the revised ABAA were subject to next review by the BMU team. An overview of the key tasks and key outcomes in each of the steps in PDSA process of ABAA prototype development is available in Appendix A

SYSTEM INTEGRATION OF ABAA IN BMS

In this project phase, the system integration effort also adopted the PDSA framework which entailed planning or coordinating with BMS vendor on system integration requirements; doing or translating the ABAA programme scripts into BMS platform with development of relevant user-interface; studying the operational functionality of ABAA and user-interface in the BMS. platform; acting to operationalize ABAA as part of a new workflow in BMU.

In the "Plan" phase, the project team worked closely with the BMS vendor to determine the system requirements which allowed ABAA to function seamlessly in the BMS platform. These requirements include:

1. On-demand feed of real-time data inputs are to be made available to ABAA before it generates the bed assignment recommendations.
2. A new function in BMS to allow users to execute ABAA to generate bed assignment recommendations.
3. An interface which allows users to review the bed assignments recommended by ABAA once the latter completes its run.

After the details of the abovementioned requirements were deliberated, the team then proceeded to the "Do" phase of building these requirements into the BMS platform. There were several iterations of the "Do" phase with the "Study" phase as every completion of building a requirement by the BMS vendor team was typically followed by a focus group discussion with the BMU team and algorithm developer to explore ways to enhance new BMS platform so that it better met the operational needs of BMU staff. Such discussion primarily entailed sharing by BMU team members and algorithm developer on (1) their user experiences; (2) ways to improve the user interface designs; (3) ABAA functional and data security related issues after running the ABAA in a testing environment. In the event that further rework was required, the BMS vendor would act by returning to the "Do" phase based on inputs gathered in the "Study" phase. An overview of the key tasks and key outcomes in each of the steps in PDSA process of integrating ABAA with BMS is available in Appendix B

RESULTS

DEVELOPMENT OF ABAA PROTOTYPE

After multiple rounds of ABAA refinement from nine review meetings among the algorithm developer and BMU team, the project team was able to conclude that the revised ABAA prototype was able to perform bed assignments like the BMU staff and in a more timely manner. The ABAA prototype was able generate multiple bed assignment recommendations concurrently in less than 10 seconds while a BMU staff typically took around 3 to 5 minutes before making one bed assignment decision for one newly admitted patient. Thus, the team went on the "Act" phase of the PDSA framework to seek hospital management approval for funding support which was necessary to embed ABAA function within the current CGH BMS. Backed by strong evidence that the proposed ABAA was operationally feasible, the project team was able to get the funding support approval by the hospital management to proceed with the next project phase of integrating ABAA with CGH BMS.

SYSTEM INTEGRATION OF ABAA IN BMS

Once it was established that the newly built-in features in BMS were ready to be operationalized as part of the new workflow (see Figure 1) for the BMU team for bed assignments, relevant training was then offered to the BMU team as part of the "Act" phase of PDSA cycle. This training entailed technical guidance to the BMU staff on how the operate ABAA function in the new BMS platform and what to follow up after the bed assignments recommendations become available (see Figures 2 and 3 for changes in BMS user interface due to introduction of ABAA). Once the training of BMU staff was completed, the project team then went on to the "Act" phase of the PDSA framework where the new bed assignment algorithm became operational in September 2020 in CGH.

To this end, it is also important to highlight the project team encountered one major setup issue during the initial operational roll out of ABAA which was not observed during the user acceptance testing of the ABAA in testing environment. The team realized the ABAA performance, particularly the speed at which the recommended bed assignment decisions were made available to users was not within the team's expectations once the BMU team started using ABAA in the production environment which required significantly more computing memory than what was required in the testing environment. As a result, the BMS vendor team needed to act swiftly to revise the system configuration setup so that speed at which ABAA generated the recommended bed assignment decisions was more acceptable to the BMU team.

FIGURE 1: PROCESS FLOW OF BED ASSIGNMENTS BY BMU STAFF WITHOUT ABAA AND WITH ABAA

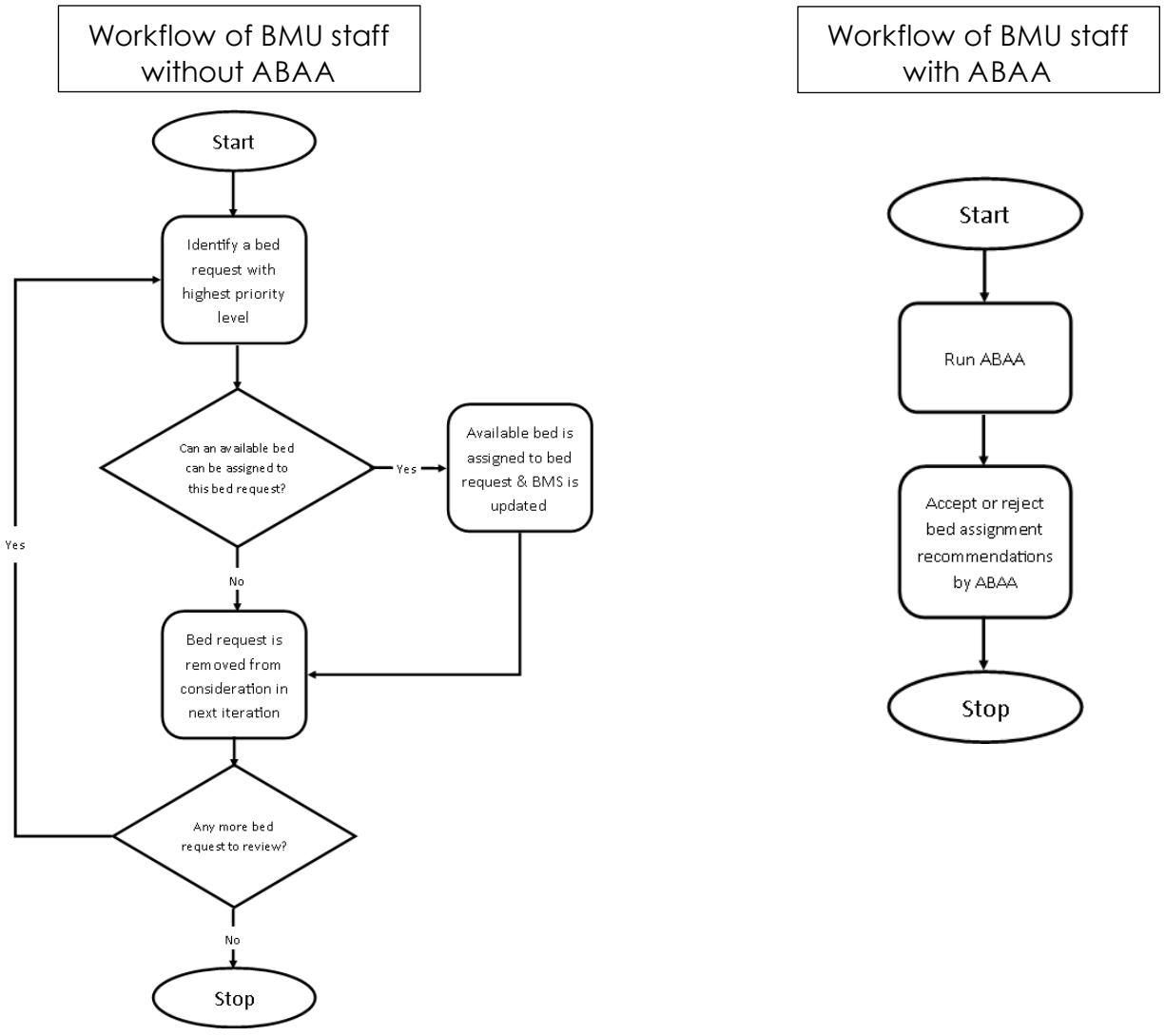
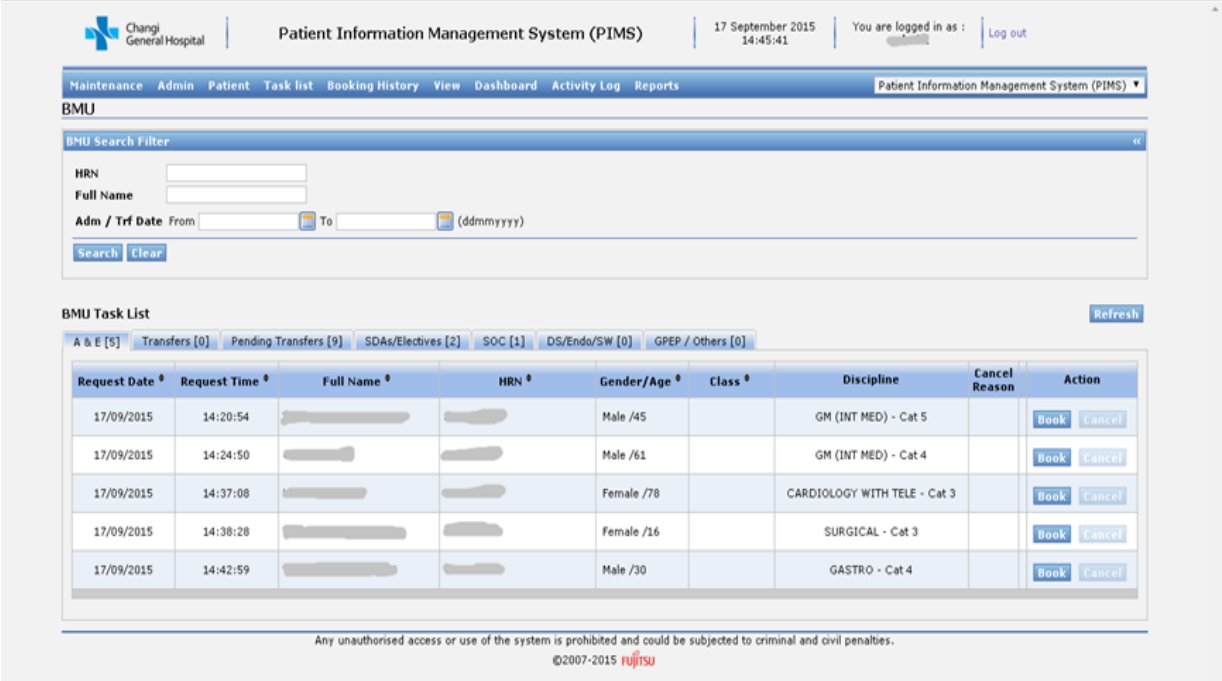


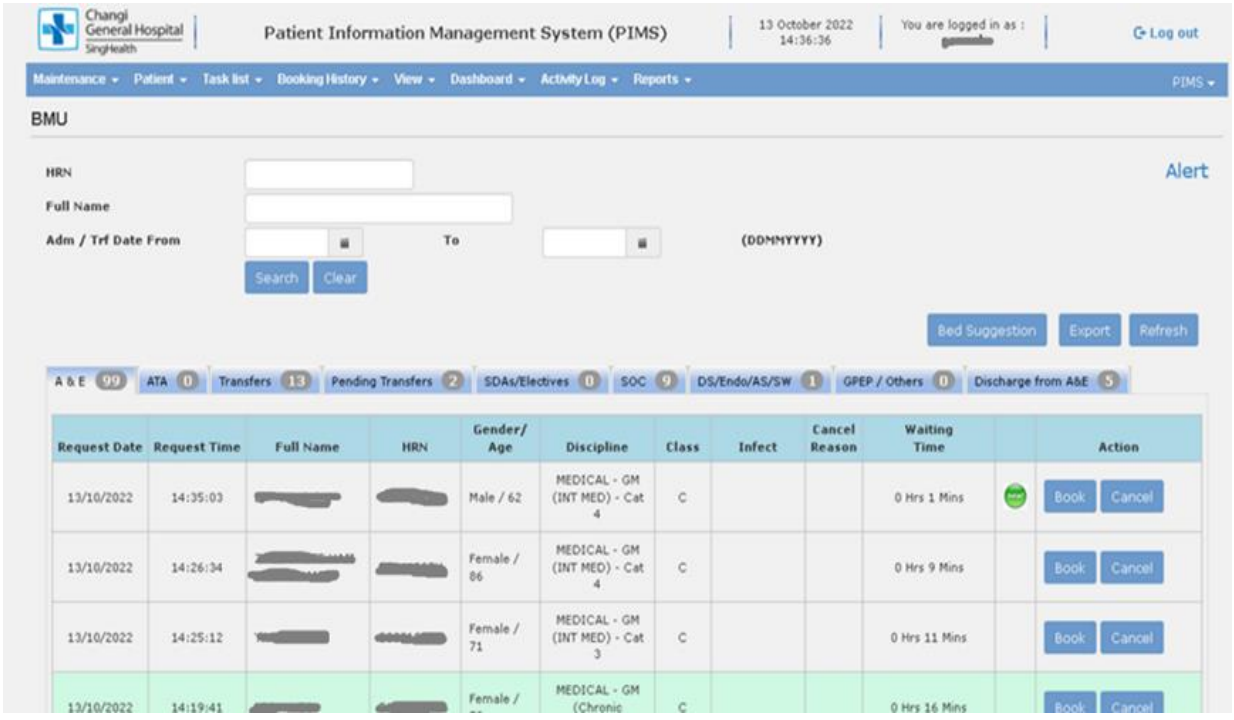
FIGURE 2: CGH BMS PLATFORM USER INTERFACE: BEFORE AND AFTER THE ROLLOUT OF ABAA

Before rollout of ABAA



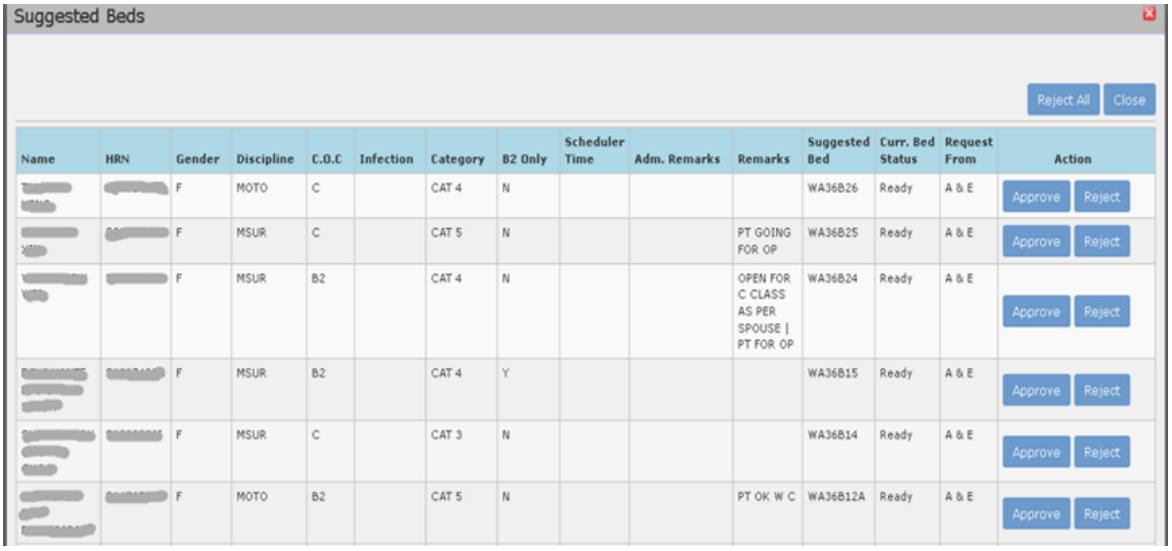
BMU staff need to click on "Book" icon before entering the details of an available bed which has been assiged to patient

After rollout of ABAA



BMU staff have the option of clicking on "Bed Suggestion" icon to activate ABAA. Refer to Figure 3 for sample of bed assignment recommendations offered by ABAA in BMSFigure 3: Screenshot of sample bed assignment recommendations made by ABAA in BMS platform

FIGURE 3: SCREENSHOT OF SAMPLE BED ASSIGNMENT RECOMMENDATIONS MADE BY ABAA IN BMS PLATFORM



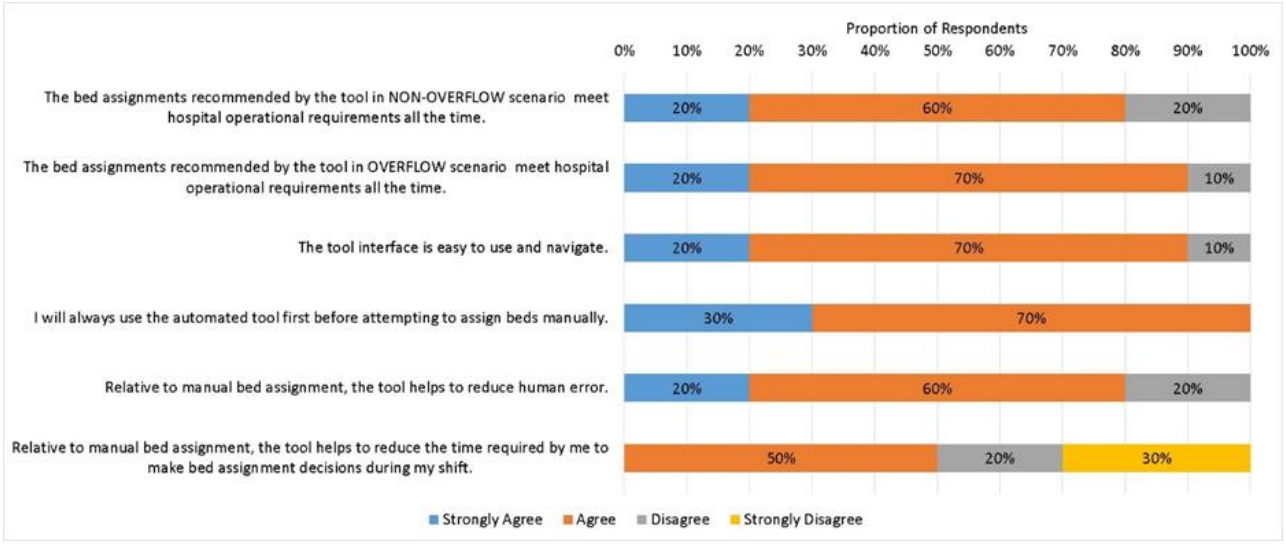
Name	HRN	Gender	Discipline	C.O.C	Infection	Category	B2 Only	Scheduler Time	Adm. Remarks	Remarks	Suggested Bed	Curr. Bed Status	Request From	Action
[redacted]	[redacted]	F	MOTO	C		CAT 4	N				WA36B26	Ready	A & E	Approve Reject
[redacted]	[redacted]	F	MSUR	C		CAT 5	N			PT GOING FOR OP	WA36B25	Ready	A & E	Approve Reject
[redacted]	[redacted]	F	MSUR	B2		CAT 4	N			OPEN FOR C CLASS AS PER SPOUSE | PT FOR OP	WA36B24	Ready	A & E	Approve Reject
[redacted]	[redacted]	F	MSUR	B2		CAT 4	Y				WA36B15	Ready	A & E	Approve Reject
[redacted]	[redacted]	F	MSUR	C		CAT 3	N				WA36B14	Ready	A & E	Approve Reject
[redacted]	[redacted]	F	MOTO	B2		CAT 5	N			PT OK W C	WA36B12A	Ready	A & E	Approve Reject

Note: BMU staff have the option of to either "Approve" or "Reject" any bed assignment recommendation made by ABAA

POST-IMPLEMENTATION EVALUATION EXERCISE

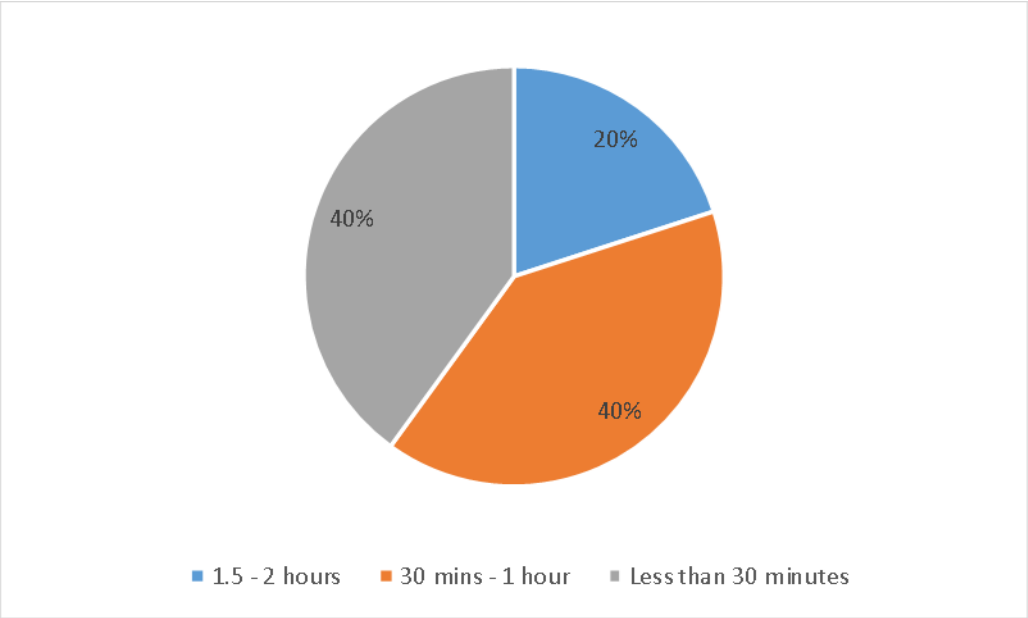
Due to operational exigencies during the COVID-19 pandemic, the project team was only able to perform a formal evaluation of the new operational ABAA in June 2022 where BMU staff who had at least six-month experience of using ABAA were invited to complete an online survey which has questions pertinent to staff's perception on the reliability, acceptability and benefits of the new tool. In total, all the 10 BMU staff who satisfied the inclusion criteria completed the anonymous online survey where the list of key questions administered in this survey is shown in Figure 4. The mean (standard deviation) years of bed assignment experience in BMU of these 10 staff was 7 (5.2). Overall, up to 90% of survey respondents reported that ABAA was able to generate bed assignment recommendations which met the hospital's operational requirements. 90% of these respondents also reported that ABAA was easy to use and navigate while all respondents always reported using ABAA before attempting to assign beds manually. Relative to manual bed assignment, 80% of respondents reported that ABAA was able to reduce human error while 50% of respondents reported ABAA had reduced their time taken for bed assignments. Among these latter respondents, 60% of them indicated that ABAA had reduced their time taken for bed assignments per shift by 30 minutes to 2 hours (see Figure 5).

FIGURE 4: KEY QUESTIONS AND RESULTS OF THE ANONYMOUS SURVEY COMPLETED BY RESPONDENTS



Note: The tool used in this survey refers to ABAA while non-overflow and overflow scenarios refer to non-bed-crunch and bed-crunch situations respectively

FIGURE 5: DISTRIBUTION OF TIME-SAVING PER SHIFT AMONG RESPONDENTS WHO REPORTED THAT ABAA HAD REDUCED THEIR TIME TAKEN FOR BED ASSIGNMENTS



DISCUSSION

ABAA had enabled BMU staff to harness two major benefits. Firstly, ABAA had reduced the time taken by 50% of BMU staff to make bed assignment decisions and this allowed them to spend more time on other value-adding tasks which included patient, next of kin engagement and care coordination with other hospital staff. This time saving was made possible due to ABAA's ability to make multiple bed assignment recommendations concurrently when BMU staff could only assign an available bed to one bed request at a time when they were making bed assignment decisions manually. The second notable benefit of the ABAA was reduction of human error in bed assignment. Relative to manual practice, ABAA also enabled BMU staff to make bed assignment decisions in a consistent and objective manner which in turn lowered the risk of BMU staff making unintended errors in their bed assignment decision-making processes and compromising inpatient care.

Two user-centric factors are crucial to the successful development and subsequent rollout of ABAA in CGH. First, all stakeholders of this project team were able to believe that the proposed ABAA was both technically and operationally possible to develop before they were engaged extensively in the algorithm development work. Due to the inherent complexity of the operational constraints and prioritization rules which BMU staff needed to account for in their bed assignment decision-making processes, some members of the project team were initially sceptical that an ABAA that suited CGH requirements was possible to develop. Once the ABAA prototype in the VBA platform was made available for the project team to test run prototype using their respective corporate notebooks, the team members were progressively more convinced that there was a good chance that ABAA might work after all. Another crucial factor for the successful roll out of the ABAA was the extensive engagement of all key stakeholders including the ABAA users in development of the system interface which allowed ABAA to function seamlessly in the BMS platform. Usability and acceptability of ABBA was evident in the post-implementation evaluation survey where all respondents reported that they would always use ABAA first before attempting to manually make bed assignment decisions.

LIMITATIONS

50% of respondents in the post-implementation evaluation survey did not agree that ABAA had reduced their time taken for bed assignments. Among these respondents, almost all of them had suggested that the current platform (BMS) where ABAA was residing needed to be upgraded. It must also be highlighted that the BMS hardware was set up more than one decade ago primarily to allow users to electronically record and track all bed assignment decisions and bed statuses, not to offer bed assignment recommendations. With added role of offering bed assignment recommendations that requires more computing resources, it is inevitable that the current BMS hardware would need to be enhanced to support this added role. Therefore, it is crucial that the computational

needs of a decision support tool like ABAA (which is to be customized according to individual hospital operational needs) have to be taken in consideration in planning for system upgrade or setting up the BMS in a new hospital.

CONCLUSIONS

The user-centric design of ABAA has enabled its high adoption and acceptance rate among staff as a decision-support tool. It is also evident from this study that hierarchical heuristic approach offers tremendous potential as a decision-support tool for hospital providers in addressing their respective unique PBAPs. As the computing hardware continues to evolve, it is highly probable that significantly more time saving can be harnessed in the near future with abovementioned decision-support tool for PBAPs. Potentially, better bed assignment decisions can also be made by the tool by embedding relevant predictive elements in the hierarchical heuristic setup where these decisions also take into consideration of future bed demand and supply.

IMPLICATIONS

This study value adds on to existing literature on hospital bed management practice by offering empirical evidence on operational feasibility of customizing a hierarchical heuristic that offer bed assignment recommendations which can meet multiple unique and conflicting hospital operational requirements. The favorable results from this study suggest that similar hierarchical heuristic can potentially be adapted to address PBAPs of other hospitals.

CONFLICT OF INTEREST DECLARATION:

The authors declare that they have NO affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

ETHICAL CONSIDERATIONS:

This quality improvement project did not require local research ethics board review as per organizational policy since the project did not involve identifiable data.

ACKNOWLEDGEMENTS:

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APPENDIX A: OVERVIEW OF PDSA PROCESS IN ABAA PROTOTYPE DEVELOPMENT.

Step	Description	Key Tasks	Key Outcomes or Findings
Plan	Plan for the change to be tested/implemented	Literature review to understand the research landscape in this domain of patient bed assignment problem (PBAP)	There is no one size fit all solution to PBAPs as the operational constraints which need to be accounted for and prioritized usually vary across hospitals. None of the approaches reported in the existing literature which aim to address PBAPs can be readily adopted in CGH. The project team decided to develop a ABAA prototype that can meet the unique operational constraints and prioritization rules of the CGH PBAP
Do	Carry out the change	Develop the algorithm prototype development using Microsoft Excel Visual Basic for Applications (VBA)	A prototype was developed and was ready to be assessed in terms of its ability to make bed assignment decisions like existing BMU staff.
Study	Study the relevant data before and after the change is introduced and reflect on what is learnt	Experiment and evaluate the ABAA prototype using sampled and de-identified sets of retrospective operational data	After each cycle of experiment and feedback from BMU team on the existing gaps in the ABAA prototype, the developer revise the prototype to address these gaps.
Act	Plan the next change cycle or full implementation	Recalibrate the composite scoring mechanism in ABAA and/or refine the underlying algorithm based on feedback from the BMU staff before new bed assignments recommended by the revised	After multiple iterations between the Study and Act phases, the project team was able to conclude that the revised ABAA prototype was able to perform bed assignments like the BMU

		ABAA were subject to next review in the Study phase. Seek hospital management approval for funding support which was necessary to embed ABAA function within the current CGH BMS	staff and in a more timely manner. Hospital management granted approval for the project team to proceed with the next project phase of integrating ABAA with CGH BMS

APPENDIX B: OVERVIEW OF PDSA PROCESS IN ABAA PROTOTYPE IMPLEMENTATION.

Step	Description	Key Tasks	Key Outcomes
Plan	Plan for the change to be tested/implemented	Worked closely with the BMS vendor to determine the system requirements which allowed ABAA to function seamlessly in the BMS platform	The vendor understood the system setup require ments before they commence the next step of the PDSA cycle.
Do	Carry out the change	Build these requirements into the BMS platform	New system setup and user interface which BMU staff execute the ABAA
Study	Study the relevant data before and after the change is introduced and reflect on what is learnt	BMU team and algorithm developer reviewed the system setup and interface and offered inputs that can potentially enhance new BMS platform so that it better met the operational needs of BMU staff.	The BMS vendor team revised the system setup and user interface design in response to collated comments from the BMU team and algorithm developer. New system setup and user interface were operationally ready for full implementation.
Act	Plan the next change cycle or full implementation	Conduct relevant training for BMU team so that they understand how the operate ABAA function in the new BMS platform and what to follow up after the bed assignments recommendations	The BMU team was ready to adopt ABAA as part of their new workflow

APPENDIX C: SET OF QUESTIONS ADMINISTERED TO ELIGIBLE BMU STAFF AFTER IMPLEMENTATION OF ABAA

Questions	Response Options	Purpose
The bed assignments recommended by the tool in non-overflow scenario meet CGH operational requirements all the time	Strong Disagree, Disagree, Agree, Strongly Agree	Assess if the assignment algorithm meets the operational requirements in CGH
The bed assignments recommended by the tool in overflow scenario meet CGH operational requirements all the time	Strong Disagree, Disagree, Agree, Strongly Agree	Assess if the assignment algorithm meets the operational requirements in CGH
The tool interface is easy to use and navigate	Strong Disagree, Disagree, Agree, Strongly Agree	Assess users' acceptability of tool
I will always use the automated tool first before attempting to assign beds manually	Strong Disagree, Disagree, Agree, Strongly Agree	Assess users' acceptability of tool
Relative to manual bed assignment, the tool helps to reduce human error	Strong Disagree, Disagree, Agree, Strongly Agree	Assess the benefit of tool
*Relative to manual bed assignment, the tool helps to reduce the time required by me to make bed assignment decisions during my shift	Strong Disagree, Disagree, Agree, Strongly Agree	Assess the benefit of tool
if the response to previous question* is Agree or Strongly Agree: how is the time saving per shift?	<30min, 30min-1hour; 1-1.5hr; 1.5-2, >2hr (to track by shift)	Assess the benefit of tool
if the response to previous question* is Agree or Strongly Agree: The time saving is significant enough to allow me to perform other job tasks.	Strong Disagree, Disagree, Agree, Strongly Agree	Assess the benefit of tool
What you like most of the tool?	Free text	Assess users' acceptability of tool
What improvement do you recommend for the current tool version?	Free text	To look out for improvement opportunity

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RESEARCH ARTICLE

WOMEN, AGING, HEALTH AND QUALITY OF LIFE: A FRAMEWORK FOR ACTION AND POLICY FORMULATIONS

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ABSTRACT

The population of the elderly in the world will double from 2015 to 2050, reaching nearly 2.1 billion. The ageing population suffers from physical, mental health, and psychological well-being. There is no such customized policy that caters to helping the ageing population. The current examination studies ageing women, their health, and their quality of life (QoL) in India. The study tried to capture the two major and vast diversified areas.

Respondents were randomly selected from four south and north Indian states. The present investigation covered 64 cities in these four states and collected 1,100 samples. The data analysis revealed that QoL has a significant difference with different demographic factors as well as health status, Literacy level, marital status, socioeconomic status, and health status of elderly women. Most of them suffer from diabetes, hypertension, and digestive system issues, so they need regular medical care and attention. Further data analysis unearthed that most ageing women belong to middle and lower socio-economic backgrounds. The government should focus more on their financial assistance and food security and arrange proper counselling therapy for their mental health to improve their QoL.

The study contributes to the constructive and reflective handling of the health and well-being of the ageing female population. Policymakers must look into the health issues of the elderly population and make customised policies and actions that can assist the elderly population.

KEYWORDS

women, ageing, health, quality of life, random sampling, policy, India

INTRODUCTION

The elderly population could double in developing countries in the next 50 years. The situation of older women is made worse by a legacy of discrimination based on gender. Our socioeconomic system discriminates against them twice because it is ageist and sexist. The population of older women will increase much more than men. For every 1,000 elderly males, there are, correspondingly, 1,310, 1,590, 1,758, and 1,980 older women in the 65, 70, 75, and 80 age categories in India.[1] They are more susceptible to health concerns, poverty, financial instability, and dependency. However, ageing is an integral part of every woman's life cycle. Moreover, the effects of ageing vary across populations, genders and geographical regions,

revealing various diversities and influences. Ageing issues have gained prominence in national and international media forums concerned with the reported distribution of demography and population communities. Ageing is a highly individualised (relevantly and vitally personalised and essentially humane) and complex process and varies with gender and culture. [2] As we move from a primitive society to a modern society, human life expectancy has also increased; women outlive men by about five to ten years. In such a scenario, the constructive and reflective handling of issues related to their physiological health and mental well-being needs to be a priority for the government. Women 0f 60 years plus age have reached the 50% mark and now account for 54% of the older population who face significant health and financial challenges that affect the quality of their lives. [3] The explosive ageing population and quickly evolving social-economic changes (i.e., urbanisation, ladies' labour force, monetary autonomy, expanding independence, and family units, disintegrating between generational bonds, occurring, maturing issues) represents a more noteworthy test to non-industrial nations inferable from asset imperatives and continuous political responsibility towards improving quality of life. [4,5] The World Health Organization (WHO) defined Quality of Life as an "individual's perception of life in the context of culture and value system in which she or he lives and with her or his goals, standards, expectations and concerns" [6].

Over a year, the QoL decreases primarily due to access to resources that impact the material condition that cannot be reversed but is always on the decline. In India, most families live with joint families, although this culture is changing in favour of the nuclear family due to urbanisation.[7] For those that have yet to receive any financial and medical assistance from the government, then in that case, their situation will be even more difficult to survive because of their illiteracy, low economic status, and lack of social support. Not only will they experience financial instability, but it will also negatively impact their physical and emotional health and quality of life. The Madrid International Action Plan on Aging (MIAPA) developed a plan for the ageing population's well-being and prosperity. [8] With this growing number, health issues are also increasing. Physical health, psychological well-being and mental health issues need priority. Through comprehensive policies, the government caters to the needs of the younger population, and fewer policies focus on the needs of the elderly.

This paper investigates the relationship between QoL and illiteracy, socio-economic status and health of elderly women to cater to and help the ageing population; our study comes with the following research objectives and research.

RESEARCH OBJECTIVES & RESEARCH QUESTIONS

RO1: - To study the women, ageing, health and quality of life of elderly women populations in North India, namely Uttarakhand and Uttar Pradesh and South India, namely Telangana and Andhra Pradesh.

RO2: - To study the relationship between the literacy level of older women and how it affects their QoL.

RO3: - To investigate their social and economic status and quality of life.

RO4: - To understand their marital status and their quality of life.

RO5: - To understand the importance of medical and financial assistance for older women concerning their health issues and QoL.

RO6: - To suggest a broader and inclusive plan of action and better policy measures that can assist older women rather than being marginalised and stereotyped as a helpless burden or funny bones, inspiring humour for soap serials or stand-up comedies.

RESEARCH QUESTIONS

RQ1: - Is there any relation between their literacy level and QoL?

RQ2: - How does a Social and Economic Status (SES) related to the QoL?

RQ3: - Does the quality of life relate to marital status?

RQ4: - Is there any relation between women's ageing and their physical health issues?

RQ5: - Is there any association between their health issues and QoL?

REVIEW OF LITERATURE

WOMEN, AGING AND HEALTH

The old-age-invested air of reverence in the eastern cultures has been erased, and a negative representation of old has emerged in their place. [9] Popular culture, primary stream culture, and media have perpetuated these images, valorising youth. Many wrinkle-free creams and dyes to turn the grey hair into black are seen regularly. In the modern-day, everyone else becomes second-class citizens due to the youth-obsessed culture, to be shunned, and this view is propagated by the media regularly. [10] Inside the sociological speculations of maturing, factors of nationality, sexual orientation, way of life, and financial status were insignificantly considered beforehand. The rise of the social speculations old enough and maturing can be followed back to the period soon after the universal conflicts with the rising worry of the legislatures regarding the results of segment irregularity and the lack of youthful specialists in the USA and UK.[11] Due to their institutional setbacks in India, older women are strictly banned or even polarised from earning or educating themselves. In some families, the husband strictly bans their wife and daughters from working, earning money, or even getting higher education, reducing, polarising, and labelling them as cooks and caretakers.[12] Even husbands stigmatised with anger or domestic violence that the house will be run only by men's earnings. Older women being ill-educated, cannot identify and seek relevant awareness and avail the policies governed and administered. We find that the dependence on social welfare leads to a more relevant trap in widows entangled in receiving money. More than anything, in the case of unmarried women, the greatest dread comes from the way that there are numerous primary restrictions on the off chance that they experience the ill effects of any illnesses. [13] Apart from the welfare framework, single ladies and widows need to track down their way to get their fates, and they are approaching an adjustment of the family-focused social arrangements. " The tax system, welfare policies, and even the medical insurance system are also designed for families, and they alienate widows, sisters and unmarried single-person households". [14]

Ageing people experiences differ in various societies and cultures. A people's culture teaches them to value individual independence and uniqueness from birth through collaborations with their folks.[15] Women in India face the challenges of ageing, such as inadequate diet, crime, hazardous working environments, and lifestyle-related diseases. [16] Late-life problems included family relationships, economic stability, health issues, role loss, working role differences. [17] Higher levels of psychological distress resulted from unstable financial conditions, personal health issues and inability to do daily activities. The relationship between stressed life, financial fear and experience of stress due to such factors in an ageing population. [18] The Aging population suffered a lot from diseases (communicable and non-communicable). There is a decline in immunity at one age, which leads to higher numbers of communicable diseases. [19]

The number of elderly individuals is growing worldwide. Economic status may affect the access that elderly individuals have to healthcare management and quality of care. [20] Traditionally, women live longer than men and thus comprise a majority of older adults. While increased longevity is a bonus for some adults, it may be accompanied by chronic health conditions, frailty, vulnerability, social isolation, and resource scarcity. Older women face a greater risk of outliving their savings. Moreover, older adults, particularly those who are widowed, experience worse health than those whose spouses are still alive". [21] Elderly women face tremendous challenges and unexpected hurdles in the form of insecurities and loss of past social roles, thus impacting their wellbeing and quality of life. [22] Old age-related chronic conditions can be prevented by practicing effective lifestyle changes and through conscious preventive measures, i.e., by adopting healthy lifestyle changes such as paying attention to and adopting healthy promoting behaviours and not to health demoting behaviours which would protect the elderly from major life events, lifestyle health problems and significant financial burdens. [23] The old wellbeing improvement was identified with offering significance to their connectedness to their grown-up kids and grandkids alongside changes made (or not made) in communicating closeness in their advanced age, and how trust and question are reintegrated for some through just taking an interest in rigorous exercises and certifying their absolute confidence. [24] Behavioural factors such as stress reduction, exercise, and getting good sleep and nutrition also have the potential positive effect and help deal with ageing. [25] The effects of rapid urbanization and societal modernization lead to a greater breakdown in family values. There is a deterioration of the closely-knit fabric of family support and the problems faced in the form of financial frailty, social disconnection, and old maltreatment prompting a large group of mental diseases.

Likewise, widows are inclined to confront social disgrace and shun. [26] Older women who are more experienced are more likely than more established men to be victims of abuse. [27] The old are likewise inclined to maltreatment in their families or institutional settings. [28] Women who suffer from loneliness lead to significant physical impairment, increased psychological issues, reduced mobility with age, lower life satisfaction, smaller social networks, and lack of confidence. [29] Living alone and financial needs were directly proportional because alone elderly people faced issues with the feeling of loneliness, adjustment problems, inability to experience and tolerate differences, feeling of rejection by close and extended social connections in family and community and loneliness indirectly affected their affiliations such reduction in visits with family members and paved path to increasing worries. [30] The financial issues of the older are disturbed by elements, for example, the absence of government-managed retirement and insufficient offices for medical services, recovery, and amusement. [31] Many studies have shown that retired old individuals are faced with the issues of monetary instability and depression. Many older women are more likely to be socio-culturally influenced by health conditions because they are less financially independent and have less control and status than older men. [32] Since most people do not work in the formal sector to make a living but still act as spouses and mothers, the feminization of ageing and the lack of inter-familial care leave most women financially insecure in old age. [33, 34, 35]

In the dominant characterization of the society, the senior citizens are understood to be unproductive and therefore made to feel useless or unwanted. The World Health Organization (WHO) defines QoL as an "individual's perception of their position in life in the context of the culture and value systems in which they live and with their goals, expectations, standards, and concerns". [6] However, QoL can be conceptualized differently depending on the "discipline, paradigm, and research time frame. [36] QoL is intrinsically related to health. Under the umbrella of QoL is the concept of health-related quality of life (HRQoL). [37] Quality of life is an all-inclusive concept incorporating all factors that impact an individual's life, while HRQoL includes the subset of the important or most common ways health or healthcare impacts well-being. [38] The intersection between the physical and the social leads to problems that affect both the physical and mental bodies. The complexity of the issues in an aged woman's life in general and the women's health is not made a part of the concerns about ageing, may further contribute to the issue of older women's health and wellness not being looked at as priority public health issues From the perspective of the aged, after keeping the house or working for years, when the 'empty nest syndrome' sets in, and when nuclear families find no elbow room to spare for an aged parent, the setback in the form of neglect feels like a slap in the face. For older women in India, the additional burdens of culturally imposed stigma and the notion of 'inadequacy' for not being good enough complicate things further. [39] Such an idea is part of the cultural baggage of a rural environment where muscular production predominates. Besides this, the onset of old age is also associated with many health issues. Mental health in itself needs to be taken seriously and given due attention with appropriate empathy, care and sensitization. Mental health takes on a grimmer picture in its intersection with age and gender, particularly from the supply side of aid and assistance. [40; 41] This resulted in a large proportion of the senior population living and related problems of living. However, the question that some of the elderly ask is whether this increase in longevity is blessing or curse. The government of India adopted the 'National Policy on Older Persons' in January 1999, where it defined 'senior citizen' or 'elderly' as a person who is of age 60 years or above. [42] We need to take back that space appropriately for the well-being of our older women. India has a vast population, and 1/10 of this population are hospitalized for specific disabilities, which are primarily due to at least some conditions of old age, and this population of the old is amounting to people about the age of 60 years only have used. [43; 44] We see that older adults suffer from specific problems related to high blood pressure and associated disorders classified as cardiovascular diseases. Further, we also have some ideas about the other diseases that arise from lack of proper nutrition and lead to changes in metabolism and the functioning of kidneys and other circulatory problems related to the endocrine systems. It was also seen that there was a significant relationship between age and self-reporting of diseases. [45] To date, research hardly seems to have attempted to study exclusively women's health to protect and safeguard their rights and to fulfil their age-related needs through supportive interventions and feasible policies. There is evidence in the literature that health and biology are two variables linked to improvements in physical health among older people. The most critical factors on the changes in older adults are physical, socioeconomic, political, and social contexts in his research on the social determinants that affect health inequalities. [46] Across the centuries, there was mutual empathy, affection, and reverence.

However, in today's shifting family situations, mainly where the daughter-in-law works and contributes to the family budget and the elderly are financially reliant, the desired harmonious coexistence does not always occur. Three adverse effects were observed on older adults' physical, social, and psychological status, as evident in the above scenario. [47] Barriers to social engagement among lonely older adults and the impact of social fears and identification. [48]

Indian society as a whole is dealing with lonely older lady. Against this background, there is a strong need to develop a multipronged approach to deal with the issues related to elderly women from all the perspectives mentioned above. Ethnomethodology centres on the investigation of people's techniques in "doing" public activity to create common conspicuous connections inside an arranged setting, delivering organization. It investigates how individuals' natural, routine exercises create and oversee settings of coordinated regular circumstances. [49] Studies demonstrate a need to sanction a preventive health care package to facilitate all aspects above. There is a need to fully understand ageing and health from a gender perspective. The research focused on the socioeconomic and health status of elderly women in rural areas t that relates to the approval.

Do not say that ethics clearance was not required better understand their situation. It was found that elderly women often suffered from psychiatric issues such as depression, alienation, solitude, and anger. These issues will become a source of tension and stress if they are not appropriately addressed.

RESEARCH DESIGN & METHODOLOGY

The current investigation was carried out with quantitative methods and random sampling. Firstly, we collected information on old age from secondary and web sources and got information on the different statistics, policies and health needs of the elderly population. The study chose the two different geographical areas to highlight policy differentiation according to demographics. The researchers collected the data with a self-administrated questionnaire from the women staying in Institutions and the homes in these four states. We have a total sample size of 1,000 in the two states of South India, Andhra Pradesh and Telangana and two in North India, Uttar Pradesh and Uttarakhand. Besides this, we had collected data of 100 more in Telangana and Uttarakhand as part of our pilot study. Hence our total sample size was 1,100. The study tried to fix an equal number of women staying in care institutions and old age homes and those staying at home with families in urban and rural dwellings. The inclusion criteria were aged women above 60 years of age, and the exclusion criteria were individuals with a terminal illness.

PROFILE OF WOMEN

The data representation of respondents shows 162 respondents belong to the 56-60 age group, 418 respondents are from the 61-65 age group and 232 respondents belong to the 66-70 years age group and the remaining are in higher age groups. A large number of women were illiterate and had not studied beyond primary. The majority of the women in our sample knew only one language but in Uttarakhand, most of the women knew two languages: the Kumaoni or Garhwali language and Hindi. In the other states in Andhra and Telangana, the majority of the women knew Telugu, and in Uttar Pradesh, they knew Hindi. When we asked the women the language they had studied, it was mainly in the native tongue and in Uttarakhand, they had studied in Hindi. As far as the socio-economic status of these women was considered most of them came from the middle and lower classes. While the majority of the women in Andhra Pradesh and Telangana were from the Middle class, in Uttar Pradesh and Uttarakhand they were from lower classes. Most of the women in our sample did get a pension because either they were working or had a pension. The other women had received the pension from their husbands but a large number of these women were receiving the pensions paid by the Government.

In accordance with ethical guidelines and principles, this research project obtained ethics clearance from the Institutional Ethical Committee of the University of Hyderabad. The approval was granted after a thorough review of the study's methodology, objectives, and potential impact on participants. The ethical clearance reference number for this project is UH/IEC/2019/171. This approval ensures that the study was conducted in compliance with established ethical standards and that the rights and welfare of the participants were safeguarded throughout the research process.

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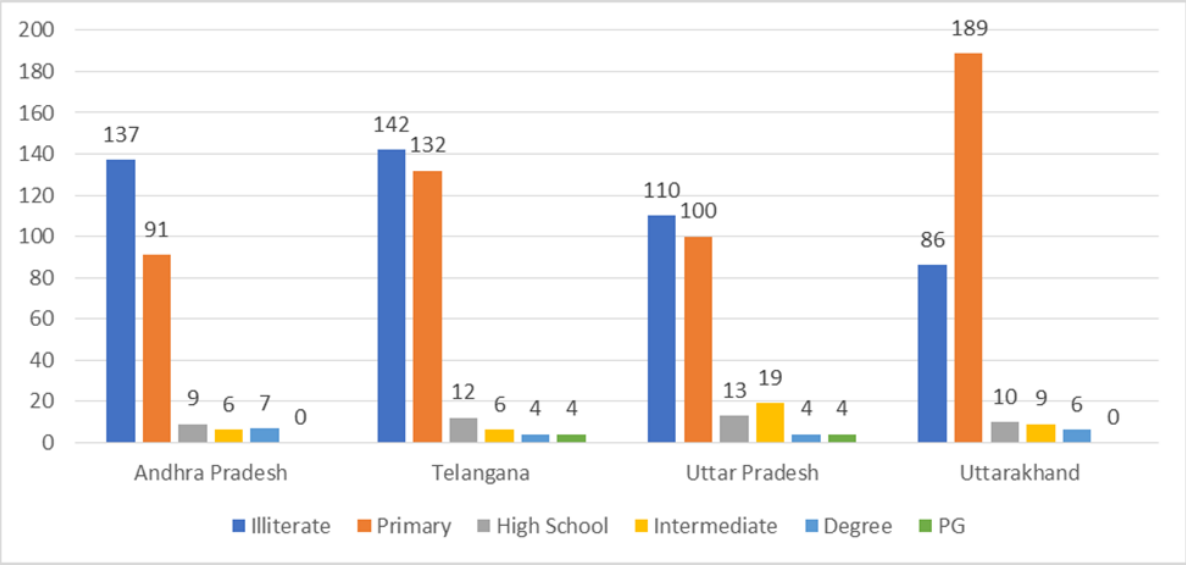
RESULTS AND ANALYSIS

DESCRIPTIVE ANALYSIS

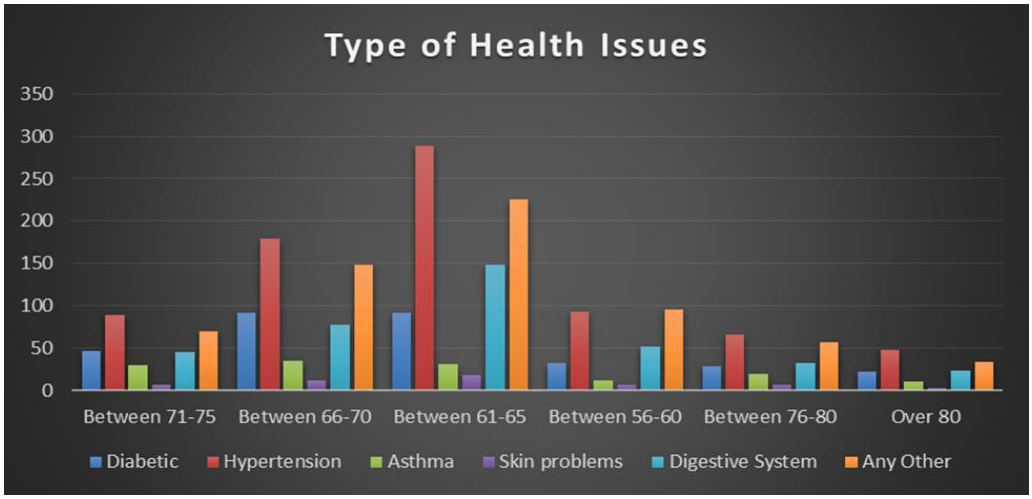
The present investigation was focused on the health and demographic details of elderly women, especially in the northern and southern parts of India (i.e., Uttarakhand & Uttar Pradesh and Telangana & Andhra Pradesh) concerning demographic details and their difference. Sample respondents' features are measured in various socio-demographic details (see Figure 1)

FIGURE 1: RESPONDENT'S EDUCATION IN RESPECTIVE STATES



We investigated that many women were illiterate and had yet to study beyond primary in selected states. Uttarakhand was a state where the women had studied until primary, and this number was more than that of the total women that were illiterate in Uttarakhand. Older women who are ill-educated need help to identify and seek relevant awareness and avail of the policies governed and administered. We find that the dependence on social welfare leads to a more relevant trap in the case of widows who are enmeshed in receiving money. More than anything, in the case of unmarried women, the greatest dread comes from the way that there are numerous primary restrictions on the off chance that they experience the ill effects of any illnesses. [11] 600 respondents came from urban areas and 418 respondents from rural areas and 82 respondents belong to semi- urban areas. Most of the respondents stay in their home, with 713 respondents staying in home, 381 respondents are staying in an institution and 6 members are staying in other places like old age homes. Majority of the women in our sample were married and a large number of women were widows. Hence for the old women there was a double issue of being old as well as being a widow and often they felt lonely and could not depend on anyone. It was interesting to see that among the women we interviewed, 14 for Andhra Pradesh and 18 from Telangana, were divorced. As far as the socio-economic status of these women was considered most of them came from the middle and lower classes. While the majority of the women in Andhra Pradesh and Telangana were from the Middle class, in Uttar Pradesh and Uttarakhand they were from lower classes. Most of the women in our sample did get a pension. This was either they were working and had a pension. The other women had received the pension from their husbands but a large number of these women were getting the pensions paid by the Government.

FIGURE 2: HEALTH ISSUES OF RESPONDENTS



In the 61-65 years of age group, 92 have Diabetes, 289 have Hypertension, 31 have Asthma, 18 have skin problems, and 148 people are suffering from Digestive system issues (Figure 2). This makes one recall the report of the World Health Organization that also claimed that life expectancy had increased worldwide by five years [46], but concerning the previous report, it is also essential to consider health status while life expectancy has increased as the present study indicates.[47] Considering the not too senior age group of 61-65 years having greater reported health issues, it is pertinent to pay attention to their future life course where the health issues may worsen their living if not taken care of early. This also calls for attention to the very senior age groups, probably owing to their relatively better living style reporting lesser history of health issues, whereas the same is not the case with relatively lower age groups. However, the sample size being a limitation, further exploration on a larger scale is required for coming up with clear findings regarding incidence and prevalence of health issues and the role of age variation in senior women.

Our literature review reveals that many elderly women are suffering from more than one disease. [43,44] Our study does not point out that women are suffering from any psychological issues, which contradict certain other recent studies. [40,41] Our data analysis suggests (Table 3) that only 3.2% of women said they are suffering from psychological issues.

The following analysis is made to check the differences in quality of life with variations in several demographic factors discussed so far. The following ANOVA tables describe the attempt in detail. Using the tables and graphs, the present section discusses and depicts the analysis describing the quality of life in its association with the demographic details. Results revealed that the quality of life of older women has significant differences with different age groups. Previous reports also suggest that the right policy can make a big difference in women's health, especially ageing. [48,49] The study further explained that quality of life has significant differences with age, literacy, socioeconomic status and place of residence of the respondents.

RESULTS & DISCUSSION

The results demonstrated that there is a difference in QoL with different demographic factors as well as health status. There was a significant difference in QoL with literacy level, marital status, retirement, social economic status, area of residence and place of staying and health status of elderly women. This calls for paying attention to the age requirements regarding the factors mentioned. Further exploration is recommended in future studies for a deeper understanding of the causes of the areas where the differences have been significantly observed concerning QoL variation. With a deeper understanding of factors affecting QoL and contributing to the differences among the aged, appropriate interventions must be planned to enhance the QoL in the identified areas.

If factors have to be considered from a psycho-social perspective, we can see that increasing age influences their QoL. Literacy level contributes to financial independence, awareness about the ongoing contexts and happenings around and functional independence in many aspects. Thus, variation in literacy level may also indicate a difference in QoL. Marital status and support from a spouse may also contribute to social support that a

woman may deem available as her own. Thus, the difference in marital status may contribute to the difference in QoL. Retirement may bring into the life of an individual some relaxation and relief. However, it may also lead to certain uncertainties and insecurities from financial, psychological and social perspectives. Thus, retirement may contribute to the difference in QoL. They similarly reside in rural areas, handicapping some persons, especially the aged, thus impacting their QoL owing to the non-availability of medical and social support facilities. The same is the case with the financial security that pension may offer them, and non-availing of pension may also affect their QoL.

As the health problems of aged women reported are more in the lower age range in the sample, it may be noted that 60-65 is the age of several transitions happening in a woman's life. Having devoted most of her time to the family, upbringing of children and livelihood and responsibilities, it is a common fact that a woman ignores her health. It is not improper to say that lower literacy levels, lack of awareness, lower SES, inability to avail proper resources, etc., may be reasons for the varied health issues women report. The women between the ages of 60-70 years feel that they are not functionally dependent on others and hence have to carry on with responsibilities and become a support system to others in the family rather than taking help and being dependent on others for chores or family responsibilities. On the other hand, when women move towards the advanced age of senior citizenship, some care and support may be expressed by significant others. In contrast, on the lower end of senior citizenship, such support may not be felt strongly by others. Women who remain a pillar of the family may not perceive their weakening of health, nor may the others perceive owing to their seemingly untiring routine performance.

TABLE: 3 ANOVA TESTING OF QOL AND DEMOGRAPHIC (AGE, LITERACY, MARITAL, RETIREMENT, SOCIAL ECONOMIC STATUS, HEALTH STATUS)

With Age group	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.944	5	1.589	16.65	0
Within Groups	104.491	1095	0.095		
Total	112.435	1100			
With Literacy Level					
Between Groups	7.944	5	1.589	16.65	0
Within Groups	104.491	1095	0.095		
Total	112.435	1100			
With Marital Status					
Between Groups	5.813	3	1.938	19.936	0
Within Groups	106.622	1097	0.097		
Total	112.435	1100			
With Retirement					
Between Groups	0.558	1	0.558	5.482	0.019
Within Groups	111.792	1098	0.102		
Total	112.35	1099			
With Social Economic Status					
Between Groups	5.09	2	2.545	26.03	0
Within Groups	107.345	1098	0.098		
Total	112.435	1100			
With Health Status					
Between Groups	16.717	4	4.179	47.854	0
Within Groups	95.718	1096	0.087		
Total	112.435	1100			

Source: data analysis by authors

IMPLICATIONS

There is a need for policy-level attention towards elderly women who, under the several adverse circumstances and contexts that they live in, face psycho-social problems which are largely neglected. Healthcare facilities need to improve and be more available in terms of home care and availability at a closer distance for the benefit of older women. Improving the networking between health care and service-related organizations to optimize the resources available for elderly care and to share expertise is felt important. For the institutionalized elderly more human interactions with voluntary health care and psycho-social support services will partially compensate for the aloofness felt due to a lack of family support. Social services such as visiting the elderly in the community or in institutions who may feel lonely may be integrated into the outreach activities of schools and colleges. This may offer the dual benefit of developing human compassion, service orientation and empathy for the younger and growing generations, and on the other hand, the feeling of being cared for and attended to by the elderly. Financial constraints must be focused on as not all elderly, especially women, are financially independent. Elderly pensions to suffice the essential requirements and health care access and services free of cost and, if not possible, at subsidized and affordable costs may be considered irrespective of public/private health services. Direct interactions with specialists from bio-psycho-social perspectives and for those who find solace in spirituality, some spiritually-based programmes may contribute towards enhanced wellbeing. Technology-assisted interventions such as crisis support and health information provided with simple mobile apps on ordinary phones or using television programmes may be planned with the involvement of relevant experts. Virtual services, such as free access to video mode technology for doctor's appointments and consultations, primarily help them. There is a need to build apps where women can easily access hospitals, doctors and nurses through a mobile app. A multi-level system of social support involving family level, community/society level, and governmental support through relevant professionals (a holistic approach as mentioned in the previous points) as an integrative model is recommended. Mental health services also need to be paid attention to. Policies and practices that benefit older women and men should support and improve the care provided by their families (e.g. respite cares and training). Incorporate mental health assessment and management of depression and other mental health problems into primary health care and pay special attention to women who have experienced elder abuse or other forms of violence. Help remove the stigma associated with mental illness and include legislation to protect the human rights of institutionalized people with severe mental disorders. There is a requirement for centres around Positive Aging and Aging in Place with the goal that more seasoned individuals need to stay coordinated in the public eye. Further, there is a need for a Positive self-view of maturing sound, cheerful and confident – is helpful for life span, advances more prominent certainty among the older and results in better acknowledgement and comprehension by family and society.

CONCLUSIONS

Socioeconomic status is a factor as a SES difference may be in several facets of living conditions and social relations. With increasing age, reduced independent functionality, and being less 'useful' to others, there is a possibility of neglect towards women of senior age groups. The cognitive, cognitive and affective functioning slowing down and the resultant behavioural aspects probably contribute to this neglect from family or society. The woman herself may not be able to articulate her health and psycho-social needs and well-being owing to the differences in the bio-psycho-social mechanisms in mutual respects. There is a need to consider customized policies to help persons of a higher age by understanding their needs and required facilities. Rural areas handicap some persons, significantly the aged, thus impacting their QoL owing to the non-availability of medical and social support facilities. The same is the case with the financial security that pension may offer them, and non-availing of pension may also affect their QoL. There is a substantial disparity in understanding and use of old age remunerations among senior citizens even though the federal government has created various programmes and schemes for older people as state-specific initiatives. Unfortunately, only some ministries are responsible for addressing all aspects of the ageing issue; hence, inadequate attention is paid to ageing issues.

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RESEARCH ARTICLE

PARTICIPATION IN ONLINE HEALTH COMMUNITIES: DECODING THE ANTECEDENTS AND OUTCOMES

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ABSTRACT

A significant number (49 %) of Indian users tend to rely on digital media to either access health-related information or use the internet as a precursor to visit a doctor [20]. According to a report by Raheja [48], "The Internet of Things" (IoT) connection has the potential to change the malfunctioning medical system into a comprehensive, effective, and individualised system. This will allow for a more proactive approach to wellness and overall health, reducing medical expenses through these inclusive practices. Online health communities in India demonstrate significant clout to transform the healthcare industry by empowering patients. They offer a platform to all key stakeholders, that are, the healthcare professionals, patients and even the caregivers alike, to come forth, share their experiences and develop remedies for various issues faced by the healthcare industry.

This paper examines the antecedents involved in the empowerment of patients in Online Health Communities (OHCs) and the outcomes of this in the form of participant compliance. The research additionally examines the moderating impact of certain factors such as the patients' e-health literacy and health locus of control (HLOC) and the physicians' paternalism, in examining the relationship between patient empowerment and compliance.

The findings of the research propose a construct or a theoretical model for the numerous factors and moderators associated with the patient's participation in online health communities. The social support available to patients leads to more empowered patients, ultimately resulting in higher Patient compliance. Further, this patient empowerment, which comprises of sense of autonomy, competence and self-efficacy makes people more compliant. The theoretical construct between patient empowerment and patient compliance, is further moderated by the patients' e-health literacy and health locus of control (HLOC) and the physicians' paternalism.

KEYWORDS

online health communities, social support, empowerment, compliance, moderators

INTRODUCTION

When individuals are searching for the treatment of health-related issues such as acidity, indigestion, diarrhoea, aches and discomforts or even very particular problems such as shedding pounds, menstrual issues, allergic reactions, nostrils drips, hair loss etc., they tend to first and foremost hunt for any potential remedies or substitutes in their near vicinity. Further, if the medical conditions require certain sort of major or minor surgery, the susceptibility and sentimental stir in the minds of the individuals, may be even higher. This is especially so, when the attitude of the consulting doctor, is nonchalant, less supportive, less empathetic or frank in communicating the diagnosis and treatment with the patient and his family. The frustration with the doctor's ability to fulfil the patients' informative as well as emotional needs, leads to the patients' tendency to look out online and join healthcare communities and rather seek advice from the netizens available online.

The study aims to examine the variables affecting patients' empowerment in Online Health Communities (OHCs). Further, it aims to study whether the empowerment gained by joining OHCs can lead to better compliance by patients. Also, whether patients with varying health locus of control, feel more empowered by participating in online health communities. The paper further proposes that e-health literacy moderates the relationship between patient empowerment and compliance. Chin [7] observed how OHCs have modified the relationship of a doctor and a patient from paternalism to enhanced autonomy. Hence, this research study also aims to examine the moderating role of physicians' paternalism in moderating the association between patient empowerment and compliance.

SOCIAL MEDIA USAGE BY PATIENTS FOR HEALTH-RELATED ISSUES

As stated by Hughes et.al. [23], Health 2.0 can be described as the use of certain online tools (searches, websites, blogs, podcasts, wikis, etc) by various stakeholders in the healthcare system viz. doctors, patients, caregivers and even research scientists. They utilise the open-source information and content shared by users, coupled with the power of networks, and are able to not only personalize health care and also collaborate and promote health education. The "2.0" monitor in Health 2.0 refers to the drastic movement and transition from the traditional static web pages to the contemporary user-generated pages and content; which is dynamic and easy to share. Some of these comprise blogs, video-sharing sites, social networks, Wikipedia, mashups, hosting services, and web-based software applications.

With easy access to digital technology, patients are able to share health-related information promptly and are in fact way ahead of healthcare professionals. Social media tools, owing to its participative and collaborative nature, are proficient at creating and retrieving information and further sharing it with patients or other health care consumers. Kaplan and Haenlein [24] categorise social media into various kinds viz. blogs, microblogs, multimedia groups, websites for socialising, collaborative projects and simulated universes. Hernandez-Tejada et.al [16] conducted research on the usage of social media in healthcare and observed the following key insights:

- Around 42% consumers use social media to check for patient reviews of doctors, clinics, hospitals and lines of treatment
- The 18-24 age group of consumers, use social media to share health-related information and almost 40% of them claim that this information sharing significantly impacts their health-related decisions.

RESEARCH QUESTIONS

The present paper involves a comprehensive study to explore the relationship between perceived social support in OHCs and patient empowerment. It further checks if higher patient empowerment leads to increased compliance in the form of medication adherence. The paper also proposes the moderating impact of the patients' e-health literacy and HLOC and the physicians' paternalism, in explaining the relationship between patient empowerment and the patients' compliance.

RQ1: Is there a relationship between perceived social support in OHCs and patient empowerment?

RQ2: Does an increase in patient empowerment leads to increased compliance in the form of medication adherence?

RQ3: Do factors such as the patient's e-health literacy, impact the above relationship?

OBJECTIVES OF THE STUDY

1. To look at the aspects that contribute to patient empowerment in OHCs.
2. To examine the connection between patient empowerment in OHCs and patient compliance

3. To investigate the moderating effects of patients' e-health literacy and HLOC, as well as physicians' paternalism, in understanding the link between patient empowerment in OHCs and patient compliance.

METHODOLOGY

A critical and comprehensive analysis was conducted on the expansive literature available on online health communities. A narrative literature review (NLR) was used to achieve this broad objective. The propositions were formed based on an analysis of the body of literature and secondary sources. The following requirements had to be met by the studies in order for them to be considered for the overview:

INCLUSION AND EXCLUSION CRITERIA

Publications that were selected were: Peer-reviewed articles, English-language publications, studies with an interpretive or exploratory design, studies addressing the relationship between social support and empowerment, consideration of empowerment as an independent variable and evaluation of patient compliance as an outcome variable. The search period for this study was for publication between 1/10/2021 and 1/3/2022.

Publications that were excluded were the ones not available in English or the ones mostly about over-the-counter medicines.

SEARCH STRATEGY

An exhaustive list of keywords was identified based on preceding searches and the relevant academic terminologies used. As a result, we first looked into various databases for review articles relating to patient compliance and/or empowerment. Key terms linked to patient compliance or empowerment and related constructs, were combined with one another in the main search. Social support, empowerment, compliance, Online Health Communities - are few of the search terms used. The following Boolean operators were used to connect the keywords: "Social support" AND "Empowerment", "Empowerment" AND "Compliance".

The vetted research outcomes were characterized by the objectives and scope of the research. The empirical findings of all the research papers were categorized by looking at the data and making preliminary notes inductively. After analysing the articles, we framed the propositions that are being discussed in the following section.

FINDINGS AND DISCUSSION

Wiley, PubMed, Scopus, Springer, Taylor & Francis were the main academic databases used for this research. In Wiley, we found 140 journal articles in English, 150 in PubMed, 110 in Taylor & Francis, 100 in Springer, 100 in Scopus. Papers that were found relevant to the topic, were selected by using a predefined inclusion and exclusion criteria. This was followed by an additional round of screening in which 450 studies were rejected and removed from the combined pool of 600 research studies. In the next step of screening, the titles and abstracts of the examined papers were assessed by both the authors with appropriate knowledge of the conceptual boundaries.

SOCIAL SUPPORT

Albrecht and Adelman [2] define *social support* as "verbal and non-verbal communication between recipients and providers that reduces the uncertainty about the situation, the self, the other, or the relationship, and functions to enhance the perception of personal control in one's experience". Patients that take an interest in their healthcare and are health-conscious frequently employ social media channels to learn from and educate one another about different therapies and ailments. OHCs are a platform where users with common interests, make new friends, upload photos and remain in contact with old pals. Boyd and Ellison [6]. OHCs are going to play an important part as pandemic has impacted the physical and mental well-being of people from all walks of life, be it academia, Kumar et al. [28], healthcare workers Pujari & Kumar [46].

The amount of time people spend in online groups is closely related to their social network usage and improved contentment with the online assistance they receive, delivering more advantages to those with poor self-esteem, life satisfaction, and the number of Facebook friends. Wright [63]. Cohen and Hoberman [8] while researching peer support in healthcare communication have shown a beneficial connection between social support and medical results. Past research [Ellison et al. [10,11]; Valenzuela et al., [57] emphasised that utilising Facebook greatly promotes social capital and individual psychological wellness, and thus has an advantageous connection with perceived support from others and creating less anxiety and elevated fulfilment in life,

particularly in excessively anxious categories. Nabi et al. [37].

Numerous definitions of social support identify three major forms of social support: societal integration, perceived support from others, and performed social assistance. Vangelisti [58]. The perspective on *social embeddedness* focuses on "an individual's connections to others or the available social ties in their social environments". Stokes [55] *Perceived social support* is pertinent to mental or intellectual assessments of positive interactions and can be described as "the social support that people believe is available to them" Procidano & Heller [45]. The third component implemented social help, is defined as the activities that people take while assisting others. Barrera [4]. Shafi et al. [52] indicate that supportive resources have four dimensions viz. sentimental (e.g., nurturance), instructive (e.g., guidance) or relationship (e.g., a feeling of belongingness); observable (e.g., financial assistance) or invisible (e.g., unique guidance).

Emotional social support is a form of interaction that addresses an individual's psychological or affective needs. *Esteem support* is communication that boosts a person's self-confidence or belief in their capacity to solve a problem or complete a goal. Network support refers to the communication and support that confirms people' network membership. Informational social influence is described as one's behaviour of monitoring another person's experience in their social network prior to carrying out a planned action, for instance purchasing an object. Kim & Srivastava [25]; Lee et al. [36].

Shavazi et al. [53] researched few virtual peer support groups for individuals with multiple sclerosis (MS) and discovered that informative social support comprises guidance, recommendations, scenario evaluation, lessons, and expressing intimate knowledge. Compliments, validation, and blame release are examples of esteem social support, whereas network support includes access, presence, companionship, and so on. Finances, straight assignments, secondary duties, readiness to help, and active involvement are examples of material support, whereas emotional support comprises words of encouragement, interactions, compassionate empathy, meditations, confidentially, virtual affection, discussing surviving doctrines and spiritual support.

One of the primary benefits of participating in OHC was identified as psychological support. Kim et al. [26], Rodgers & Chen [50]. Psychological assistance assists patients in dealing with the burden of living with and combating illnesses. Qiu et al. [47] In comparison to educational support, emotional support encourages patients to stay longer at OHC. Yi-Chia et al. [60]. Companionship, according to Wang et al. [59], is a strong forecaster of users' sustained engagement, although informational assistance is the most commonly requested social support in OHCs.

PATIENT EMPOWERMENT

OHCs such as PatientsLikeMe, WebMD, MedHelp and many others, help patients to share their experiences related to health, extend support to others and engage in meaningful discussion with the experts i.e., the doctors. They also play a crucial role in transforming the age-old relationship of the doctor and the patient from the traditional patient-centred relationship to a contemporary patient-empowered or patient-centred relationship; this phenomenon is known as PERP (*Patient empowerment in the relationship with the Physician*). Patient Empowerment, as defined by the WHO, is "*a process through which people gain greater control over decisions and actions affecting their health*".

Patient empowerment can be classified into two varieties: the first empowerment emphasizes on the transformation of an individual patient while the second emphasizes on the relationship between doctor and the patient Petric et al. [42].

Patient Empowerment can be defined as the patient's communicative behaviour in connection to his or her physician Zimmerman [66]. Self-efficacy, sense of control, and competency are three characteristics of Patient Empowerment. Self-efficacy refers to a patient's conviction in his or her capacity to achieve goals during a doctor's appointment, as well as awareness of the results desired. In a relationship with a physician, the patient's sense of control denotes the willingness and eagerness and capacity to involve in decision-making and individualised therapies. Finally, competencies refer to the abilities and talents required to have a productive conversation with a medical professional. As a result, PERP is a kind of communicative orientation and behaviour that has the potential to influence the physician-patient relationship. It can lead to a lack of trust between the patient and the physician, the patient being viewed as difficult, the patient turning overly confident, or the patient inciting and acting aggressively toward the healthcare provider.

PERP could have functional or dysfunctional consequences depending upon orientation towards the doctor which could be communicative or strategic. In a strategic orientation, patient is more on the receiving end and is more concerned about his/her benefits and thus aims at fulfilling his/her goals. S/he might not recognize the doctor's interests which further leads to a misleading, insincere and disrespectful relationship with the doctor.

On the contrary, the power originating from open interaction is aimed at realising a settlement. Thus, in a functional PERP scenario, patients exercise self-efficacy, better control and proficiencies while having a conversation with the doctor.

According to Barak et al. [6], OHCs provide informational, emotional and relational supports which further help the patients to have better control over themselves, higher confidence, and personal autonomy and acquaint them with sociable skills to manage their own problems and well-being. Arnold [3] conducted a study on pregnant women and observed that these OHCs help them to exchange knowledge and build empathetic relationships, leading to higher empowerment.

Several other studies have found that OHC users' diverse actions result in Patient Empowerment, which manifests itself in a variety of good outcomes for OHC users: increased self-esteem, self-efficacy, and control and management of one's health problems; improved social well-being and quality of life; more confidence in interactions with doctors; more competent use of health services; and even improved social well-being and quality of life. According to Oh and Lee [40], online community involvement has a good impact on computer-mediated social support, which allows patients to take control of their self-care. The relationship between computer-mediated social support (CMSS) and the intention to actively engage with the doctor was shown to be mediated by the patient's sense of empowerment. User CMSS, according to Pontevia and Menvielle [44], has a good impact on user empowerment and engagement during consultations, which affects user commitment to the physician's relationship.

The social interaction of people can be explained by two main theories: the social exchange theory (SET) and the economic exchange theory (EET). SET places more emphasis on the social-emotional parts of participant relationships, whereas EET places more emphasis on the material, more monetary aspects of the exchange connection Shore et al. [54]. Individuals must believe their contribution is valuable enough to share with others in order to provide new value. They also anticipate taking advantage of some of that value Pontevia et al. [43].

Horng [17] investigated those personal variables (viz. satisfaction, generosity, pleasure, confidence, credibility, reward); structural capital (interaction); cognitive capital (tenure); relational capital (reciprocity, identification) are the factors which affect the intention to participate in a virtual community. As a result, it is claimed that-

Proposition 1: Consumers' perceived social support in an online health community (OHC) will be positively associated with their empowerment.

Proposition 2: People seeking emotional and psychological support engage in OHC for a long time as compared to people with informational and esteem support.

PATIENT COMPLIANCE

Compliance by patients refers to the extent patients are following the medication referred by the doctor. Laugesen et al. [29]. It includes adherence to medicines as well as adopting healthy lifestyles Lu et al. [31]. Additionally, patient compliance helps to build a healthy relationship between a doctor and a patient; especially in the case of chronic diseases, where patients' regaining depends on self-administration and self-tracking Horwitz & Horwitz [18]. Tustin [57] has emphasized that compliance by patients can have better effectiveness in their treatment; especially when the diagnosis and treatment prescribed is good. Horwitz & Horwitz [18] further added that patients with high compliance are healthier than those with low levels of compliance. OHCs increase patient empowerment with more information now by their side Petric et al. [42]. Lu and Zhang [33] have also observed that conversations that take place between the doctor and the patient help in better patient compliance.

Empowered patients, bring in better health outcomes Lorig et al. [30], effective use of health services, improved health status Bergsma & Carney [5] and medication adherence Hernandez et al. [16].

Pontevia et al. [43] also investigated the relationship between patient empowerment acquired by means of collaborative online health communities and patient compliance and found that patient empowerment raises

patient compliance with physician-proposed treatment. As a result, it is suggested that-

Proposition 3: High patient empowerment leads to increased patient compliance in the form of increased medication adherence.

The patient's participation on the online platform and use of social media continues to provide several obstacles. The most significant of them is privacy, as some people are unwilling to discuss their health difficulties amenably. Wensing [62]. Other obstacles or zones of worry for patients and physicians while utilising social media include: a lack of refuge for personal information, identity management, inaccurate information, and a large number of people's incapacity to utilise a computer and the internet properly. Househ et al. [19]. However, it may be claimed that these issues will alter for patients with differing levels of e-health literacy, medical paternalism, and health locus of control.

E-HEALTH LITERACY

Norman and Skinner [39] define electronic health or e-health literacy as "the ability to seek, locate, interpret, and utilise health information using electronic resources and use this knowledge to solve health-related problems". It attempts to assist people in making educated healthcare decisions by utilising e-health resources. Norman and Skinner [39] and is seen as a critical tool for enhancing wellness and eliminating fitness disparities Wu et al. [64].

OHC which is a particular sort of digital society makes it possible for "*social networking, participation, apo mediation, collaboration, and openness within and between different health-related stakeholders*" Eysenbach [13]; Hara & Hew [21]. Healthcare consumers and patients can exchange health knowledge and social support Huang et al. [22] and make online appointments with health professionals Guo et al. [15]. Empowerment was found to have a substantial relationship with improved health among medically literate people. Nafradi et al. [38]. Petric et al. [42] also found that people who find meaning in OHCs and had high e-health literacy were less likely to develop dysfunctional competences and control. High level of patient autonomy should be accompanied by equally high level of health literacy for adherence/compliance to occur Schulz & Nakamoto [51] According to Freeman et al. [14], e-health literacy is crucial in the daily lives of teenagers and can encourage healthy behaviours such as vigorous physical activity and a balanced diet. Lu and Zhang [32] also verified that patients' e-health literacy in OHCs can assist increase their adherence by directing their communication behaviour with physicians, generating a health information seeking behaviour, and enhancing their assessment of the quality of information in OHCs. As a result, it is claimed that

Proposition 4: People with high e-health literacy will feel more empowered after participating in OHC and will comply more as compared to people with low e-health literacy.

PHYSICIAN'S PATERNALISM

Paternalism is "*a pattern of behaviours, by a person or organization, which limits liberty or autonomy of an individual for that person's or group's own good, regardless of the will of the individual*". Paternalism i.e. "*the medical expertise a doctor has about a disease*" and Autonomy i.e. "*the personal expertise that a patient has about their own body*" are the two ends of a continuum.

The patient loses all autonomy when a doctor practises full paternalism. Patients believe they are unable to make educated judgements about themselves, and as a result, they abdicate all responsibility for their health situation.

The "paternalistic" concept of the physician-patient interaction promotes the "sick role" of patients, especially when individuals and physicians have dramatically different degrees of expertise, experience, and authority in health-related concerns. Emanuel and Emanuel, [12]. Patients who are in a dangerous or unknown medical scenario rely on a trustworthy physician and his/her specialised expertise to guide them care.

OHCs for health issues and health, online communication, health and medical content on the internet, patient portals from providers and employers, data capturing and personal health record systems all give an alternative to the physician-directed paternalistic approach. OHCs empower patients through informed decision-making with varied levels of psychological engagement, in order to present facts (informative), exchange perspectives (deliberative), and extract their opinions (interpretive). Petri and Petrovcic [41] discovered that the physician's perceived paternalism had a moderating effect on the functional components of empowerment while having a considerable influence on the dysfunctional components and control.

Lu and Zhang [33] investigated the impact of physician-patient communication on patient compliance by

mediating perceived quality of online health information, decision-making preference, and physician-patient concordance. They observed that physician-patient conversation in OHCs improves patient compliance. Patient compliance can be enhanced by directing physician-patient contact in OHCs. Physician-patient conversation, according to Roberts et al. [49], can result in patient compliance. Online health information, according to Laugesen et al. [29], can improve physician-patient communication and, as a result, patient compliance. On the basis of the above debate, it is consequently argued that-

Proposition 5: More paternalistic physicians lead to lesser Patient empowerment in OHCs and lesser Patient compliance despite the social support that the patient gets.

HEALTH LOCUS OF CONTROL (HLOC):

HLOC is a concept that internal and external variables impact an individual's health. Devin et al. [9]. When a person believes in external control, he believes that external forces or the power of others dictate life events, but when he believes in internal control, he believes that life events are under his control and that he is accountable for them. Macsinga & Nemeti [34].

Internal locus of control (ILOC) and external locus of control (ELOC) are two types of multidimensional health locus of control (MHLOC). ELOC can further be subdivided into sub-dimensions such as Powerful Others, Doctor, Chance, and God HLOC Wallston et al. [61].

Wulandhari et al. [65] discovered that chance HLOC and adherence have a negative relationship. Ahmedani et al. [1] discovered a link between God's HLOC and medication adherence. The HLOC and adherence to powerful others were found to have a negative association. People having a high doctor HLOC, according to Theofilou [56], are more likely to stick to their prescribed medical regimen.

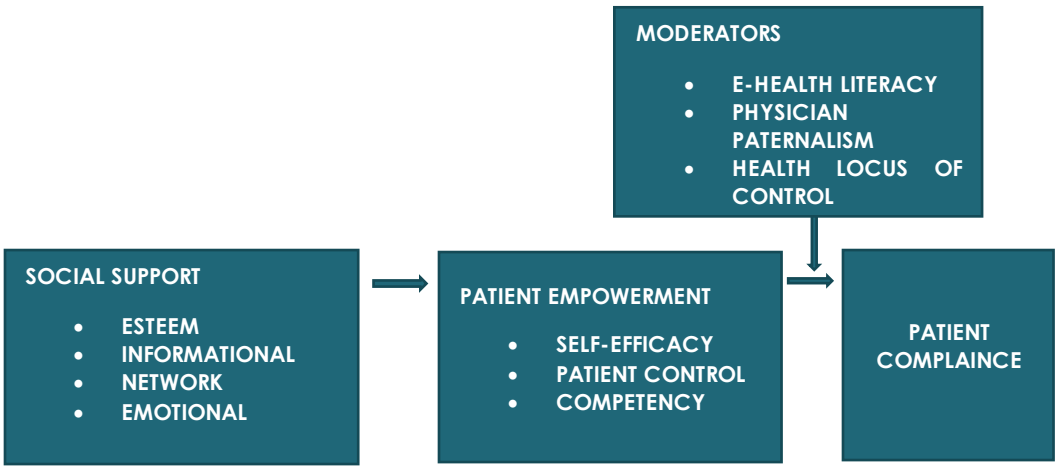
Individuals who think they have extraordinary control over their health (internal control) benefit psychologically and behaviourally. Individual loneliness and impotence, as well as an undesirable struggle against illnesses, would come from disbelief in this issue (external control). The term "internal locus of control" refers to personality traits and characteristics that can assist people in gaining more control over their life. Individuals with an external locus of control have more mental issues than those with an internal locus of control.

Empowerment is an energising aspect that encourages individuals to take control of their health habits and disease treatment is one of the patient-related aspects. Empowerment may be interpreted as an individual choice, referring to the patient's authority and power in the medical setting, or as a relational concept, underlining the existing equality in the physician-patient relationship. Nafradi et al. [38] observed that patients' perceptions of their capacity to control their own health, i.e., ILOC- a component of patient empowerment- were connected to higher drug adherence. As a result, it is argued that-

Proposition 6: People with internal HLOC feel more empowered and comply more as compared to people with external HLOC.

In conclusion, we propose a model for Patient Empowerment and Patient Compliance (Figure 1) for the several variables and facilitators related to the engagement of individuals in online health communities.

FIGURE 1: MODEL OF PATIENT EMPOWERMENT AND PATIENT COMPLAINCE



MANAGERIAL IMPLICATIONS

The outcomes of the present study will benefit medical professionals to develop strategies for providing more emotional and psychological support as compared to informational and esteem support so as to increase participation in OHCs. Medical professionals should incorporate strategies to increase patient e-health literacy as it tantamount to patients feeling more empowered after participating in OHCs.

SOCIAL IMPLICATIONS

The present paper will benefit medical practitioners as medication adherence can be increased when patients feel empowered i.e., they feel that they have the autonomy and competence to improve their well-being. Efforts should be done to improve patients' health as well as digital literacy so that patients can co-create value for themselves too. Online health communities serve as a powerful tool to change patients' HLOC from external to internal.

Health professionals should also strive to reduce their paternalism in OHCs and make efforts to make people realize that their health is an outcome of their internal locus of control.

THEORETICAL IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

According to the present studies, social support encompasses all types of verbal and nonverbal communication that minimises confusion about the situation. The psychological or cognitive supports, which are available to patients from their social environments, instils confidence and skills in them needed to have a meaningful discussion with physicians, thus, enabling empowered patients. Patient empowerment which comprises of sense of autonomy, competence and self-efficacy make people believe in following compliance i.e. medication adherence which is also in line with the results of Nafradi et al. [38].

Patient e-health literacy relates to a patient's ability to communicate with the outside world and mitigate the harmful impacts of environmental influences. Because proper e-health literacy increases patients' capacity to self-manage their health and interact with clinicians, e-health literate patients have a stronger sense of autonomy, competence, and self-efficacy. In accordance with the outcomes of Nafradi et al. [39], the present paper also supports that ILOC is positively associated with medication adherence i.e., patient compliance. Patients who feel greater sense of autonomy and competence also believe themselves in control of their own health and thus portray higher medication adherence. Paternalistic attitude of physicians seems to lower patients' self-competence and autonomy, thus lowering patient empowerment and thus leading to a breach of trust in the relationship of physician and patient and hence reduced patient compliance.

This paper has only studied the impact of social support on patient participation and engagement. Future research can study which type of social support viz. informational, network, emotional or esteem, is more important for patients' continued participation in OHCs. The paper has explored the case of OHCs alone. Future studies can investigate the proposed hypotheses in case of mobile health technologies i.e., mobile health apps as well. While the present paper proposes internal and external HLOC, the components of external HLOC have not been discussed in detail. Future research can analyse the moderating impact of external HLOC components (such as chance HLOC, God HLOC, powerful others HLOC and doctor HLOC), in explaining the relation between patient empowerment and patient compliance. Patient's self-esteem also impacts life satisfaction when they join health communities. Kong and You [27]. It would be interesting to see how self-esteem mediates the relationship between social support from online health communities and patient empowerment, in future.

The opposite of participation in OHCs is the trust and privacy factor while sharing personal information in social healthcare communities. Madaan et al. [35] also concluded that participation in IoT devices gets severely impacted due to data breach concerns. Future studies can explore how to tackle data privacy concerns of participants/members of online communities.

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RESEARCH ARTICLE

PHYSICIAN MULTI-SITE PRACTICE IN CHINA: DOCTOR PRACTICES, PUBLIC VIEWS AND LEGITIMACY BASED ON A CONTROVERSIAL CASE

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ABSTRACT

AIM:

Physician multi-site practice (PMP), or dual practice, is commonplace worldwide. Since the mid-2000s, the Chinese Government has issued a series of laws and regulations to promote PMP with a goal of improving access to high-quality medical services. However, PMP is widely conducted illegally in China, i.e., without official registration of practicing doctors. This article provides a more nuanced understanding of PMP in China.

APPROACH:

This article takes a case study approach, one of the most widely used methods of qualitative research in the social sciences. It presents a high-profile case exposed through Chinese social media as well as public perceptions through the lens of online comments given by over thirty thousand netizens on a nationally controversial case.

FINDINGS:

Netizens saw benefits to PMP despite being illegal. A culturally rooted Chinese construction of the triple concepts of 'Qing' (sensibility, feeling or sentiment), 'Li' (propriety, norm or reason) and 'Fa' (rule, regulation or law) is employed to explore the issue of legitimacy of PMP in the Chinese context and explain why PMP has not yet been implemented effectively, and why members of the general public strongly support illegal PMP.

CONCLUSION:

While doctors and the public support illegal PMP, it will be challenging for the Chinese Government to gain traction with official PMP policy.

KEYWORDS

physician multi-site practice, public views, legitimacy, China

INTRODUCTION & BACKGROUND

Also known as dual practice, physician multi-site practice (PMP) is common internationally. [1-3] In China, PMP (duodian zhiye) was illegal until 2004 when an official document of the Central Committee of the Communist Party of China and the State Council on "Deepening the Reform of the Medical and Health System" sanctioned that doctors can practice at multiple sites under the management of the government. As a symbolic project of organizational change, health care reform has been ongoing in China for the last 30 years, with the proclaimed goals of improving efficiency, better quality, more equal access, and the development of primary care. [4-6] Since 2004, PMP has become an important part of this reform process, aimed to bring balance into the allocation of human resources for better healthcare. The Chinese state and other authorities have been promoting PMP for the past two decades via a series of laws and regulations. A regional registration system, an electronic registration system and registration information disclosure and inquiry system have also been established to encourage doctors to undertake PMP.

One of the key aims for the central government in promoting PMP is to allow physicians in the best hospitals to practice in those with lower quality. There were 35,394 hospitals in China in 2020. [7] More than two thirds of hospitals in China are officially graded: 2,996 level III hospitals (including 1,584 level III, Class A hospitals, known as 3A hospitals); 10,404 level II hospitals; 12,252 level I hospitals; and 9,742 ungraded hospitals. 3A hospitals are the highest-ranking hospitals in China. Doctors in 3A hospitals are generally considered to provide the best-quality medical services. In 2020, there were 3.58 billion outpatient visits to hospitals, with 1.85 billion, more than half, going to Level III hospitals.

However, the implementation of government initiatives around PMP has been challenging. From January 2010 to August 2016, 12,275 doctors, accounting for only 5.7% of the total of 228,000 doctors, had registered as PMP in Guangdong Province. [8] In March 2011, Beijing began to implement the "Beijing Doctors' Multi-site Practice Management Measures [Trial Implementation]". According to the Beijing Health and Family Planning Commission, [27] as of May 2014, only 1,993 (less than 3% of total licensed doctors) had registered for PMP in three years. In August 2014, the Commission revised the "Beijing Medical Practice Management Measures" to further reduce the criteria for taking up PMP. By the end of 2015, the number of doctors registered for PMP had increased to 8,173, accounting for 10% of the total number of doctors in the region. [9] Given the law and policies, why have so few doctors formally registered for PMP?

The fact that doctors at 3A hospitals do not register to become multi-site physicians does not mean that they are not willing to do PMP. Some studies have confirmed the willingness of the great majority of doctors to practice at more than one site. In Zhejiang Province, for example, 89.1% of doctors in 3A hospitals were willing to do so. [10] In other words, there are far more willing doctors than those who have formally registered for PMP. This indicates that, in practice, there is a clear distinction between those engaging in regulated PMP and those undertaking illegal PMP, as noted elsewhere. [11] What this means is that the formal policy continues to be only partially effective and that the responses to this require further investigation.

More importantly, the fact that doctors in 3A hospitals have not formally registered for PMPs does not mean they do not actually practice in other hospitals. The reality is the opposite. As the highly publicized case to be presented in this paper demonstrates, instead of official registrations, doctors commonly make arrangements with other hospitals privately, maintain a tacit understanding with the cooperating hospitals, and generate their own separate income. In China's judicial system, this type of private arrangement is a clear violation of more than one law or regulation, but this violation has been tacitly accepted by society and policymakers. PMP is referred to by the general public as "running caves" or "flying knives", as the later sections of this article show.

A review article published in 2018 pointed out that the topic has been widely discussed among policy makers, medical institution officials and health professionals in China. [12] But surprisingly, the limited available literature in English either gives the out-dated description that PMP is officially banned or focused on the issue of informal or illegal payment to doctors who do PMP without registration. [Ibid] This indicates a need for more in-depth research. PMP in China, as elsewhere, raises a wide range of challenging issues in health policy, medical law, healthcare administration and management, healthcare systems, and medical ethics. To date, there is little information available in the English literature on how PMP actually operates in China and how the Chinese public view the practice.

Furthermore, there has been no research either in English or Chinese language publications into the implementation and legitimacy of PMP from a conceptual approach rooted in Chinese culture.

This article will present a highly publicized case in China in 2019 and, particularly, an analysis of online comments of tens of thousands of Chinese netizens. Based on this nationally controversial case, as well as the illustrating views of the public, we explore the issue of legitimacy through a Chinese conceptual framework centred on the triple cultural notions of Qing (sensibility, feeling, affection or sentiment), Li (propriety, norm or reason, or what might be referred to as rites) and Fa (rule, regulation or law). The question of legitimacy, of course, has considerable implications for policy implementation and on the management and delivery of quality health care.

METHOD

In spite of some popular misunderstandings and intrinsic limitations, the case study method is important for generating knowledge and insights. [13] According to the authoritative reference series of *The Sage Handbook of Qualitative Research*, particularly *The Sage Handbook of Qualitative Research in the Asian Context*, the case study is "one of the most widely used qualitative research designs in the social sciences since the late 1960s" (14, p.99). It constitutes one of the "big five" qualitative research methodologies, along with narrative inquiry, phenomenology, ethnography, and grounded theory. With its main strengths including being more concrete and more contextual, the case study method is "challenging" but can be "enlightening" in investigating societal issues in Asian and other countries (14 pp. 99,119).

Employing an in-depth case study method, this article will first present the high-profile 2019 Hongdong County case and analyses a large number of Chinese netizens' (citizens who use the internet) comments on the case (nearly 20,000 participants on one website alone). Through thematic analysis, the most common themes of public viewpoints were identified based on the viewpoints that had the most responses from other netizens. In other words, the most high-ranking viewpoints were prioritised and analysed, with findings presented in this article.

While there exist potential sample biases, the use of netizens' online comments can offer meaningful information especially when few studies are available on certain and especially controversial topics. Other social science studies have indicated that online comments can be an important source of accessing and understanding public opinions in China. [15] For example, a case study of Chinese netizens' comments shows that it can generate new knowledge on the views of the public about challenging topics such as capital punishment. [16]

Chinese statistics indicate that, in 2020, 64.5% of the population were internet users, with 71.8% of users living in urban areas. Internet users aged 20-29 and 30-39 account for 21.5% and 20.8% respectively; 17.6% fall into the 40-49 age group; those 50 and above account for 16.9% of users. [17] This suggests that the internet continues to penetrate into the middle-aged and older age groups and that netizens are likely to come from all ages, indicating that useful information can be obtained through analysis of netizens' comments.

The primary data collected for this article draw on the comments of Chinese netizens, particularly the users of Netease (Wangyi) and Sohu. With each having more than 100 million users, NetEase and Sohu are among the largest and most popular internet companies in China. For Chinese, along with Sina.com and Tencent, they are known as the "Four Gateways of China" in internet technology and especially internet media.

As the following sections will demonstrate, the Hongdong Case and Chinese netizens' strong responses offer a very valuable window into the complicated Chinese reality and the general public's attitudes toward PMP. The Hongdong case was constructed by the authors from primary research data. From the first-hand empirical information generated from the case study, innovative theoretical analysis presented in this article can be derived.

RESULTS

THE HONGDONG CASE

In August 2019, a video went viral on Chinese social networking platforms showing doctors taking a large amount of money from a patient's family member in the operating room (18). The patient paid 10,000 Yuan (about 1,500USD) directly to the doctors for a stenting procedure in a part of China with a smaller population and limited healthcare services provided at a Grade 2A level hospital. The hospital claimed the payment was an expert fee for a

visiting surgeon from Beijing, some 700km away, but the patient was not given a receipt. It was also reported that, for the hospital, the money was a legitimate payment for visiting experts, and the consent of the patients' family was obtained beforehand. The hospital's head of surgery admitted to the media that it was "not standard" to collect money from patients in the operating room instead of by the hospital finance department, but "the hospitals here are all doing this". The surgery head also claimed that the health bureau had intervened, and that the matter had already been resolved.

However, lawyers, reported in the media, said the hospital's action was against regulations and broke the law, pointed to Article 15 of the Provisional Regulations on the Management of Doctors' Consultation (Decree No. 42 of the Ministry of Health), which came into effect on July 1, 2005. This stipulates that "consultation fees shall be paid to medical institutions in a unified manner, and not to consultants themselves." In effect, the cost of inviting experts should be paid by the hospital, but not by the family members of patients directly to doctors in the operating theatre.

Lawyers further explained that Article 17 of the Provisional Regulations stipulate that "doctors shall not accept or demand money and property from patients and their families or seek other illegitimate interests." Thus, in this incident, the surgeons appeared to have violated the rules on prohibiting medical corruption such as briberies to doctors through private "red envelope" payments.

CHINESE NETIZENS' STRONG SUPPORT FOR ILLEGAL PMP

The written online comments of over 30,000 of Chinese netizens on the Hongdong case are illustrative of how Chinese people respond to PMP and of the other factors involved in illegal PMP. A summary of the main views from Netease and Sohu, two well-known Chinese internet media and social media websites, is in the Text Box 1.

TEXT BOX 1: MAIN VIEWS OF CHINESE NETIZENS

Reasons why patients support illegal PMP:

- They can get the service from a competent doctor who they may not be able to access if they go to a 3A hospital by themselves.
- They can save time and money being treated locally. They understand the lower-end hospital's lack of experience to do certain operations. Good service costs extra, whether under the table or not, and they are willing to pay for it.
- They understand this hidden rule [paying the money privately to the doctors to get the better medical service] is not legal but they don't care and wish to keep that way.
- They believe this is in their favour; they want to buy that right and reject those who want to enforce the rules.
- They think the best doctors deserve private payment.

Reasons why the media were wrong in their reporting:

- This is against what the public believes.
- Illegal PMP provides access to services that otherwise won't be available.
- They do not realize that PMP policy is not implementable because it counters the hidden rules between doctors and patients.

Netease had a total of 19,623 participants in the discussion and 2,083 posts about the Hongdong case. To further demonstrate the viewpoints of the Chinese public, the five most popular comments made on Netease, in terms of reader agreement with the comments, are presented below.

The first of the five posts read: "My mother had an operation in a [large 3A] cancer hospital. Basically, we had given

money to the director, deputy director, assistant, anesthesiologist; they would not discuss anything without money, and after giving money their attitude immediately improved". 3052 netizens agreed with this post, with only seven disagreeing.

The second top post was about the long waiting time in larger hospitals. It stated: "After government involvement, no flying knives allowed, you have to go to the big hospital to wait for a bed, and do all kinds of checks again, slowly waiting for an operation time." 1465 participants agreed with this post, with only seven disagreeing.

A total of 1,267 Chinese netizens agreed [only 10 disagreed] with the third top post which criticized the patient by saying that "This kind of patient [who exposed hidden rules to the public] is the culprit that disturbs order!"

The fourth top post justified payment to the physician, which was supported by 717 people with only three disagreeing. It asserted that: "This is flying knifes service fees. If a patient flies to Beijing to receive surgery, 10,000 Yuan is not enough to cover the costs, not to mention they cannot get into the hospital because of the long waiting list."

The fifth top post was endorsed by 673 and disagreed with by five netizens. It maintained that "This money is not required by this hospital. It is the money to invite Beijing experts to come for surgery. Family members will be told how much needs to be paid before the operation."

Overall, it is clear that netizen responders to the Hongdong case expressed the utmost understanding and overwhelmingly strong support for the doctor's otherwise illegal behaviour. Furthermore, they also harshly criticized the family members of the patient for exposing the matter to the public. Of note is that it is not very common for the public to express support for an illegal incident in China.

DISCUSSION

Understanding Legitimacy of PMP from a Chinese Cultural Perspective

The Hongdong case is a typical case of PMP in China, involving a large number of legal, policy, administrative and management, socio-cultural and moral issues. One salient aspect is that the case offers another example of widespread corruption in China's healthcare system. [7, 20] It is legally and regulatorily prohibited for health professionals to receive 'red envelopes'. Netizens' disappointment and anger with corruption and hospital administration are shown through their online comments. Yet, as many netizens understood, the payment could be treated as a legitimate payment for the physician's medical service, which otherwise would not be accessible. Although the issue of PMP and corruption is important and deserves in-depth examination, it is not pursued here due to the scope of this article.

Rather, our discussion focuses upon the implementation and especially the legitimacy of PMP in China from a Chinese cultural perspective. Related to this, the focus of Chinese netizens was more on PMP rather than corruption, on whether PMP improves the quality of medical care and why the state does not have the ability to provide the same quality and cost effective legal PMP.

It is not common in China for the implementation of government policy to be weak as in the case of PMP. Often, changes organized by the Chinese state move swiftly. This weak implementation is puzzling for many reasons. PMP helps meet the needs of different parties. The central government needs high-quality medical practitioners, mainly from 3A hospitals, to serve in lower-level primary hospitals and help their development; patients need better medical service from lower-level primary hospitals; and 3A hospital doctors need to increase their income through PMP. But after nearly two decades, PMP has not been effectively implemented, although widely and illegally practiced.

There are studies showing that PMP has had a negative impact on service quality, efficiency, costs and fairness amongst 3A hospitals. [21, 22] Doctors in PMP are linked with staff shortages in outpatient services and on call duty, and with medical safety issues. 3A hospitals lack a human resources information sharing platform, and it is difficult to supervise doctors in PMP, which is also an obstacle to its promotion. [20] From this point of view, PMP requires not only changes in the government's hospital management system, but also to the internal organization and management mode of the hospital. As a result, the implementation of PMP in China is far from straightforward. One way to better understand PMP in China and improve its implementation is to address the issue of legitimacy. Many theoretical perspectives are put forward to investigate PMP, or dual site practice, including those about labour supply, employee satisfaction, bureaucracy, employee incentives, healthy markets, rational interest

maximization, and principal-agent relationships. [23] Particularly, various Western theories exist on the subject of legitimacy. According to one prominent theory, [24] legitimacy is a reflection of the consistency between organization and perceived laws, regulations, and normative support, and the alignment with cultural cognition.

To explore the legitimacy of PMP in China, a Chinese cultural perspective is necessary and valuable. The triple notions of Qing (sensibility, feeling, affection, or sentiment), Li (propriety, norm or reason) and Fa (rule, regulation or law) can be employed. [25] These notions are not only deeply embedded in Chinese culture and history but still widely used by Chinese to make judgments on whether or not an event or certain way of doing things is legitimate.

From the information in the previous section, the vast majority of China's responding netizens appear supportive of PMP even when it is practised in an illegal way. This can be interpreted that contributing netizens generally used Qing (human sentiment) and Li (propriety or reason) to argue for the legitimacy of being against the law in their posts, which can be puzzling and difficult for people in the Western world to understand. However, Chinese society has been governed often by Qing, Li and Fa (in this order) for many centuries so that justifying an action or practice by these triple notions is commonplace. It is often believed that rationalism and rule of law are the characteristics of Western civilization, while ruling by meritocracy, sensibility, affection and morality are the characteristics of Chinese culture.

In the Western world it is believed that all people are equal before the law, that the law should be just or fair, and that procedural justice or fairness needs to be upheld. But China has long been governed by Confucianism. This socio-political, moral and spiritual system holds that "human sentiment" is the foundational motive force for the human existence, that "reason" is the ultimate or "Heavenly" law of the universe, and that "regulation or law" is the human/social order arranged for "human sentiment" to suit "reason". Therefore, Chinese people often put what is reasonable or sensible before what is legal. This characteristic is reflected in the Chinese netizens' responses to the Hongdong case.

One particularly important factor that contributes to the wide Chinese acceptance of PMP is the relatively low salaries of physicians and other health professionals. This is a result of insufficient governmental investment in the healthcare sector, only 6.4% of GDP compared to the OECD average of 9% and 17.9% in the USA in 2019. [26] In Dec. 2017, the Chinese Doctors Association published a white paper on the practice of Chinese doctors. After surveying 146,200 doctors, the average income of male doctors was 78,702 RMB per year and female doctors 73,294 RMB (USD11,300/10,500). [27] In contrast, according to a 2019 report by MEDSCAPE the average income of physicians in other countries was USD313,000 per year in the United States, USD138,000 in the United Kingdom, USD163,000 in Germany, USD108,000 in France, USD63,000 in Spain, USD58,000 in Brazil, and USD22,000 in Mexico. [26] In other words, the average salary of Chinese physicians was not only much lower than those in developed countries, but several times lower than their counterparts in developing countries such as Brazil and Mexico. Indeed, research has shown that over 80% of doctors enter PMP primarily to increase their income. [9]

Based on Qing and Li, people have formulated their own supportive attitude toward the procedure of giving money privately to doctors who practice at more than one site and who have low income in their regular practice. At the same time, patients hope that this will ensure doctors provide them with better service. If the doctor accepts money from a patient, then, in accordance with Qing and Li, he or she has the obligation to offer the best service to that patient as a return. In this situation, both parties apparently and willingly violate the doctor's practice law, tax law and even risk violating criminal law. Because the Chinese government does not rule the country strictly according to the law but always takes Qing and Li into account, officials also solve any possible breach of existing law in a very Chinese way, with a so-called 'no accusation or complaint, no action' approach. That means if no-one accuses doctors then officials will let them undertake PMP privately, that is, without legally required registration. As long as people think fees are reasonable, even if it is practised in an illegal manner, if no one complains, the government will not investigate. Therefore, it can be concluded that, prioritising Qing and Li over Fa (rule or law) constitutes the main reason for which legal registered PMP has been difficult to implement in practice in China.

In this way, doctors, as the implementers of the PMP policy in China, can undertake PMP whenever they wish and collect money without paying tax. However, since doctors do not formally register at the PMP hospital, the hospital itself, not the PMP doctor, will take the risks of the provided

medical service. The government is aware of this problem but chooses not to address it. In accordance with Qing, Li and Fa, this is the explicit and implicit Chinese method for handling such issues. When the government does not apply the law alone, but often with Qing and Li, neither do the people. On one hand, Chinese policy makers have not been sensitive to reality and the wider socio-cultural context in formulating PMP law and policies. On the other hand, Chinese doctors and patients have formed their own attitudes toward PMP privately and act upon them accordingly. As a result, the government's law and policies regarding PMP have been effectively abandoned in practice.

CONCLUSION AND AREAS FOR FUTURE RESEARCH

Chinese patients require good services, and Chinese doctors wish to improve their income. There is thus a wide demand for PMP in the Chinese medical market. The apparent phenomenon that PMP cannot be implemented in China is false because it has been carried out widely and under hidden rules. Based on the Chinese outlook and cultural norms which prioritize Qing (sensibility, feeling or sentiment) over Li (propriety, norm or reason) and especially Fa (rule, regulation or law), PMP is often carried out in an illegal manner. This is accepted by society and tolerated by government. For the general public, if PMP is deemed to be moral, sensible and reasonable, it does not matter much even though it does not follow the procedures required by laws and policies. So long as doctors and the public support illegally practiced PMP, it will hardly be possible for the Chinese government to gain traction on its official PMP policy.

More in depth research on PMP in China is needed, including into hospital administrator, physician and patient perspectives. Such research has been undertaken by the authors, with this article a part of a larger project. From the standpoints of medical ethics and health professionalism, one issue is whether and how PMP can be justified by the fundamental moral principles of medicine as a profession and what society as a whole should adhere to. These principles include the primacy of patient welfare, patients' rights, and social justice. In the Chinese context, "medicine as the art of humanity or humaneness", an essential norm of medical ethics based on Confucianism moral beliefs, should be engaged to discuss the legitimacy and other normative aspects of PMP. Moreover, more systematic research on PMP in China in comparison with other countries is necessary and overdue.

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RESEARCH ARTICLE

APPLICATION OF ACTIVITY-BASED COSTING METHOD IN THE EESTIMATE OF CATARACT SURGERY COST

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ABSTRACT

OBJECTIVE: Hospital managers need to have accurate information about actual costs to make efficient and effective decisions. Activity-based costing (ABC) is put forward as an alternative, more accurate costing method to calculate the cost of medical treatment. The objective of this paper is the application of an activity-based method to estimate the cost of cataract surgery in an ophthalmic hospital.

METHODS:

The present descriptive-analytical study was carried out at an ophthalmic hospital, in February and March of 2021, in Iran. Surgical operations for cataracts were considered. The required data were collected through conducting interviews with experts and relevant units, direct observation of activities, analysis of documents in the financial department, and the hospital information system (HIS) and financial software system of the hospital. The cost of surgical operations was estimated by activity-based costing (ABC).

RESULTS:

According to the findings, the amount and the share of the total costs of the activities identified in the main centers were as follows: human resources 54.24% of the total cost of cataract surgery which is the highest share of surgery costs; the cost of consumables was 32.57% of the total cost of cataract surgery is the second share of surgery costs.

CONCLUSIONS:

The research results showed that in this regard administrators should design and implement a comprehensive operational planning system in the hospital.

KEYWORDS

cataract, costs and cost analysis, hospitals

INTRODUCTION

Healthcare costing is challenging due to the complexity and diversity of patients and conditions. Various explanations for increasing healthcare costs include the aging population, and technological advances providing new and more expensive treatments [1]. In the United States, growth in healthcare spending has outpaced growth in population, inflation, and the gross domestic product (GDP) [2]. In 2019, healthcare spending represented 17.7% of the GDP for a total of $3.8 trillion, which equates to $11,582 per person [3,4].

It is now recognized that surgical care has a central role in the management of many medical conditions [5]. Cataract, It is the most common cause of vision loss in the world. This disease reduces the individual and social function of a patient. Additionally, its surgery imposes a large cost on the patient's family and society. Also, cataract surgery is the most prevalent surgical procedure of all medical specialties with an estimated 3.7 million cases per year in the USA, 7 million in Europe, and 20 million worldwide [6]. Cataract epidemiology in Iran is not precisely defined. In a cross-sectional study in 22 districts of the city of Tehran, cataract was the most common disorder vision has been reported with a relative prevalence of 36%. The basis of another study on residents 40 years and older was done in the city of Tehran, in one-fifth of the population over 40 years cataract has been observed. The prevalence rate in women is 24.5%, and in men, about 22.1% reported that in both sexes with increasing age, its incidence has also increased, and in total about 3.5% of people because of this disease became visually impaired or blind. Cataract surgery for one million people every year is one of the indicators the World Health Organization has set the direction of controlling blindness caused by cataracts. Based on studies in Iran, this index increased significantly from 526 in the year 2000 has shown to be 1,331 in 2005. However, this index is less than the suggested limit of the organization as it is universal health [7,8]. Because of a history of patients with conditions that need surgical intervention being referred to higher-level hospitals and the perception that higher-level hospitals should provide surgery, surgical care is often viewed as expensive compared with the medical management of other diseases [9,10].

Therefore, it is necessary to calculate the cost of resources a patient consumes as they move along the care process [4]. The development of an adequate costing system is of extreme importance in hospitals. They feel the need to properly manage the resources at their disposal and control their costs to achieve management efficiently and effectively [11]. Assuming that a well-suited costing method can track the expenses involved in the intricacy of activities in organizations such as hospitals [12]. Dubron 2021, hospitals move toward an activity-based costing model for calculating of cost of health care [4,13].

The activity-based costing (ABC) system emerged in the 1980s as a costing method capable of overcoming traditional costing systems' limitations in the face of economic and technological developments [11]. Cooper and Kaplan stated that ABC is a system designed to provide clearer information about the production, support activities, and product costs so that managers can focus their attention on products and processes with higher consumption of resources [14, 15]. ABC is a costing system in that the crucial objective is to provide management with more efficient and accurate information, both on the cost and profitability of the business processes themselves [16]. Park et al. added that ABC emerges as an innovation in management accounting to address traditional systems gaps [11,17].

Kalicanin pointed out that ABC's information is essential for hospital managers when evaluating alternative ways of managing the business and making comparisons with other hospitals [11,18]. Arora, Raju and Kaplanog added that, because the information is more detailed, facilitating decision making makes it possible to reduce costs and identify activities that do not add value to reduce or eliminate them [19-20]. Thus, the ABC costing method can improve the hospital's performance in different ways, such as helping hospitals become more efficient and effective, providing information on where resources are being spent and where the money is being earned or lost, and identifying the activities that add or do not add value to the product or service [11]. The aim of this research is to estimate the cost of cataract surgery in a super specialty ophthalmology hospital.

METHODS:

This research is a descriptive-analytical study with a retrospective, cross-sectional design. It was conducted between February and March of 2021 in a super specialty ophthalmology hospital in Tehran to calculate the total cost of cataract surgery using activity-based costing.

The main cost centers are those directly involved in providing medical services to patients. In this research, the ophthalmology operating room and the inpatient care unit are considered the main activity centers. Support centers are those that provide general services and support to care centers. These include hospital management as well as various departments such as administrative affairs, accounting, reception, insurance, discharge, admission and medical records, facilities, information technology, telecommunication/call center, services, security, catering, and warehousing/supplies.

In this research, costs, according to management needs, are identified and traced under eight categories, each with several subcategories. These categories are as follows: personnel costs (including salary, overtime, paid time off, pension, and benefits of medical and non-medical staff); the cost of medical consumables (including medicine and medical consumables); the cost of non-medical consumables (including office supplies, toiletries, spare parts); building, property and medical equipment repair and maintenance cost; overheads (including water, electricity, gas, telephone, energy, and internet); depreciation (including buildings, medical tools, and equipment, computers, furniture, telecommunication equipment, mechanical, electrical, and heating/cooling equipment); contractual service fees (including building lease, food, clothing, medical transport, waste management, financial software, and health information system); and others (including all administrative and financial costs not included in other categories [21-24]. Cost data is collected from accounting software and the health information system (HIS). All direct and indirect costs of hospital services related to cataract surgery are included in the analysis.

In this research, cost drivers include the adjusted number of patients and staff as well as the total area of each activity center.

After direct tracing, the costs realized in each activity center (e.g., personnel costs, medical and non-medical consumable costs) are traced to the main activity and support centers. Costs that are not directly traceable (not connected to the relevant activity center) are allocated through indirect tracing. The total cost of each activity center is calculated as the sum of direct and indirect costs. The tracked costs of each of the support cost centers were distributed to the main cost centers with appropriate cost drivers based on one-way cost allocation (Table 1).

To calculate the cost of per cataract surgery, the total cost of the ophthalmology operating room and inpatient care unit is divided by the number of patients. Excel 2016 software is used to help with the organization of data and calculations.

TABLE 1: PREDETERMINED ALLOCATION BASIS

Department	Cost Allocation Basis
Hospital management	Adjusted the number of patients and staff
Accounting	Adjusted the number of patients and staff
Revenue and Discharge	Adjusted the number of patients
Reception	Adjusted the number of patients
Property	Adjusted the number of staff
Nursing Station	Adjusted the number of patients and staff
Admission and Medical Records	Adjusted the number of patients
Administrative Affairs	Adjusted the number of staff
Services	Adjusted the number of patients and staff
Warehousing	Adjusted the number of patients and staff
Security	Adjusted the number of patients and staff
Call Center	Adjusted the number of patients and staff
Facilities	Adjusted the number of patients and staff
Information Technology	Adjusted the number of patients and staff
Telecommunications	Adjusted the number of patients and staff
Catering	Adjusted the number of patients and staff

FINDINGS

The data relating to the ophthalmology operating room, the inpatient care unit, and support departments between February and March 2021 are analyzed. During this period, 8,350 patients have been referred for cataract surgery.

Using direct costing, the ophthalmology operating room and the inpatient care unit account for 57% of the total costs, while support centers account for 13%. It must be noted that the remaining 30% of the cost of the hospital is accounted for by the other operating departments.

Next, the share of each of the main units from the costs of each support center is determined according to the allocation basis. Among the support centers, the service department accounts for the highest cost (19%), and the procurement department for the lowest cost (0.8%).

Personnel cost includes the salary, overtime, paid time off, pension, and benefits of all medical and non-medical staff working in the ophthalmology operating room, the inpatient care unit, and all support departments, including specialists, general practitioners, nursing staff, surgical team, patient escorts, administrative staff, security guards, and service personnel. Personnel cost constitutes 55%, 55%, and 66% of the total costs of the ophthalmology operating room, the inpatient care unit, and the support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the personnel cost of the support departments is 23% and 16.59%, respectively.

The medical consumable costs (medicine/medical consumables) of the ophthalmology operating room, the inpatient care unit, and all support departments constitute 38%, 22.5%, and 2.7% of their total costs, respectively. The share of the ophthalmology operating room and the inpatient care unit of the medical consumable costs of the support departments is 40% and 35%, respectively. In support departments, these costs are related to gloves, masks, and personal disinfectants used in the wake of the COVID-19 pandemic.

Non-medical consumables include office supplies, toiletries, and spare parts used in the ophthalmology operating room, the inpatient care unit, and all support departments. The non-medical consumable costs constitute 1.41%, 3%, and 0.077% of the total costs of the ophthalmology operating room, the inpatient care unit, and all support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the non-medical consumable costs of the support departments is 26% and 19%, respectively.

Building repair and maintenance cost includes maintenance of the building, property, and medical equipment in the ophthalmology operating room, the inpatient care unit, and all support departments. Building repair and maintenance cost constitutes 0.8%, 7%, and 11% of the ophthalmology operating room, the inpatient care unit, and all support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the Building repair and maintenance costs of the support departments is 38% and 28%, respectively.

Overhead costs includes water, electricity, gas, telephone, energy, and internet in the ophthalmology operating room, the inpatient care unit, and all support departments. overheads cost constitutes 0.1 %, 0.45% , and 1.19 % of the total costs of the ophthalmology operating room, the inpatient care unit, and all support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the overhead costs of the support departments is 40% and 30%, respectively.

Depreciation cost includes buildings, medical tools and equipment, computers, furniture, telecommunication equipment, mechanical, electrical, and heating/cooling equipment in the ophthalmology operating room, the inpatient care unit, and all support departments. Depreciation cost constitutes 1.12 %, 5.6%, and 4 % of the total costs of the ophthalmology operating room, the inpatient care unit, and all support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the depreciation cost of the support departments is 34%, and 11%, respectively.
Contractual service fees cost includes building lease, food, clothing, medical transport, waste management, financial software, and hospital information in the ophthalmology operating room, the inpatient care unit, and all support departments. Contractual service fees cost constitutes 3 %, 4 %, and 11 % of the total costs of the ophthalmology operating room, the inpatient care unit, and all support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the contractual service fees cost of the support departments is 40 %, and 28 %, respectively.

The other costs include all administrative and financial costs not included in other categories. Other groups constitute 0.5 %, 2.42 %, and 4 % of the total costs of the ophthalmology operating room, the inpatient care unit, and all support departments, respectively. The share of the ophthalmology operating room and the inpatient care unit of the others' cost of the support departments is 49 %, and 38 %, respectively.

DISCUSSION

The results of this research showed that personnel costs constitute 58% of the total cost of each cataract surgery. A

similar study conducted at Al-Zahra Hospital in Isfahan reported that personnel costs account for 62.33% of the total cost of cataract surgery [25]. However, Sadri et al. showed that only 11.69% of the average cost of each cataract surgery at the Kensington Eye Institute is related to personnel costs [26]. In the studies conducted by, Xue et al., they stated that personnel was the highest cost category for the U.S. based sites, while consumables were the highest cost category for South Asian sites. In addition, both personnel and consumables accounted for significant cost differences between the two sites in the United States [27]. Other studies reviewed the cost of medical services have also shown that personnel costs account for the largest portion of the total cost of services, ranging from approximately 46.6 to 66 percent [28-34]. According to a report by the World Health Organization, about two-thirds of costs in the health sector are related to the health workforce, and according to international standards, wages and benefits account for about 55-65% of the total operating expenses of hospitals [35].

In this study, medical and non-medical consumables accounted for 37.27% and 0.75% of the total cost of each cataract surgery, respectively. Medical consumables are a major factor driving the cost of health care services, which can be due to the lack of proper consumption patterns, incorrect or incomplete storage, and poor use of consumables [28]. Ferdowsi found that consumables account for 23.83% of the total costs of each cataract surgery [25]. In Al-Zahra Hospital, Isfahan, consumables accounted for 23.83% of the total costs of each cataract surgery (1,992,852 rials). In Arowin et al.'s study, the cost of materials and consumables for an MRI activity was calculated to be 3.5% of the total cost using break-even analysis [36]. In the studies conducted by Xue, they said even though consumables are the most cost driver at AEH-P and TIO, HOPD and ASC still incur a much higher consumables cost compared with these sites. They said, excluding pricing differences, the use of disposable items also plays a role in elevated costs in the United States [27]. In the studies conducted by Janati to estimate the cost of eye surgeries in the Nikookari medical training center, medical equipment depreciation cost ranks third after personnel costs and indirect costs [37].

Regarding depreciation, the results showed that this cost category accounts for 1.6% of the total cost of each cataract surgery. This is calculated solely based on the studied period. Alinejad et al. found that depreciation is mainly driven by wear and tear of equipment and installation of new equipment, and failure to properly use the equipment and physical space will increase these costs [38]. In Al-Zahra Hospital, depreciation was reported to account for 3.4% of the total cost of cataract surgery [25]. In this study, overheads accounted for 0.14% of the total cost of each cataract surgery. In a similar study by Ferdowsi, the overhead cost of each surgery was calculated to be 4.13% of the total cost [25]. In the studies conducted by Janati to estimate the cost of eye surgeries in the Nikookari medical training center, the second part of major costs belonged to indirect costs. Analyzing the components of these costs can greatly help the hospital manager in providing the required information for the budgeting activity center and the entire hospital system. A study done in Ireland showed that more than 50% of the total costs were indirect costs [37, 39].

The results of this study also showed that repairs and maintenance, contractual service fees, and other costs account for 1.69%, 3.4%, and 0.7% of the total cost of each cataract surgery, respectively. According to the results of Janati research about estimating the cost of eye surgeries in the Nikookari medical training center, the share of costs belonging to utility cost is 0.11% [37]. Khoshnoud et al. found that maintenance cost constitutes 6.88% of the total cost of each X-ray image [40]. Additionally, Zahiri et al. reported that the cost of building/equipment maintenance is 1.6% of the total cost of an oncology unit [41].

Hospital administrators are trying to make funding decisions to provide optimal service outcomes. ABC can shed light on hospital operations in different ways: Firstly, it can reveal which service lines are feasible and potentially cost-saving [42]. Hospitals may choose to invest further in these service lines and use those saved dollars to reinvest in other areas essential to their communities. Conversely, it can provide new insights into service lines that may be underperforming, and this can only be achieved appropriately through ABC. In addition, the process maps developed for ABC allow hospitals to understand their workflow, which would facilitate procedural improvements.

Secondly, adopting a standard and accurate costing methodology for hospitals can also help hospital administrators and clinicians better understand how they perform against their peers. Over time, this could help all hospitals improve healthcare delivery efficiency across several service lines [26,43].

CONCLUSION

Implementing a standardized costing approach is an excellent first step. However, to make informed policy and expenditure decisions, the costing methodology needs to be standardized and accurate. Applying ABC across hospitals and service lines would lead to a greater understanding of the cost at the service or procedure level. It would also help administrators better understand health human resource utilization as every input in the process is tracked and converted into associated costs. Accurate costing can facilitate informed policy decisions, such as allocating procedural volumes to the most cost-effective settings.

Considering that the costs of human resources, medicine, and medical equipment, make up more than 80% of the costs, the hospital management must attend to both the improvement of the effectiveness and decreasing the costs.

One of the suggestions in this regard is to design and implement a comprehensive operational planning system in the hospital. So that according to this planning, operations related to an order, follow-up, and control of consumables can be done according to different departments of the hospital, and by specifying the consumables of each department during the period, the costs are determined exactly and then by comparing it with the standards, Identified the causes of deviation. In addition, by using this system, it is possible to identify the efficiency and performance of the devices and capacities in use by creating work standards in different departments of the hospital and providing the necessary solutions to improve this situation.

However, if health system administrators would like to understand better how funds would be utilized and inform better decision-making, ABC could be beneficial.

LIMITATION:

The main problem in calculating the cost of health care services is the lack of required information. Currently, few costs remain unaccounted for due to the weaknesses of hospital information systems, which can significantly affect management decisions. Training hospital management on how to use the information related to the cost of services can play a vital role in controlling costs and increasing revenue while providing the basis for better decisions.

CONFLICT OF INTEREST:

The authors had no conflict of interest in the various stages of this research.

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.

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AUTHORS' CONTRIBUTIONS:

Azadeh Chatrrouz, Sareh Daneshgar, and Azam Lari contributed to the design, concepts, and definition of intellectual content. Azadeh Chatrrouz, Sareh Daneshgar, and Azam Lari collected, compiled, and interpreted the data. Sareh Daneshgar did the statistical analysis. Azam Lari prepared the manuscript and all the authors read it before approving the manuscript.

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CONFERENCE ARTICLES

Selected papers from

Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-Being on 10-11 December 2022 in Delhi, India

Conference outcome:

The conference helped the academicians to understand and interlink their research on health management as per the requirement of the journal APJHM. The experts and reviewers refined their research related to health management. Further, the implications of the papers published in APJHM can be useful for policymakers and other fellow researchers doing research in the area of health management. In many conference papers, the advanced usage of emerging technology has also been discussed within healthcare institutions. It will add value for the readers of the journal.

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CONFERENCE ARTICLE

BLOCKCHAIN-BASED HEALTHCARE MONITORING SYSTEM USING PATIENT ELECTRONIC HEALTH RECORDS

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ABSTRACT

The majority of hospitals and other healthcare institutions have made the switch from paper-based techniques to something that is known as electronic health records or EHRs. This change was made possible by technological advancements. Various parties need to exchange the data records they keep on one another, and users need to be allowed to exercise control over who has access to the information they have on file. The Electronic Health Record (EHR) system is beset by issues relating to managing problems, challenges with trust, and data protection. Data stored on blockchains are immutable, private, and accessible only by their intended users. Blockchain technology's use has also led to managing a system with the potential to provide decentralized data storage. In this research, we determine whether it is appropriate to deploy blockchain technology in EHR and explore its potential uses in the efficient leadership of the COVID-19 pandemic.

"This paper was selected from the Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-being on 10th and 11th December 2022 in India organized by Confab 360 Degree."

KEYWORDS

scalability, decentralization, blockchain, electronic health record systems, technology.

INTRODUCTION

A patient's real-time official health record is referred to as an "electronic health record" or EHR for short. This record is kept in a digital format and is able to be transferred quickly, safely, and easily between different institutions and departments. The term "electronic health record" was coined in 2000. It comprises every piece of information essential to gain the patient's particulars, such as the patient's medical history, radiological photos, diagnoses, prescriptions, immunization dates, treatment plans, allergic reactions, test results, and so on. As a result of the fact that it enables rapid access to patient's medical records, which are used in deciding how to treat the patient, it plays a significant role in the healthcare business. EHR incompatibility is a serious concern that has to be taken into the mind by healthcare practitioners [1]. The process of file

sharing is hindered by a lack of standardization and regulation, which contributes to the problem. A further degree of complication is added to attaining interoperability due to the difficulties associated with determining the level of secrecy and preserving security while transferring information. Electronic Health Records (EHRs) and other health information technology (HIT) organizations need to be more organized due to poor communication standards across systems, high integration costs, insufficient patient engagement in data sharing, and inconsistent patient identification across systems (HIE) [2].

The term "blockchain" is often used to refer to a distributed ledger that keeps a digital record of transactions [3]. This technology is known as "blockchains" because of its distributed ledger structure. It consists of files containing information on the people involved, organized in a linear fashion known as a chain. These components are referred to as "interlinked blocks" in the database. After a decentralized network of validating nodes has verified a transaction, it is only added to the blockchain. To put it simply, blockchain is a kind of Distributed Ledger Technology (DLT). The overall category title for this set of technologies is "DLT." Due to its decentralized nature, this network of computers cannot be hacked and used to add unlawful or invalid blocks to a particular chain. For each new block added to a blockchain, a cryptographic hash is generated and used to link it to the preceding blocks [4]. This hash is computed using the previous block's contents to connect the newly created block to the existing partnerships in the blockchain. Since blockchains are immutable and may employ cryptographic techniques for secure communication, they are well-suited for the reliable exchange of EHR data. Because of this, blockchain technology might be helpful for EHRs (EHR). Contact tracking, data aggregation, data sharing, lab record administration, Covid certificate for infected and recovered patients, and prognosis for continued development of the infection population are just a few of the many possible use cases for blockchain-based EHR in pandemic management. Blockchain technology allows the supply chain for vaccinations and other necessities to be controlled efficiently and reliably [5]. The research aimed to fulfill the objectives like studying electronic health record (EHR), the importance of blockchain technology in EHR), challenges presented by blockchain technology and its future, and the application of blockchain technology.

METHODOLOGY

Blockchain technology may speed up innovation in healthcare models focusing on preventive care and community settings. The advancement of people's health - in communities worldwide depends on the capacity to develop healthcare trends to work together. Care delivery and the associated healthcare, financial, and payment systems are complex and might benefit from blockchain technology. A distributed ledger system's ability to ensure data integrity while sharing across parties may make this possible. Cryptography's public and Intelligent contracts and permissioned access to all EHR systems further strengthen the blockchain's robust connectivity. This system's transaction layer allows quick access to many non-patient identifying, standard, and anonymous data. A more open and automated system may lead to greater efficiency and reduced administrative costs. This approach is more suited for the healthcare sector since it does not need a whole overhaul of all systems simultaneously. Patient medical histories are now routinely kept in a digital format known as electronic health records (EHRs). Data processing and security issues have been significantly reduced as a result. This article has covered various EHR requirements, common EHR system issues, and how blockchain technology may be used to solve these issues. We have performed a further study to understand better how blockchain-based EHR may be used in pandemic management. Some examples of these uses include vaccine supply chain management, contact tracking, data aggregation, data sharing, user data privacy, Covid certificates for those infected and treated, forecast of the spread of an illness in a community, and so on. By providing trustworthy, accurate, and secure data storage and exchanges, blockchain has the potential to be used effectively to overcome the shortcomings of typical EHR problems and to aid in the management of the COVID-19 pandemic issue.

RECORD OF ELECTRONIC MEDICAL CARE (EHR)

In the past, all treatment records were documented and recorded on paper, and they were filed away manually. Today, electronic medical records have mostly replaced paper-based methods. These days, computerized versions of treatment records are almost always preferred over their paper predecessors. In addition, these medical records were retrieved and organized with the assistance of shelves built specifically to store the file folders associated with this data. These bookcases were developed especially to serve

in this capacity. Things began going in a more positive direction as people had access to new forms of information technology.

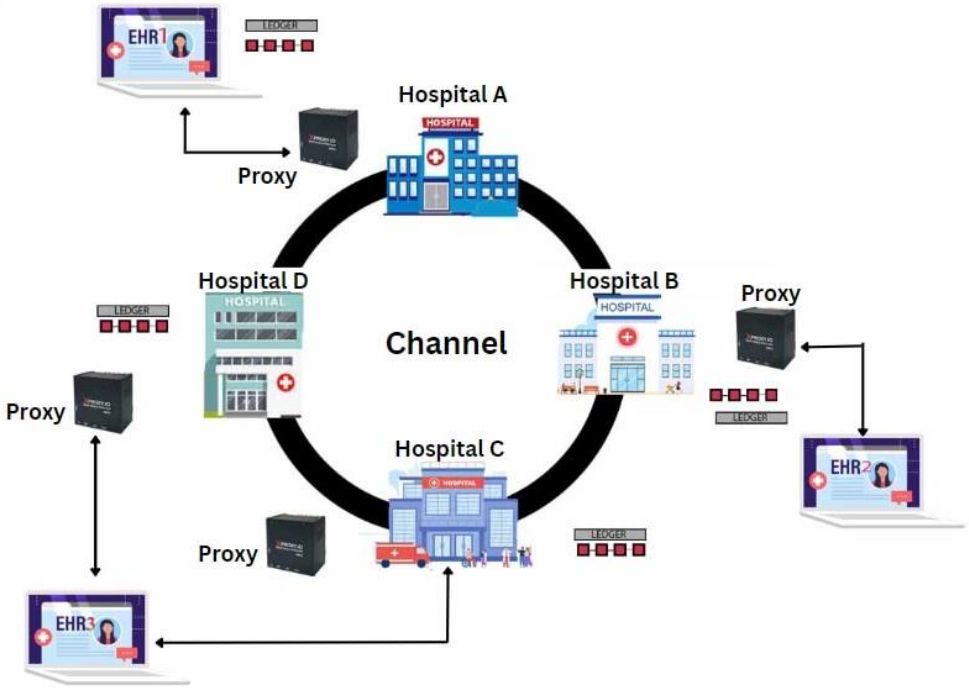
As a consequence of the beginning of the process of transferring records into a digital medium for storage and retrieval, electronic healthcare record systems came into being [2]. Because of this, they were storing records and retrieving them became simpler. The automated administration of the patient records makes the patient records easy to access, and the patient records can be immediately linked to the monitoring devices to record and analyze the data that patients supply in the EHR. This is done to record and analyze patients in the EHR. In a relatively short time, during an era of rapid growth, electronic health records (EHRs) began to be used in production and in vast quantities to retain medical data that was found to help conduct research connected to epidemiology. This data was useful in research because it was found to be useful in conducting research. When carrying out the study, it was discovered that this knowledge was helpful [2].

EHR REQUIREMENTS

The following are the prerequisites for EHR:

- Interoperability is the degree to which different devices and systems can exchange and translate data with one another. In the context of electronic health records (EHR), interoperability is defined as the following:
- Privacy and safety: the goal of implementing privacy and safety measures in healthcare settings is to empower patients to take control of their medical records by empowering them with the authorization necessary.
- The confidentiality of the patient's records must be maintained at all times. The term "confidentiality" refers to dependable communication or a contract between healthcare practitioners and patients. It is differentiated from "privacy" by focusing on the distinction between the two.
- Control of access: After that, only authorized medical professionals and patients should be able to view their medical records. Patients need to have access to their data and should have the ability to decide who may see it.
- Data sharing: the exchange of medical information is a necessary prerequisite because several different healthcare providers are providing the patient's treatment; thus, the data is shared with several other medical institutions and the government.
- Data Integrity and Availability: Maintaining the accuracy and reliability of the data is an essential part of maintaining data integrity. In terms of electronic health records, this results in the fact that the data has not been compromised by usage that is not authorized [6].

FIGURE 1. DECENTRALIZING HEALTHCARE: EXPLORING BLOCKCHAIN'S ROLE IN EHR MANAGEMENT [7]



Source: Oodles Blockchain [7]

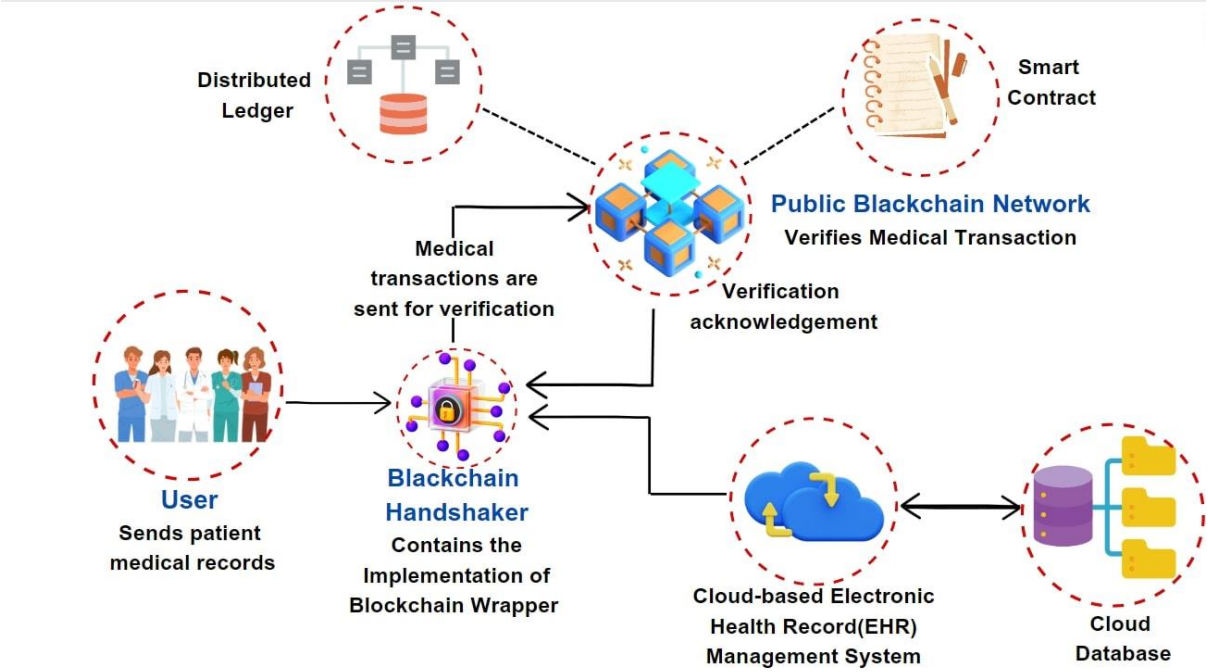
THE IMPORTANCE OF BLOCKCHAIN TECHNOLOGY IN HER

By providing a risk-free channel for the transfer of patient information, blockchain technology has the potential to facilitate a more recent iteration of the electronic health record exchanges now in use in the field of healthcare efficiency [8]. This is accomplished by using a decentralized peer-to-peer connection to guarantee the data's safety while the connection is passed from user to user. The Blockchain methodology is an approach that has been provided as a way of offering support and making the process of comprehending the distributed ledger technology simpler to do. The Blockchain methodology makes this assistance and ease of performance possible. Recent developments in cutting-edge technology known as blockchain have made it possible to optimize a variety of transactional procedures, including, amongst others, those pertaining to insurance billing, medical data, and smart contracts [9]. [10] This has made it feasible to optimize a wide range of transactional procedures. The ability of blockchain technology to include in the blockchain substructure records exchange, enhanced user data accessibility, including continuous surveillance that covers a full device's life cycle is one of the most significant benefits of utilizing blockchain technology in the healthcare industry. This ability is one of the reasons why blockchain technology is becoming increasingly popular in the healthcare industry [11]. The usage of blockchain technology in the healthcare business is already helpful for various reasons, and this is only one of those reasons. The Internet of Things (IoT) and cloud computing are two examples of other developing technologies that might be used in conjunction with blockchain to facilitate the creation of enhanced electronic health record (EHR) systems. A distributed ledger system that utilizes blockchain technology will, as a result, meet the criteria for security, dependability, immutability, and interoperability. Accessing the patient's previous medical data to deliver drugs using blockchain technology is vital. Substantial developments in the organizational structure of medical care services will provide no significant problems when it comes to putting them into practice [11].

Blockchain technologies can transform not just one or two sectors but the entire corporate environment. This might be a game-changer for several reasons. 16 percent of the 200 healthcare executives who took part in the survey are optimistic that a commercial blockchain solution would be available at scale at some point during the year 2018. This would completely change the dynamic of the game. The essential actors in deploying blockchain technology will be governmental authorities, trade associations, and market makers. The administration and protection of data in the healthcare sector and the management of supply chains are notable examples of fundamental concepts that stand to be impacted and altered by the potential use of blockchain technology Figure 1. Let's take a minute to go over each one of them one at a time:

When healthcare professionals share data more effectively, patients have a greater chance of receiving accurate diagnoses, more effective treatments, and an overall boost in healthcare organizations' ability to provide cost-effective and efficient care. Because it enables various stakeholders in the healthcare value chain to trace the provenance of data and any modifications made, blockchain technology may make it possible for these stakeholders to share access to their networks without compromising the data's security or integrity. This is because blockchain technology enables stakeholders to trace the provenance of data and any modifications made [12].

FIGURE 2. BLOCKCHAIN-DRIVEN HEALTHCARE: PIONEERING A SECURE AND TRANSPARENT FUTURE [13]



Source: A Novel Architecture for Tamper Proof Electronic Health Record Management System using Blockchain Wrapper [13]

CHALLENGES THAT THE TECHNOLOGY OF BLOCKCHAIN AND THE FUTURE IT PRESENTS.

The storage capacity, in addition to the scalability of the system: The storing of data on the blockchain gives rise to two key concerns, the first of which is privacy and the second of which is scalability. Both of these concerns are discussed more below. The fact that the data on the blockchain is available to everyone on the chain makes the data vulnerable, which is different from the outcome desired for a decentralized platform since it might compromise the platform's purpose. Because all of this enormous data is going to be saved on the blockchain, the storage capacity of the blockchain is going to be severely impacted. The people's clinical background, documents, lab results, X-ray studies, MRI results, and the outcomes of several other studies would all be part of the blockchain information. Lack of social skills: Very few people can fully appreciate how the technology that underpins blockchains operates in its most basic form. This technology's development is ongoing since it is still in the early phases of its life cycle. Because hospitals and other healthcare institutions need to redesign their information systems to employ blockchain technology completely, shifting from dependable EHR systems to blockchain technology would take some time. There are presently no universally approved standards for using this technology since it is still in its early phases and is continually undergoing development. [14] However, this is expected to change shortly. Because of this, using this technique in the medical field would need far more time and labour than had been first estimated. Mostly as a result of the fact that it would be required to have confirmed standards from international authorities that monitor the process of standardization for every specific technology. These uniform standards would be beneficial in determining the quantity of the data, the structure of the data, and the kind of data that might be kept on the blockchain. They would also help establish the types of data that might be saved on a blockchain, which would be an essential step. Additionally, adopting this technology would be made much easier due to the defined standards, making it much simpler to apply these standards inside organizations. This would allow more people to participate in developing these standards Figure 2.

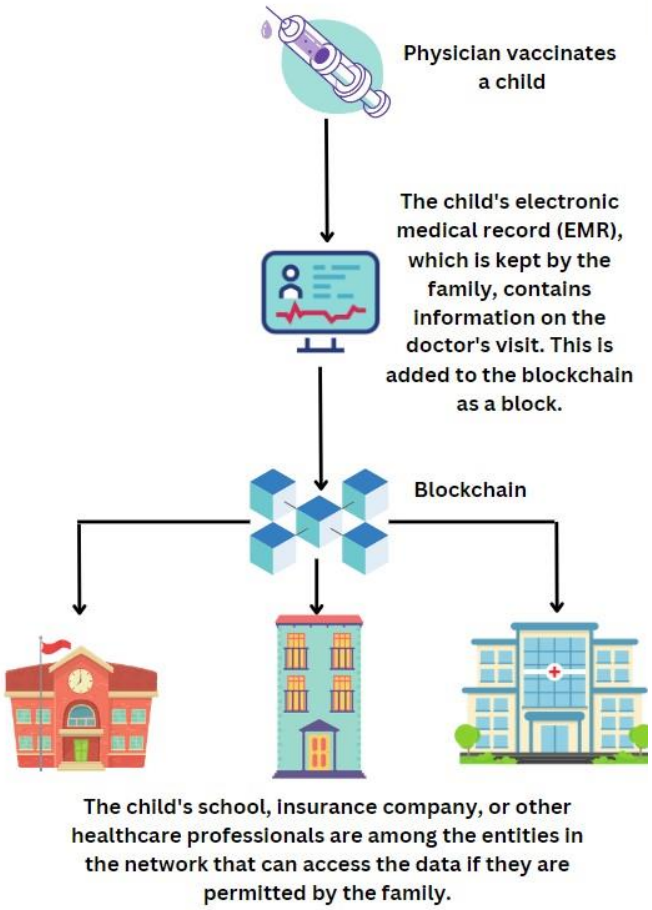
• Future

Blockchain technology is advantageous for the healthcare sector and how it may be used to create electronic health records. They continued to need help with several problems, all of which were solved by an innovative technology known as the blockchain. Despite the progress that has been made in the healthcare industry and the technological advancements that have been made in EHR systems, they continue to need help with several problems.

[15] A combination of secure record storage and granular access control for the documents is what we have in mind for the structure that we want to implement. Since of this, the system will be easier to understand for the individuals using it because it will be simpler and less confusing. In addition, the framework proposes processes to guarantee that the system will manage the data storage issue even though it utilizes the off chain storing method of IPFS. This is accomplished by ensuring that the system will address the problem in a manner that ensures it will. The system also benefits from role-based access since it guarantees that medical records are only available to those who can be trusted and related to the patient. This is one of the main advantages of role-based access. As a bonus, the problem of information asymmetries inside the EHR system has been overcome. In the future, one of our goals is to include a payment model in the architecture that is now being used. Because of this, we need to have certain considerations in place, as we need to calculate how much a patient would pay for consultation by a doctor on this decentralized system that runs on the blockchain. Specifically, we need to know how much a patient would pay for the consultation. In addition, we need to sketch down certain laws and regulations that follow the overarching principles governing the healthcare business.

As a result of the many benefits that may be obtained from using electronic health record systems, a wide range of hospitals worldwide have begun to use these systems. These benefits include, most prominently among them, improved safety and decreased expenditures linked with it. Because they offer a significant level of functioning to the healthcare organization, they are primarily considered an indispensable component of the healthcare sector. This is the primary explanation for why the healthcare sector considers them to be an important component. Because of this, they are one of the industry's most important components. Some of the tasks under this category include the electronic storage of patients' medical information, the management of patients' appointment schedules, invoicing and account management, and laboratory tests. Some of the EHR systems now being used in the medical industry probably include them as part of their offerings. While making medical records accessible across various platforms, the primary goal is to protect their confidentiality, maintain their completeness, and ensure that they cannot be altered in any way. However, these systems ran into several difficulties and could not live up to the expectations placed on them. The introduction of electronic health record (EHR) technologies in hospitals & similar healthcare contexts were based on the belief that accomplishing so will increase healthcare quality. This is notwithstanding the premise that implementing EHR systems in hospitals or other medical facilities was predicated on the premise that accomplishing so will improve the level of professional care given. A study was conducted in Finland to investigate the experiences of nursing staff members using electronic health records (EHR). According to the findings of the research, electronic health record systems (EHR) are plagued by problems stemming from the fact that they are unreliable and provide a poor degree of user-friendliness. The EHR system also suffers from various additional issues, which may be summed up as follows: The process through which different information systems can exchange data is referred to as interoperability. The information has to be able to be utilized for other reasons as well as be able to be traded with other parties. Electronic health record systems need to have the capacity to support data sharing, which is often referred to as health information exchange (HIE). Because there are so many different EHR systems being implemented in many different hospitals, and these systems all have different levels of terminologies, technical capabilities, and functional capabilities, there is currently no universally defined standard for electronic health record systems. This is because many different EHR systems are being implemented in many hospitals [16].

FIGURE 3: - UNLEASHING THE POTENTIAL: THE FUTURE OF HEALTHCARE THROUGH BLOCKCHAIN TECHNOLOGY [17]



Source: USF Health, Morsani College of Medicine [17]

APPLICATION OF BLOCKCHAIN TECHNOLOGY

In the following sections, the possible use of the blockchain system to regulate and mitigate the COVID-19 situation is explored and studied in depth. This will be done using the blockchain system Figure 3.

- **Clinical Trial Data Management**

Data from clinical trials should be stored following applicable legislation, which may include requirements that records be made accessible to relevant stakeholders, that privacy and record protection measures be taken, and that data be immutable. The technology behind blockchain will provide physicians and doctors with the ability to capture real-time information about patients' health and make it accessible. It makes the information more accurate and provides an audit trail, which improves privacy and data security.

- **The Supply Chain for Vaccines and Other Necessary Medicines**

Blockchain technology may facilitate effective health supply chain management if a pandemic or other emergency requires massive worldwide cross-border transactions. Up to the time when the approved form of the vaccine is accessible for sales and marketing, there is the possibility of instability in its distribution. The possibility exists that unethical business activities, including issuing fake vaccinations, inflated prices, and stockpiling, will occur. These issues may be effectively addressed using a medical supply chain based on blockchain technology [18].

- **Tracking Down a Contact**

Although governments and healthcare institutions are involved in patient contact-tracking systems, the gathered data might be misinterpreted and utilized inappropriately. The use of blockchain technology will result in data that is reliable and consistent [19]. The activities of patients may be monitored by blockchain networks, which can also deliver real-time information to the afflicted regions. In addition, a report for the affected and possibly infected population may be generated from the data based on contacts.

- **Data Aggregation**

To properly react to the pandemic, essential resources include sorting, gathering, and getting the necessary information to monitor the epidemic, interpreting patterns,

and conducting tests. Utilizing a blockchain network offers a monitoring and communications infrastructure, which may assist in collecting, storing, and analyzing data on the containment and spread of viruses. The capability of blockchain to authenticate and store information permanently and in real time provides a guarantee of data integrity.

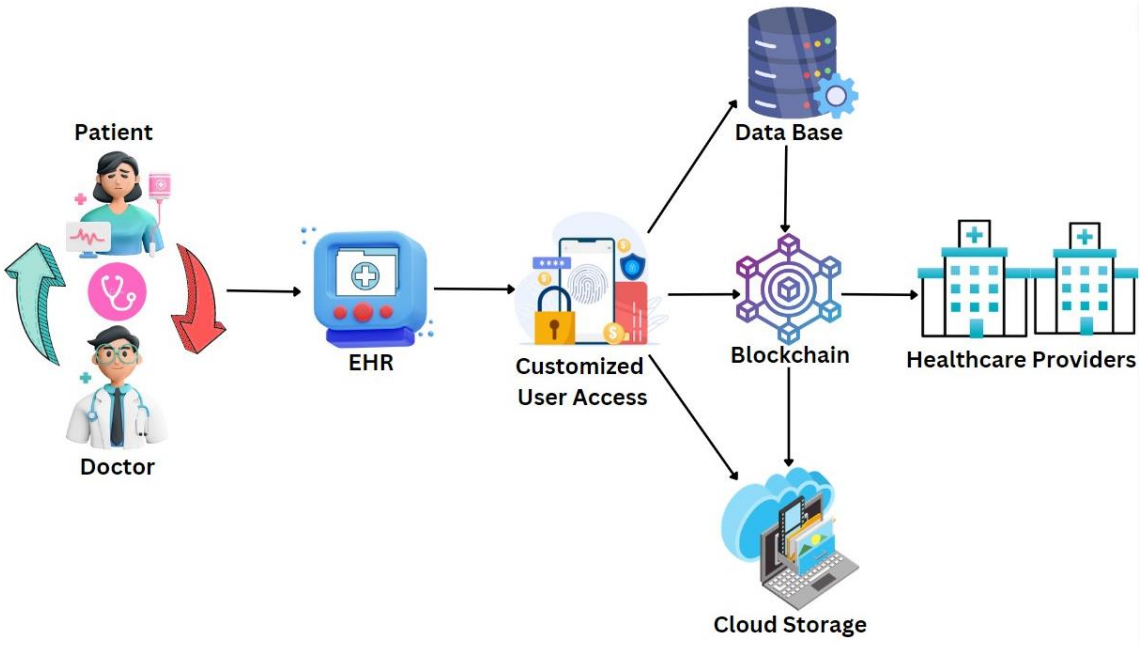
- **User Data Privacy**

In these troubling times, it is necessary to do a balancing act between the management of records and the management of user privacy to increase Preprints users' confidence in the system. Policymakers & healthcare professionals must acquire client information via patent surveillance and other activities for enhanced decision-making while also discussing client confidentially and privacy concerns. This is because improved decision-making requires both parties to obtain patient data. While maintaining patients' right to privacy, recording and presenting medical information, screening patient procedures, and establishing social isolation degrees are all possible applications for blockchain technology.

- **Early Identification of Susceptible Populations**

There are a variety of AI-based triage solutions that have the potential to reduce patient anxiety. The online bot will assist in understanding the early warning symptoms, after which it will lead users toward preventative measures like social distancing, hand cleanliness, and other similar practices. If symptoms worsen, users should be advised to seek medical treatment. Maintaining the privacy and confidentiality of a patient's medical information is of the highest significance for protecting the patient's personal and societal values. The architecture built on blockchain technology can efficiently tackle security and privacy concerns [20].

FIGURE 4: REVOLUTIONIZING HEALTHCARE: EXPLORING THE TRANSFORMATIVE POTENTIAL OF BLOCKCHAIN TECHNOLOGY [21]



Source: Blockchain Technology in Healthcare: A Comprehensive Review and Directions for Future Research [21]

CONCLUSION

Within the context of the existing system, companies' most prevalent concerns about the information carried from one organization to another are maintaining trust and security. There is a significant possibility that a lack of trust will develop because information may be inputted at any point along the chain of communication. This possibility is of utmost significance in medicine because of the sensitive nature of the information involved [22]. Concerns could be warranted when several providers have different copies of the same health information that has not been verified. This might happen when the information has not been checked for accuracy. As a result, the data could contain a variety of mistakes, in addition to presenting inconsistencies and being incomplete in their representations. Given the ubiquity of dangers such as hacking, data manipulation, and claims of security

breaches, it is no surprising that healthcare industry authorities are worried. When all of these aspects are considered, it is not unexpected that the authorities are concerned about the situation. This technology might be the solution to the bulk of these problems since it is cryptographically secure and because the data that is included inside it can be validated using a digital signature that is unique to each user. Electronic health records, often referred to by their acronym EHRs, are digital records that incorporate the patient's medical history. EHR is a common shortened form of the term. It handled a considerable number of concerns connected to the processing of data and the protection of such data. Those issues included: In this article, we have discussed a wide range of subjects, some of which include the many needs for EHR, the potential difficulties that may develop with EHR systems, and the use of blockchain technology as a solution to these potential concerns. Our group has conducted more research on the wide variety of pandemic management applications that might be suitable for electronic health record (EHR) systems that are powered by blockchain technology Figure 4. Among these applications are the following: contact tracking, information gathering, database exchange, customer information protection, and the Covid certification for sick or recovering people, the forecasting of future infection development in the community, and efficient & reliable supply chain administration for vaccinations as well as other vital goods. Blockchain is an innovation that can effectively overcome the shortcomings of traditional EHR problems and aid in the administration of the COVID-19 outbreak problem by providing trustworthy, precise, & confidential information storing & transfers. Blockchain also has the potential to be successfully implemented to address the deficiencies of standard EHR concerns and to assist in the management of the issue with the COVID-19 pandemic. There is also the possibility that blockchain technology might be utilized to assist in alleviating some of the problems around the pandemic's control.

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CONFERENCE ARTICLE

ANALYSING THE IMPACT OF STUDENT HEALTH POST COVID-19 PANDEMIC AND PROVIDING A SOLUTION USING DIGITAL TECHNOLOGIES

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ABSTRACT

COVID-19 has created enormous uncertainty into important parts of national and global society, including schools and institutions. This uncertainty had halted the normal functioning of students. For example, it is unclear how the institute's shutdown in Spring 2022 affected students' academic performance. Similarly, the quick transition to virtual learning in academic years will continue to have an impact on academic performance.

Despite the uncertainties, there is a growing consensus that the lockdown and school and college closures caused by COVID-19 harmfully influenced students' academics, mental health, and physical health. This research study examines how students in schools and colleges feel post lockdown in India. This study also highlights how digital technologies and their applications is improving the educational process.

"This paper was selected from the Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-being on 10th and 11th December 2022 in India organized by Confab 360 Degree."

KEYWORDS

pandemic, lockdown, physical health, mental health, academics, digital technologies.

INTRODUCTION

Children already have been dealing with the mental and physical health issues where they have been vulnerable [1]. Emerging uncertainty due to COVID-19 has paused the India's functioning. Students, educators, and parents have faced numerous problems for in relation to COVID-19. In this research, there has been learning about the broad influence of COVID-19 amongst students and what schoolchildren have been feeling about effects of this changing scenario for the mental health, physical health

and academics of students in schools at undergraduate and post-graduate levels [2]. To research the overall evaluation of this impact a questionnaire method has been used to obtain first-hand data. Data collection is divided into three major sections covering all the responses [3].

Deferred board assessments have caused tension and disturbance of the circumstance of clinical rotations; however, this may, at last, change the way the evaluations are regulated. The COVID-19 pandemic was declared by WHO on January 30. During the pandemic it become difficult in the Indian states for travel across borders and economies were affected due to the lockdown. School and colleges were closed which affected students. A review of these situations enabled the following research questions to be framed:

RQ1: How was student health and their studies were impacted post lockdown?
RQ2: How mental health of students were impacted due to the lockdown?
RQ3: How will the students feel that their academics being affected by the closures of schools and colleges and adopting virtual learning platforms?

A variety of learning management systems (LMS) have emerged as a result of the use of digital technology in education. These LSMs take fostered virtual laboratories in which an educator may engage with undergraduates in real-time, segment his materials, present his speech, evaluate students' learning, gather comments, and respond to students' questions. Students have access to innumerable internet resources thanks to technology, which encourages them to conduct research and so fosters their independence. Additionally, it facilitates learning by making topics more consumable, for instance through instructional videos.

LITERATURE REVIEW

In a search of relevant articles, we accessed the Scopus database and using keywords ("Post COVID-19", "Student Health", "Digital Technologies", "Digitalization"). The search strings that were used for "Title, abstract and keywords". The search was limited to the subject area of business, accounting and management and document types included - articles, reviews, and articles in the press were selected. Finally, authors located only 39 papers related to the study area.

During the pandemic it was suggested to have online based learning due to the spread of the virus. The students were allowed to have the experience of experiential learning which enhanced their knowledge [4]. This framework shift to the virtual climate and settings have been testing however, it may permit more intuitive than customary readout meetings or pedantic talks. The review was directed to survey the mental state young people after the COVID-19 infection occurred in China a fortnight later and also research factors influencing the emotional well-being among gatherings of young people [5].

The review explores the effect of COVID-19 on student health. Information was gathered by organized surveys directed to 200 respondents, including educators, understudies, guardians, and policymakers from various nations. The disruptions of COVID-19 have impacted the human lives. [6].

This paper seeks to understand the effect of COVID-19 on the student. The mental state of the student was affected due to the pandemic as they had to study online, they were not able to meet their friends, outdoor games they were not able to play. All these had a severe impact on the health of the students as we know online learning cannot provide the same environment [7].

There has been a direct link of emotions with the offline studies for the students [8]. This paper investigates the consequences of this overall peculiarity on explicit advancements and how this may further develop our lives. The review was attempted to look at the outcomes of weaknesses, hazards, and the impact of preventive practices related to the COVID-19 pandemic.

RESEARCH HYPOTHESIS

Schools and colleges started to utilize online video conferencing applications for training to relieve the impacts of a post lockdown(such as the Zoom conferencing system). Because of the lockdown, every open space, including and not restricted to parks, films, recreation centers, and eateries, were likewise shut. There has been impact on the mental health of the students due to the lockdown measures [9]. Many students felt they can't go back to the schools and colleges. Given these situations the following hypothesis were developed for this study:

H1: COVID-19 and the imposition of lockdowns had a significant impact on student physical health.

Children were stressed and missed out on opportunities for healthy growth and learning due to forced homestay and loss of contact with teachers, friends, trainers, and counsellors [10]. Many children cannot obtain the nutrition they receive from school meals.

H2: COVID-19 and the imposition of lockdowns had a significant impact on students' mental health.

Closures of schools had been a standard tool for the fight against the COVID-19. However, the costs and its benefits are not well understood. To assess its impact of the school closures on the students' learning, we used a natural type of experiment during examinations.

H3: COVID-19 and the imposition of lockdowns had a significant impact on students' academic development.

Schools and colleges are an unmistakable gatherings with dynamic with a way of life propensities in view of connections and contacts, physical and scholastic exercises, travel, and parties. The pandemic crisis fundamentally affected their lives, particularly given the college's limitations [11]. The COVID-19 pandemic, specifically, fundamentally affected the psychological wellness of understudies in numerous nations throughout the world, getting a comparative reaction as far as feelings and worries among the overall population [12].

H4: Online learning will significantly impact student's frequent mood swings.

RESEARCH METHODOLOGY

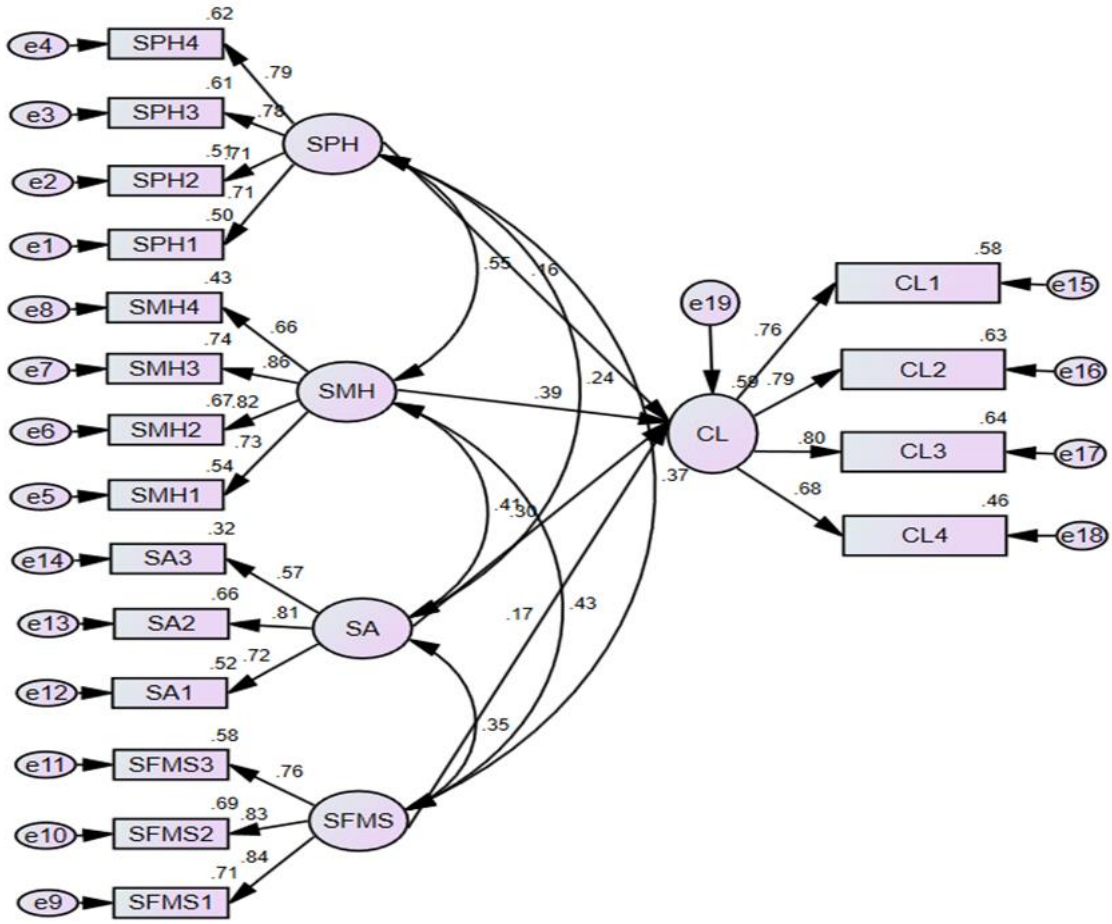
Primary data source collection has been used to undertake this research by getting first-hand data from the students of schools and colleges. A questionnaire method has been used to collect the data for the research [13]. According to the study, this designed questionnaire was circulated among the students in the sample category, and their responses were recorded [14]. The questionnaire contains three significant sections: academic, physical health, and mental health questions. The respondents had to rate on a 5-point grading scale ranging from strongly agree to disagree strongly [15]. Research does not pertain to primary students under 12 years of age. Students from urban areas are surveyed, but not those from rural areas. Due to the persistence of COVID-19, this research was used for a post-lockdown period therefore, it cannot be applied to typical situations. Due to the lockdown, data availability was reduced and a small sample size was collected. This research has contributed significantly to the state of COVID-19 on students, allowing other researchers to use it as secondary data. Data could be used as a resource to comprehend the effects of virtual learning platforms on students' physical and mental health, as well as their academic performance. The questionnaire was distributed to 678 students in various schools and universities, but only 314 students returned the questionnaire enabling data analysis. We have used the structural equation modelling (SEM) approach.

The ethics clearance has been waived for this research by SSBSR, Sharda University, Greater Noida.

DATA ANALYSIS

Hypotheses were tested using a SEM approach using the AMOS 22.0 software [16]. The model fit measures for the study are chi-square fit statistics/degree of freedom (2.272), goodness fit index (0.911), comparative fix index (0.933), incremental fix index (0.914), Tucker-Lewis's index (0.937), root mean square error of approximation (0.051). Figure 1 shows the structural model testing all of the hypotheses. The path analysis result is used for the hypothesis testing. It has been found that all the hypotheses for this study are accepted. For H1 estimate (0.159), SE (0.061), CR (2.61); H2 estimate (0.389), SE (0.099), CR (3.93); H3 estimate (0.301), SE (0.061), CR (4.93); H4 estimate (0.169), SE (0.073), CR (2.32).

FIGURE 1: STRUCTURAL EQUATION MODELLING FOR THE HYPOTHESIS



DISCUSSION

The first hypothesis proposed is a that there was a significant impact of an outbreak of COVID-19 and the imposition of lockdown on students' physical health. Future public health policies involving post lockdowns should increase social support levels to boost general resilience [17]. The second hypothesis proposed was about significant impact of the outbreak of covid and imposition of lockdown on students' mental health. The result shows that the hypothesis is accepted. Under typical conditions, undergraduates experience expanded degrees of mental trouble, which hurts their scholarly execution. Due to physical separating measures carried out because of COVID-19, tertiary schooling establishments have moved to a crisis internet learning design, which is relied upon to compound scholarly stressors for understudies [1].

The third hypothesis proposed was about significant impact of the outbreak of Covid-19 and the imposition of post lockdown on students' academics. The outcome shows that the theory is acknowledged. Various elements added to understudies' misery during this pandemic but be that as it may, much still needs to be found out regarding understudies' mental health impact and how their antagonistic impacts can moderate them. A credible source of inspiration for an extra investigation into the effect of COVID-19 on understudy psychological wellness is proposed [18]. Variations of constant survival techniques, and approaches taken by academic establishments to diminish unfavorable scholastic and psychosocial results [19].

The fourth hypothesis proposed was about the relationship between adverse health and mental state effects due to online learning and the developments in the behavior, such as frequent mood swings. The result shows that the hypothesis is accepted. Proof might assist with illuminating understudy focused help programs and relieve long haul adverse results for understudy training and psychological wellness [20]. Students will add to diminishing the generally worldwide emotional well-being trouble related with this time of remarkable disturbance and vulnerability [21].

From the audible to the visible, the virtual library to the interactive, digital methods are widely utilised. While digitalization has made it simpler for instructors to disseminate knowledge, it has helped students more quickly by removing barriers [22]. Additionally, the use of technology methods has made studying a serene experience. The introduction of these methods has resulted in the improvement of the school system by integrating a culture of blended and mobile learning. When augmented reality is combined with education, it enhances learning skills such as teamwork and problem-solving. Unlike virtual reality, augmented reality gives teachers the ability to improve learning and its consequence [23]. It is one of the key functions of a LMS to facilitate streamlined learning by allowing instructors and institutions to compile course materials. Gamification is a method for motivating students by creating a fun learning environment through the incorporation of game aspects into academics [24].

CONCLUSION

This research does not apply to the primary students below the age of 12 years. Data is collected from the metropolitan city's students and not from rural areas. This research is used for the post lockdown period due to the persistence of COVID-19, so it is not applicable for typical scenarios. Data availability was less and a small sample size was taken due to lockdown. The research carried out has contributed well to the state of COVID-19 on students so that other researchers could use it as their secondary data. It could be used as a reference to understand the impact of virtual learning platforms on students' physical health, mental health, and academics.

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APPENDIX

QUESTIONNAIRE

Name: .....

City/District: .....

Age: .....

Likert scale: (Strongly agree = 5; agree = 4; neutral = 3; disagree =2 and strongly disagree = 1)

	1	2	3	4	5
Q1. students' physical health					
Due to pandemic our health was impacted or not.					
There was restrictions on playing outside.					
There was depression due to the pandemic.					
There was improvement in the physical health after the lockdown					
Q2. students' mental health					
Stress was a major element that impacted the mental health of the students					
Loss in studies impacted the mental health of the students.					
Fear of online classes impacted the mental health of the students.					
After the revoking of the lockdown there was improvement in the mental health.					
Q3. students' academics					
There was loss in the students studies.					
Students were not able to participate in the co-curicular activities.					
Students got less marks in exams conducted online.					
Q4. Students frequent mood swings					
Due to online teaching students had to face problems which lead to frequent mood swings.					
There was no proper activities which can motivate the students to completely focus on their studies.					
Students mood swings become normal after the lockdown.					

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CONFERENCE ARTICLE

AN EFFECTIVE HEALTH CARE SYSTEM THROUGH HEALTH TECHNOLOGY ASSESSMENT AND AN EVIDENCE BASED PAYMENT SYSTEM IN INDIA

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ABSTRACT

The purpose of this research is to discuss the significance of health care insurance compensation for obtaining comprehensive medical treatment in India. Through a systematic review survey focusing on the keywords like out-of-pocket, health technology assessment and health care system was conducted by searching Google Scholar, Science Direct, PubMed and ProQuest Database.

It is observed that India ranks among the greatest out-of-pocket (OOP) healthcare expenditure across the globe. This seems to be notwithstanding the deployment of several public health plans and the provision of a significant variety of both private and public health coverage schemes. Decrease in the treatment quality across many healthcare institutions of government is a key cause causing the typical Indian individual to constantly rely on medical services provided by private firms, heading up OOP expenses. Among the most significant problems in implementing universal health care (UHC) in India is a poor acceptance of insurance products and awareness between many Indians. The burden of large OOP expenditures on people might be lessened by increasing medical insurance acceptance, which may be accomplished by enhancing India's medical claims system.

"This paper was selected from the Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-being on 10th and 11th December 2022 in India organized by Confab 360 Degree."

KEYWORDS

Health insurance, medical expenditure, technology, out of pocket, public health

INTRODUCTION

Out-of-pocket (OOP) medical spending is very common and highest in India. Since about 2016, over 65% of overall medical spending is carried through OOP by Indian families, which is greater than those of other Southern Asian nations such as Thailand, Sri Lanka, Nepal, Maldives, Indonesia, China, and Bhutan [1]. Specialist appointment charges, laboratory testing, the cost of medications and healthcare products, and treatment bills are all examples of out-of-pocket expenses. The substantial OOP expenditure on medical services leads to financial disaster, as when 40% of a family's earnings are invested on medical care [2]. The financial disasters caused by significant OOP medical expenditure lead to massive indebtedness for single families, which is seen in either middle-income or low-income individuals. According to the Healthcare Use Survey 2014, 24.9% of all assessed Indian families were suffered crisis repayments due to medical expense [3]. An optimal medical plan would offer preventative and therapeutic treatment, in addition to appropriate compensation structure for individuals to obtain quality and prompt treatment, decreasing OOP spending.

The medical sector in India is complicated, including both governmental and private organisation [4]. The level of treatments offered in India varies from internationally famous institutions to disorganized centres providing subpar treatment. India's private medical practice, like that of various emerging economies, typically offers excellent performance yet is greater priced, while the government medical network is neglected and badly implemented but offers lower services. The poor treatment quality provided at primary medical clinics and community levels clinics is mostly attributable to insufficient public medical costs, insufficient supervision, and insufficient regulation. India's important national medications list is marketed at cheap prices and are anticipated to be available to a substantial proportion of the people; more costly items can be found within just a few large hospitals set by government and many private medical institutions, and therefore are not widely obtainable. It has developed as a scenario in which both the lowest-income and least educated individuals of India in both urban and rural regions choose the highly premium commercial hospitals and clinics over the government medical establishments.

In 2015, the private industry provided approximately 60% of hospital services and approximately 80% of outpatient services [5]. This increased reliance upon that pricey commercial medical industry is a key contributor to India's high percentage of severe OOP medical costs. The rising out-of-pocket medical spending in India also suggests a deficiency to obtain universal health coverage (UHC) that further seeks in supplying equitable accessibility to high-quality healthcare to all common people, such as exposure to new medications introduced globally, while avoiding economic stress [6]. The Indian Government and other governments at state level have developed numerous wellness programmes to minimize OOP medical costs and so attain UHC, with variable levels of effectiveness in decreasing OOP cost. The way to cut OOP cost is to increase medical coverage enrolment in India, which is now relatively small. In a 2017 report for India, just over 34% of entire nation is protected by medical coverage, as well as the large bulk (about 79%) of medical coverage firms are public firms. [7] An option for increasing healthcare coverage adoption is to improve payment systems, which may be accomplished by using evidence-based healthcare (EBH) standards for compensation. We carefully explore the different national medical plans that have recently been implemented, and then show how applying EBH standards might enhance not just the level of medical treatment, but also coverage enrolment and medical insurance compensation in India. India has significant public medical plans. In India's healthcare system, technology assessment is critical to ensuring that medical technology and infrastructure investments are cost-effective and consistent to minimize out-of-pocket medical expenses. Assessing healthcare technology uptake and effect can assist in optimizing budget allocation, improving healthcare quality, and expanding access under national medical insurance.

METHODOLOGY

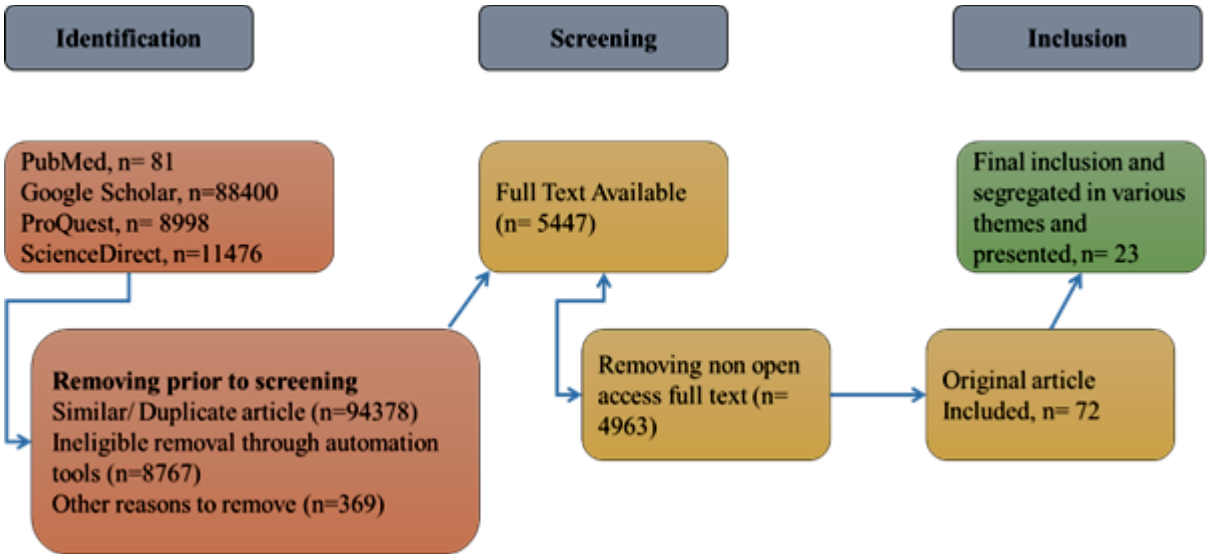
Our study rigorously employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) framework, ensuring a comprehensive and standardized approach to conducting this investigation, enhancing its reliability and transparency.

SEARCH STRATEGY

The study has considered the most relevant search databases for literature such as Google Scholar, Scopus, PubMed, and Science Direct to find the relevant original research articles. The research papers are segregated as inclusion and exclusion that are published from 2015 to 2022, language as English, full text and original work while

double or duplicate publications are removed respectively, which is presented in Figure 1.

FIGURE-1 FLOW CHART OF PRISMA FOR EXCLUSION AND INCLUSION NAME



From Figure1 it can be clearly understood that by using the keywords like out-of-pocket, Health Technology Assessment and health care system, the search platforms like PubMed resulted in 81, Google scholar gives 88,400, ProQuest gives 8,998 and Science Direct gives 11,476. In total it gives a result of 108,955 articles that are filtered with inclusion and exclusion criteria mainly focusing on years, full text, language and no duplications.

RESULT OVERVIEW

The government has attempted to offer monetary assistance for medical treatment by various insurance programs, including since 1952 and 1954 are ESIS (Employees State Insurance Scheme) and (CGHS) the Central Government Health Scheme (Table 1). Even after its popularity within and between Indian people, these plans just intended to aid handpicked beneficiaries to acquire healthcare coverage at the regional or central stage, and UHC might not be of benefit to individuals on their own. Individuals that were not qualified for such plans remained to pay out of pocket for their medical requirements.

TABLE-1 INDIAN HEALTHCARE SCHEMES FOR GENERAL PUBLIC

State or National Scheme	Scheme Name	Year	Scheme Plans
National	Employees State Insurance Scheme (ESIS) [8]	1952	Employees earning up to Rs. 21,000 can avail maternity benefit, health coverage and disablement benefit
	Central Government Health Scheme (CGHS) [7]	1954	Pension holders and employees of Central government to avail medical care comprehensively
	Rashtriya Swasthya Bima Yojana [9], [10]	2008	Below poverty line families to get hospitalization expenses assistance for per family per year up to Rs. 30,000 and addition to transportation expenses

	Ayushman Bharat [11]	2018	Health insurance coverage for vulnerable and poor family up to Rs. 5 lakh per family per year
Maharashtra	Mahatma Jyothiba Phule Jan Arogya Yojana [12]	2012	Per family per year to receive cashless hospitalization expenses up to Rs. 1.5 lakh
Tamil Nadu	Chief Minister's Comprehensive Health Insurance Scheme [13]	2012	A yearly to every family with an annual income below to Rs. 72,000 to receive cashless hospitalization expenses up to Rs. 1.5 lakh
Odisha	Niramaya Scheme [14]	2012	Health insurance for specially abled people
Odisha	Biju Swasthya Kalyan Yojana [15]	2018	A health insurance facility for all residents of the state with Rs. 5lakhs per family and 7 lakhs per women of that family

Several Indian states have adopted medical coverage plans and promote public-private commercial dealings for medical coverage. Such a plan in Andhra Pradesh was Rajiv Aarogyasri Yojana initiated in 2007. As of 2013, the Rajiv Aarogyasri Yojana (a government community health insurance scheme) has reached as much as 87% of the nation's poor individuals just 6 years of its launch ($USD 1,009 as of October 2019). Furthermore, since 1995, in Tamil Nadu medications have been made available with no cost in public hospitals. [16] Achievement of such plans is evidenced by the core that out-of-pocket cost of medical expenses in Tamil Nadu is indeed the cheapest by many Indian states. A further prosperous nation health plan in Maharashtra is the Mahatma Jyothiba Phule Jan Arogya Yojana. Another medical coverage was introduced by the Ministry of India in 2008 to offer monetary assistance against destructive medical expenses, minimize OOP spending for hospital treatment, and achieve better accessibility for low-income households and some other weaker sections of the society in the disorganized sector is the Rashtriya Swasthya Bima Yojana (RSBY). The business of insurance is outsourced, and the governments, state (25%) and central (75%), split the cost. In essence, the insurance firm agreements with a network of private and public healthcare institutions to provide free outpatient assistance to the beneficiaries. The insurance firm compensates a specified sum as deals per business category to the empaneled clinics. As of December 2020, members pay a processing charge of INR 30 ($USD 0.41). [9] This strategy was supposed to reduce OOP expenditure. But nevertheless, successive findings confirmed that RSBY did, in assertion, maximize the chances of OOP medical funding by 30%. The major causes for such an assertion were recommended to be low uptake, poor registration habits, unsatisfactory medical insurance, an absence of insurance for ambulatory care expenses, useful for classification of arraigned amenities, insufficient control and reporting, fixed component premiums, and an absence of a great execution plan. On September 23, 2018, the Indian Government introduced the Ayushman Bharat plan, gaining out from failures of RSBY. The country's greatest publicly financed medical insurance program and it is divided into two parts: wellness and health clinics and the PM-JAY (Pradhan Mantri Jan Arogya Yojana) exist for delivering complete demand medical care including preventative, therapeutic, and outpatient treatment in India's tertiary, secondary and primary, level health facilities. The wellness and health facilities provide complete medical assistance, maternity and paediatric welfare facilities, and chronic non - transmittable diseases care. [10] The PM-JAY benefits over 500 million people from poor and vulnerable households of 107.4 million, without any household size restrictions. This policy offers an overall medical insurance in December 2020 of INR 5 lakh ($USD 6,810) per household for tertiary and secondary care treatment in India, spanning governmental and non - governmental arraigned facilities. All pre-existing issues are included in PM-JAY since day one. There is already coverage for expenses up to three days beforehand and up to fifteen days afterwards treatment and beneficiaries can use the plan's benefits in any arraigned governmental or non - governmental hospital in the nation. The plan covers all expenditures for roughly 1400 treatments, and qualifying beneficiaries can receive these treatments totally free. The government compensates medical costs, and medical facilities are funded at the same rate as private hospitals. National Health Authority [17] stated that the benefits of installing PM-JAY are split among the federal and state governments. There at moment, Indian residents are enthusiastic about Ayushman Bharat. Approximately

recipients of 90 million since around July 2019 had been recognized, and over 3.6 million claimants had indeed successfully treated in even further 16 000 arraigned hospitals. Additionally, and over 9000 medical facilities throughout India were arraigned there under PM-JAY as of December 2019. Further recipients are recognized by referring to the 2011 Social economic Caste Survey and the very first part will encompass the lowest 40% of the poor and unprotected community. Possible options, nevertheless, are necessary to lower the OOP medical spending of the people who are currently ineligible for enrolment in PM-JAY. However, one technique is to increase medical coverage enrolment in India.

INDIA'S MEDICAL COVERAGE AND PAYMENT SITUATION

Owing to the prevalence of many medical coverage programmes given among both commercial and public medical coverage companies, coverage consumption in India remains low. There are several explanations for this circumstance: Observations of persons who have been protected by a private medical coverage program but did not receive the advantages that have been guaranteed. According to Healthcare Use Survey in the year 2014-2015, just 1.3% of private coverage families received compensation for healthcare expenses. Thus, raising funding levels is critical to increasing medical enrolment in India. Choosing the best coverage plan and determining the appropriate benefits from the accessible selection of programs is normally unclear for the common Indian individual. Inadequate medical infrastructure and a lack of insurance knowledge building in the countryside. Many commercial healthcare plans in India are "topped" health plans with predetermined limitations on a certain product, and they primarily focus the middle-class people instead of improving the coverage to meet the much more recent needs and technology [18]. Difficulties with health insurance: many private medical insurance firms pay back only handpicked medical care, such as hospital treatment, and doesn't include ambulatory care counselling in their regular insurance cover. As a result, patients who require ambulatory care counselling are frequently expected to devote cash, even after being protected by medical insurance. Private health insurance companies are given greater motivation to participate. Individuals with the least health hazards seem to be more able to obtain medical insurance than those with greater health hazards. This disparity in client selection strategy has the potential to disrupt insurance sectors [19]. [20] A patient who is additionally not a client of any public healthcare system bears a large out-of-pocket expense for every medical treatment, also with majority of the out-of-pocket expense being for drug purchasing. [21] Although having spent tremendous sums of pay on medical out of pocket, Indians are hesitant to obtain health care coverage. A most major explanation for this discovery is that many medical coverage plans exempt ambulatory care expenses from payment and only make the payments after admission. [22] States that as a consequence, there is an increased occurrence of needless treatment and "carrier requirements" in order to collect health coverage. [23] This scenario, in which a great percentage of Indian residents generally do not have exposure to necessary medications or must pay exorbitant OOP prices for them, contrasts sharply with the established reality that India sells drugs to over 200 nations worldwide and is lauded as the "pharmacy of the world."

Nandi [24] stated that, the significant issues that impact India's medical care scheme have an inadequate Medicare spending plan, wide variations in medical exercise all over areas or clinics, all public failed to qualify for government medical insurance plans, low utilisation of medical insurance plans, health coverage that does not properly support ambulatory care, and an inadequately formalized Medicare payment process, all of which contribute to high OOP care costs. One possible method for resolving the majority of these issues and ensuring optimal resource utilization in India is to enhance, that is the payment through evidence-based and applying HTA (health technology assessment) [25].

COMPENSATION THROUGH EVIDENCE-BASED AND HTA

Medical payment, distinct as how a covered individual gets reimbursed for medical expenditure, is determined by how much insurers are ready to reimburse for authorized items and services on favour of their coverage scheme subscribers [26]. [20] Despite the fact that companies work in a strictly controlled setting in terms of innovation, production, and marketing, their primary goal is to maximize profit by delivering medications, medical tests, and hospital instruments. Profit is crucial for the business, but it must not be used to discredit scientific findings. This is how the EBH as an idea gets into play.

It attempts to increase the level of medical treatment and happiness of patients while lowering medical expenses by combining research-based medical expertise, professional competence, and the individual's preferences and beliefs.

These findings, derived from the analysis of evidence gathered in a specified method, substitute commonly proposed therapies dependent on empirical and experienced viewpoints with novel therapies that are greater efficient, reliable, dependable, efficacious, faster, healthier, and less expensive.

EBH enables health workers and individuals to make more educated decisions, which leads to higher value, patient experience, and controlled price. EBH also assists authorities in determining which strategies succeed and which do not. The use of EBH concepts in defining medical insurance compensation ensures that people receive the most adequate therapy for every given set of conditions while also protecting people from extraneous fees associated with hospital treatment, medical tests, medications, and other supporting requirements.

Most authorities concerned in medical compensation are not substantially involved in the formation of modern science. They acquire medical facts for deciding compensation rates employing the similar techniques and resources that professionals and other medical players use to determine the optimal therapy for individuals. The information for setting compensation policies in the United States is mainly obtained by the Agency for Healthcare Research, Quality's National Guideline Centre and the Cochrane Database of Systemic Reviews. The information is then examined by initiatives of the US Preventive Services Task Force and the Blue Cross and Blue Shield Association's Technology Evaluation Centre. The scenario is comparable in industrialized nations such as Australia, United Kingdom, and Canada. In reality, an institute based in UK as the National Institute for Health and Care Excellence has been a trailblazer in the use of EBH in drug compensation and the development of scientific proof standards. Furthermore, these nations encourage the development of statistical evidence concerning the security, efficacy, and quality of medical innovation in order to determine the kind and amount of drug compensation. This technique of evaluating the cost to profit ratio of HTA, employs EBH concepts to reduce the expense and variances in healthcare system, hospital equipment spending, and the total medical care cost. HTA also minimizes patients' out-of-pocket expenses and streamlines healthcare compensations methods.

HTA is slowly making inroads in poor nations. The International Decision Support Initiative (iDSI) holds a vast link of medical, regulatory, and leading economists, takes on added relevance. The iDSI was established to assist moderate - income and low-income nations in building decent judgments on how taxpayer funds should be invested on medical care in order to get the greatest potential results. iDSI's operations involve addressing medical concerns, building medical practices and structures, creating and utilising facts, and intelligent buying for attaining UHC, with the goal of obtaining the best use for expenditure in order to provide sustainability. As of 2019, the iDSI is constantly assisting UHC in further than ten nations, notably India.

INDIA'S HTA

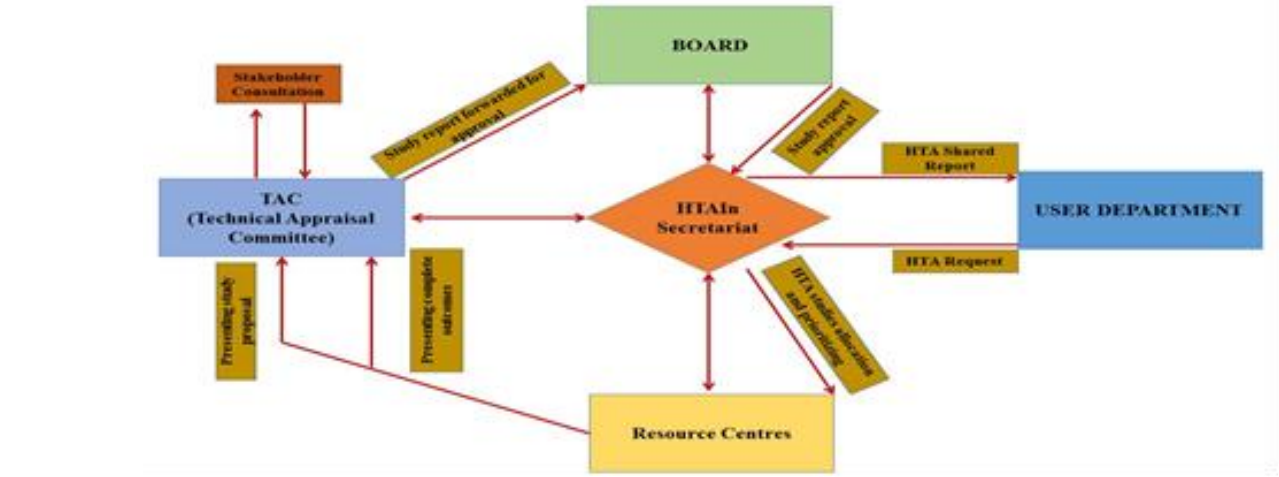
Even in India, HTA activity is progressively growing up. The Ministry of Health and Family Welfare, Department of Health Research (DHR) and Government of India, devised a framework to adopt HTA in India by integrating specialists in healthcare finance to encourage evidence-based planning in health coverage. International Decision Support Initiative [27] in February 2017 was supported by the National Health System Resource Centre that focuses on HTA for the price limiting of cardio stent by the Indian government. As a consequence, the estimated price of drug-eluting stents has been reduced by approximately five times as of December 2020, from USD 1,648 (INR 1.21 lakh) to a limit of USD 403 (INR 29,600). Such a result of this accomplishment, an HTA committee in India has been created by the DHR that is called as the Health Technology Assessment in India (HTAIn). The establishment has indeed combined the HTAIn with increased expert support from the iDSI.

The HTAIn is now in charge of procuring, creating, quality standards, and endorsing HTA findings in India, as well as being meant to provide as a link among HTA information providers (such as study associates, HTA hubs, and similar entities) and its consumers (such as financial safety schemes, regulatory assistances, insurance corporations, and health packages). The HTAIn primary goals are to maximize healthcare, reduce OOP spending, and reduce medical inequity. The HTAIn is made up of a professional evaluation panel, local research centres, and expert collaborators, as well as the HTAIn secretariat, the HTA Board (HTAB) manages the operation of each of these elements. Figure 2 depicts the present HTAIn structure. In some circumstances, the HTA administration can begin HTA research even when there is lack of a written application from a customer. The results of all HTA investigations are preserved in a database that is accessible to all parties [27].

The HTAB is planned to serve as a state-wide advisory committee for delivering rigorous research for making decisions on healthcare resources and treatments, developing medical, population health, and care home recommendations, and evaluating excellence in the social and health sectors. The HTAB is indeed anticipated to give direction on how to use EBH to improve the efficiency and quality of public health services, as well as strive to UHC by building cooperation among the states and the federal government. Just at time of writing, the proposal of the HTAB law is already being distributed around diverse participants, and its passage is anticipated to provide a well support to HTA operations in India, hence increasing the adoption of EBH concepts in healthcare coverage and payment [27].

The HTAIn has successfully conducted multiple HTA trials in various domains, including eye surgery, cervix cancer, long-acting flexible contraception, and breast cancer monitoring. [27] The findings of an HTA research done by HTAIn using expert support from the iDSI on laser technology for cataract treatment and safe injection were applied to influence the concept and price of the PM-JAY health benefits package.

FIGURE 2: HEALTH-CARE TECHNOLOGY EVALUATION SYSTEM IN INDIA [27]



HTA remains in its initial phase in India. The adoption of HTA offers enormous opportunity to enhance India's present medical system and laws. In India, one of the biggest crucial uses of HTA is to guide strategic planning in several domains. For instance, evidence of HTA research may be utilized by state and national healthcare systems to focus and locate one of most price effective plan of treatments, locate and aid in the purchase of the least expensive price equipment and medicines, and optimize the allotment of budgeted funds, therefore optimizing health benefits and thoroughly achieving aims. Various funding security plans could use HTA knowledge to build clinical parameters that are both cost-efficient and scientifically successful, as well as to take skilled decisions regarding creating limitations for beneficiary payment. Sourcing authorities can indeed utilize HTA data to improve price and rationalise inventory. Governing bodies may utilize HTA data to rationalize the National List of Essential Medicines (NLEM) and to develop more rigorous medicine and equipment costing. HTA may also aid in the development of quality measures that can then be utilized to assure compensation for effectiveness. Thus, the uses of HTA are numerous that can bring the Indian medical industry one step nearer to UHC if effective operation of HTA are implemented.

THE SIGNIFICANCE OF HTA IN ENHANCING INDIA'S EXPOSURE TO BASIC MEDICATIONS

Among the critical elements of UHC is ensuring global exposure to necessary medications at fair price. To accomplish this, Indian government issues a medication grade and compositions known as the NLEM by the collaboration of the Indian Ministry of Health and Family Welfare, and the National Pharmaceutical Pricing Authority enforces cost controls on such specified goods. These price stabilization initiatives are intended to reduce OOP medical expenditure in India by improving accessibility to vital drugs for everybody. Nevertheless, this was discovered that perhaps the provision of necessary pharmaceuticals is indeed poor, including both private and public institutions. [28] This remark is based on the notion that when the manufacturing of value pharmaceuticals gets unsustainable for the medicinal producers, the pharma corporations opt to terminate manufacturing (Singh et al.,

2021). Maiti (2015) HTA can serve a significant contribution in avoiding such a negative effect of restricted availability to pharmaceuticals designated within NLEM due to its unprofitable status. Handled correctly HTA of critical pharmaceuticals could be utilized to identify suitable valuation costing for such medicines that are never too high for the people nor too cheap for such producers to just be viable [29], [30].

APPLYING EVIDENCE-BASED PRICING IN INDIA: TOWARDS UNIVERSAL HEALTH CARE

Each effort towards UHC that is supported by EBH seems to be more certain to succeed. This seems to be true including both commercial medical coverage schemes and government-sponsored coverage and payment programs. If the payment schemes in a medical coverage program or payment system are still not effectively organized, such systems will never be well received, particularly by private clinics. The WHO has stated that it will give expert advice for the execution and transformation of Ayushman Bharat in India as per the 2019-2023 the WHO India National Cooperation Strategy. Considering findings from HTAs, the evidence-based compensation plans that are competitively valued can be achieved through the collaborative effort of both WHO and the DHR.

This information emphasizes the relevance of HTA and EBH in determining payment schemes that is critical for attaining UHC in India. Several other suggestions in the similar vein are as follows:

1. Expand the coverage of PM-JAY beneficiaries to encompass the whole Indian community. The wealthy populace might well be registered in the plan paying greater registration costs and sometimes even premiums.
2. Employ HTA to precisely calculate payment schemes for health facilities within PM-JAY and some other current public medical plans, including the CGHS and the ESIS. A well-planned compensation structure that will not lead in loss to medical centre operations would increase the participation and interest of all health care professionals in such medical plans. Additionally, when residents get conscious that commercial organizations also offer treatment below a government medical program, the program's enrolment increases.
3. Utilize HTA to compute healthcare costs and payment limits. Similarly, consider HTA required for medical coverage. This will increase payment efficiency, assisting in increasing the nation's acceptance of medical coverage.
4. Establish HTA essential for the pharmacy and equipment firms. Project budget, in contrast to effectiveness and safety data, must be mandated by law ahead to commercial clearance. This one will promote accountability in medication and equipment costs.
5. Apply HTA guidelines to improve current tender-based acquisition of drugs and equipment through different state- and national-level medical systems.
6. Use HTA to price critical drugs on a value-based basis. It will give a motivation for medical businesses to produce important drugs, therefore alleviating shortages and enhancing accessibility to individuals that need it at affordable prices.
7. Determine the nation's essential medical problems and perform HTA research in these areas with both the goal of developing representatives of government for the diagnostic, monitoring, and treatment of different critical illness problems. This will improve the availability of medical and move our nation forward to UHC by bringing standardization of treatment throughout diverse venues in the nation.

CONCLUSIONS

Substantial OOP costs in India demonstrate not just the country's over-reliance on the private medical plans, as well as that UHC still needs to be implemented. Regardless of the accessibility of a huge range of medical coverage policies across various medical insurers, Indians generally hesitant to enrol in a policy, resulting in a significant OOP spend.

A joint approach by private and public sectors is important to overcoming this challenge. By establishing medical initiatives such as Ayushman Bharat, the government is assisting UHC and boosting healthcare availability. To improve medical coverage acceptance, commercial players must encourage health insurers to employ HTAs when structuring policy plans, rates, and payments. The formation of HTAIn is a positive move in that direction. In comparison to most established HTA organizations all over the world, India's EBH-based HTA system remains in its immaturity. The strengthening of HTA in India is necessary stages that can assist reduce OOP expenditure on medical requirements by the typical Indian population, hence assisting to the achievement of the vision of UHC in India.

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CONFERENCE ARTICLE

EXAMINING CHALLENGES IN THE ADOPTION OF BIG DATA IN HEALTH CARE INSTITUTIONS AND ITS IMPACT ON PATIENTS' SATISFACTION: AN EMPIRICAL STUDY IN DELHI, INDIA

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ABSTRACT

The study aims to investigate the obstacles and factors influencing the adoption of big data in healthcare organizations, and its subsequent impact on patient satisfaction. Big Data in healthcare refers to the collecting, analysis, and use of clinical data from patients that is too massive or complex to be grasped by standard data processing methods. Adopting big data in health care will enable manages to render services to patient and customer satisfaction. However, in the health care sector, firms must overcome several hurdles and problems by adopting new technology.

A detailed literature review was undertaken to examine many obstacles associated with the use of Big Data. A well-structured questionnaire was prepared in Likert scale to find the elements that influence big data adoption and its impact on patient satisfaction. To evaluate factors, exploratory factor analysis using SPSS 21 was performed, and Structural Equation Modelling (SEM) was performed to assess key significant factors that impact patient satisfaction. The data was gathered from employees associated with the hospitals.

The survey received responses from 212 participants. Following the analysis of the data, it was found that five challenging factors influences big data adoption. These are data integration, data understanding, technology and infrastructure, lack of expert and regulation barrier. These factors explained 70.36% of variance. Whereas SEM analysis indicated that both data integration, data understanding and lack of expertise significantly affect big data adoption Furthermore, big data adoption in hospitals will help in improving patient satisfaction.

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KEYWORDS

healthcare, big data, patient satisfaction

INTRODUCTION

The healthcare business in India has experienced remarkable growth in terms of employment opportunities and revenue generation. This growth can be attributed to improved services, expanded coverage, and increased investments by both public and private institutions. Furthermore, the integration of cutting-edge technologies like Big Data (BD) is playing a pivotal role in transforming the Indian healthcare system towards a patient-centric approach [1]. The efficacy of medical outcomes, the productivity of healthcare professionals, and ultimately patient satisfaction can be significantly impacted by BD, which entails the analysis of vast and complex datasets [2].

In today's rapidly evolving healthcare landscape, hospitals are faced with the challenge of streamlining care-delivery processes and developing sustainable business models to cope with escalating healthcare costs while meeting the expectations of increasingly informed and engaged patients. Alongside advancements in patient care, hospitals are investing efforts in deploying and leveraging their information technology (IT) infrastructure, resources, and organizational capabilities to improve the quality of care-delivery [3].

In addition to streamlining care-delivery and improving operational efficiency, hospitals are faced with the challenges of addressing the convergence of unexpected and market dynamics. This includes adapting to regulatory changes, evolving reimbursement models, and shifting patient expectations. To navigate these complexities, healthcare professionals, including doctors, office workers, and other staff, can benefit from leveraging cutting-edge IT solutions and harnessing the massive volumes of patient-generated data that are readily accessible. By consolidating patient information, such as medical history, into a single, practical location, hospitals can enhance the quality of care-delivery, improve clinical decision-making, and promote seamless coordination among healthcare providers [4].

Looking ahead, hospitals are expected to encounter a myriad of significant organizational, political, and technological challenges as they strive to fully leverage digital technology. The integration of BD and advanced analytics presents opportunities for hospitals to re-define their position within the broader healthcare ecosystem. By harnessing the power of data-driven insights, hospitals can enhance their ability to deliver personalized and value-based care, leading to improved patient outcomes and experiences [5]. Furthermore, the adoption of BD has the potential to drive significant societal advantages by optimizing the quality and efficiency of healthcare services [6].

Despite substantial investments in the adoption of BD to meet patients' demands and expectations, the healthcare industry continues to face hurdles and obstacles. These challenges range from technical complexities, such as data integration and infrastructure limitations, to organizational barriers, including a lack of expertise and resistance to change. Additionally, regulatory and privacy concerns pose significant challenges for healthcare organizations seeking to leverage BD for improved patient care [7]. Therefore, this paper aims to address the issues and limitations that healthcare organizations confront in providing excellent care and value to patients, with a specific focus on maximizing patient satisfaction. By examining the challenges associated with the adoption of BD in healthcare institutions, this study aims to provide valuable insights and recommendations for overcoming these obstacles and harnessing the full potential of data-driven healthcare.

LITERATURE REVIEW

The adoption of BD is defined as a technique that allows an invention to modify an organization's infrastructure [8]. The adoption of BD comprises cutting-edge information processing technologies and decision-making tools [9].

BIG DATA IN HEALTH CARE INDUSTRY (HCI)

BD in health care contains vast volumes of information that may be used significantly. Because of the tremendous potential that exists in it, it has been a topic of special attention for industry and academics during the last decade. Every organization dealing with BD has to deal with 3V's- Velocity, Volume, and Variety. BD has grown in importance in healthcare due to three main trends in the industry: the large quantity of data accessible, rising healthcare costs, and an emphasis on patient satisfaction. To improve services and patient satisfaction, several clinics, healthcare hospitals and institutions produce, store and analyse BD. Some significant data sources in the healthcare sector include hospital records, patient medical records, test results, and internet of things-enabled devices. Effective administration and analysis are required to generate usable information from this data. Otherwise,

reviewing vast amounts of data to find a solution quickly, may become a mammoth task like hunting for a needle in a haystack. Each stage of extensive data management has unique challenges. Some of the significant obstacles to its acceptance are as follows:

1) **Lack of Experts** – As professionals understand data, the healthcare institution must look for learned professionals to manage BD. These people include data analysts, data engineers, and scientists who have worked with technology and can make sense of vast amounts of data. To bridge this gap, specific actions must be taken.[10]. Similarly [11], studied the shortage of skilled professionals in the field of BD analytics is a widespread challenge across industries, including healthcare. The rapid growth of data and technological advancements have outpaced the development of a qualified workforce to effectively manage and derive insights from large datasets. Also, [12], emphasized the critical role of data scientists in healthcare organizations for successful implementation of BD initiatives. They highlighted that data scientists possess the necessary skills to handle complex data integration challenges, apply advanced analytics techniques, and communicate actionable insights to support evidence-based decision-making.
2) **Technological and infrastructure Barrier** - Technological and infrastructure Barrier - BD has emerged as a crucial top-line business problem that organizations must address to be competitive and relevant in today's increasingly data-driven world. For this reason, technological and infrastructure needs are critical to ensuring the early completion of progress execution. BD investment is increasing across the board. Still, the cost will continue to be one of the most significant barriers to technology adoption and infrastructure development when launching BD projects [13]. In addition to the cost barrier, other authors have also identified various technological and infrastructure challenges in the adoption of BD in healthcare. For instance, [14], highlighted the need for scalable and robust IT infrastructure to handle the large volume, velocity, and variety of healthcare data. They emphasized the importance of investing in powerful servers, storage systems, and networking capabilities to support efficient data processing and analysis. Furthermore, [15] emphasized the importance of data security and privacy in the context of BD infrastructure. They discussed the challenges of safeguarding sensitive patient information and complying with regulatory requirements while leveraging BD technologies. Implementing robust security measures, such as encryption and access controls, is crucial to protect patient data and maintain trust in healthcare organizations' data-driven initiatives.
3) **Data Integration -** Social networking sites, customer logs, financial reports, ERP software, emails, presentations, and staff reports are just a few data sources used in businesses. Businesses typically ignore this region. It takes much work to compile this information into reports. On the other hand, data integration must be faultless because it is essential for analysis, reporting, and business intelligence [16]. In addition [17] emphasized the need for a robust data integration strategy that enables seamless collection and integration of heterogeneous data sources in healthcare organizations. They stressed the importance of developing standardized data formats, protocols, and interfaces to facilitate interoperability and efficient data integration.

   Moreover, [18] discussed the complexities associated with integrating structured and unstructured healthcare data from various sources, such as electronic health records, medical devices, wearable sensors, and patient-generated data. They emphasized the need for advanced data integration techniques, such as data cleansing, transformation, and mapping, to ensure the accuracy, consistency, and reliability of integrated data for meaningful analysis and decision-making.

4) **Regulation barriers-** Different structures might have guidelines, but in any case, one of these guidelines applies to most organizations. Organizational rules may be divided into four main categories: government rules, asset-imposing business model rules, asset-guideline-imposing industry rules, and brand-guideline-imposing industry rules. The strategy and exploitation of Big clinical data have yet to be clearly and efficiently specified, even though it is challenging to create Big clinical data without the restriction of regulations. [19]. Further, [20] discussed the complex legal and regulatory landscape surrounding the collection, storage, and use of healthcare data, which often creates challenges for healthcare organizations aiming to leverage BD. They emphasized the need for clear guidelines and policies regarding data privacy, consent, security, and compliance to ensure ethical

and responsible use of BD in healthcare. [21] addressed the regulatory challenges related to data sharing and interoperability in healthcare. They emphasized the importance of addressing regulatory barriers to enable seamless data exchange and collaboration among different healthcare entities. They highlighted the need for standardized data formats, protocols, and consent frameworks to overcome regulatory hurdles and facilitate secure data sharing for improved patient care and research.

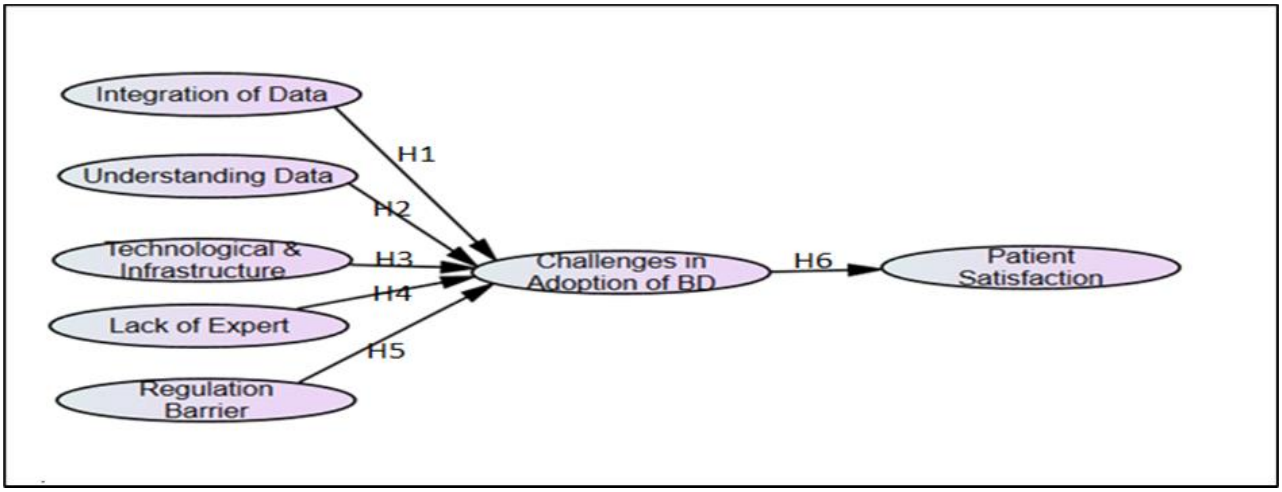
5) **Lack of understanding and securing data- -** The failure of businesses' efforts to use significant data results from ignorance. Staff members may need to learn about data definitions, sources, processing, and storage. Data experts could understand what's happening, but others might need help understanding. Keeping these enormous data sets secure is one of the most challenging parts of BD. Businesses typically put data security off since they focus on comprehending, storing, and analyzing their data sets. However, this is a bad idea since vulnerable data repositories might serve as a haven for hostile hackers, slowing the procedure [22].

In addition to the challenges mentioned above, other authors have also emphasized the significance of understanding and securing data in the adoption of BD in healthcare. [23] discussed the importance of data literacy and education among healthcare professionals to enhance their understanding of data concepts and promote data-driven decision-making. They emphasized the need for training programs and resources that equip healthcare personnel with the necessary knowledge and skills to effectively utilize and interpret BD. Furthermore, [24] highlighted the criticality of data security and privacy in the context of BD in healthcare. They discussed the risks associated with unauthorized access, data breaches, and misuse of sensitive healthcare information. They emphasized the need for robust data security measures, such as encryption, access controls, and monitoring systems, to safeguard patient privacy and maintain data integrity in the era of BD.

6) **Patient Satisfaction** - BD may empower people to manage their health by informing, educating, and inspiring them. Extensive data analysis knowledge provides medical professionals with clinical insights that enable them to provide improved client satisfaction. Additionally, it removes the guesswork frequently present in treatment, allowing clinicians to prescribe medications and accurately make clinical judgments. This lowers costs and improves patient satisfaction. Utilizing financial and clinical data may demonstrate treatment plans' effectiveness and efficiency. Beyond this, the billing systems can be enhanced, diagnosis and procedure codes can be cleared, patients can be given unique patient identification, and data can be synced with other verticals for future use [25].

Based on the literature study and the challenges encountered in adopting BD in Health Sector, a conceptual framework is being tested with the following hypothesis.

FIGURE1: CONCEPTUAL FRAMEWORK AND HYPOTHESIS



Source: Authors Compilation

OBJECTIVE OF THE STUDY

The research attempts to clarify the basic influences on hospitals' use of big data technology and how this technology contributes to patients' higher satisfaction levels.

HYPOTHESIS OF THE PRESENT STUDY

H1. Integrating Data by staff and executives significantly affects the adoption of big data in Health Care Institutions.

H2. Understanding data by staff & executives significantly affects the adoption of big data in Health Care Institutions.

H3. Technological and Infrastructure challenges significantly affect the adoption of big data in Health Care Institutions.

H4. The need for more experts significantly affects the adoption of big data in Health Care Institutions.

H5. Regulation Barrier significantly affects the adoption of big data in Health Care institutions.

H6. Challenges in adopting big data have a positive effect on patient satisfaction.

RESEARCH METHODOLOGY-

The ethics clearance has been waived for this research by Graphic Era Deemed to be University, India. The research intends to investigate Delhi's Health Care Industry (HCI) challenges in using big data. To comprehend the obstacles and challenges associated with the implementation of BD in HCI as well as its impact on patient satisfaction, a well-structured questionnaire was developed. A simple Random Sampling method was adapted to collect a sample from every tier of employees because the study's huge population allowed for substantial congruency from the subpopulation. A 5.0 Likert scale was administered to assess the respondents' responses, ranging from "strongly agree" to "strongly disagree." The questionnaire was delivered to the respondents using Google Forms, and responses were requested via their email addresses. Data were gathered from 250 respondents from five hospitals and four clinics located in Delhi. Hence, the scope of the study is limited to the Delhi region. Out of the total sample size of 250 participants, a total of 212 respondents provided complete and filled responses, while the remaining participants provided incomplete responses. Due to the incomplete nature of these responses, they were not included in the analysis for the present study.

TABLE1: DEMOGRAPHIC PROFILE OF HEALTH CARE EXECUTIVES

Characteristics of Respondents	Group	Frequency	Percentage
Age	<35	58	27.36
	36-45	55	25.94
	46-55	51	24.06
	>55	48	22.64
Gender	Female	77	36.32
	Male	135	63.68
Education	Technical	55	25.94
	Graduate	77	36.32
	Post-Graduate	67	31.60
	Others	13	6.13
Front-Line Executive (Admin Staff)		67	31.61
Back-End Executive (Admin Staff)		97	45.75
IT Staff & Executives		48	22.64

Source: Authors Compilation

DATA ANALYSIS AND INTERPRETATION

RELIABILITY ANALYSIS

The reliability analysis is a calculation-based study that also provides information on the correlations between the scale's items and several widely used scale reliability indicators. Using the Cronbach alpha technique, internal consistency and reliability of data were assessed. All values were above a threshold level of 0.7 [26]. Additionally, as stated by Hu et al [27], all dependent constructs had CR values larger than 0.7. The variables investigated were connected and sufficient for testing the hypothesis because the factor loading values fell within the range of 0.68 to 0.91.

EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS:

Exploratory factor analysis (EFA), a conventional formal measuring paradigm, is used when both observable and latent variables are thought to be examined at the interval level. The study variable must pass the KMO test to investigate the factors. Our study's Kaiser-Meyer-Olkin (KMO) value was 0.867, above the threshold level. High values near 1.0 show that the factor analysis is practical when applied to the data [28]. Using the principal component method with eigenvalues greater than 1, Five-factors were extracted, accounting for 70.36% of the variance. Data integration (23.24%), lack of expertise (17.31%), technology and infrastructure (9.15%), data understanding (12.45%), and regulation barrier (8.21%) are these factors. CFA uses SEM to validate the construct and evaluate its impact on endogenous construct [29].

TABLE2: DESCRIPTION OF INDICATOR

Construct	Item Code	Description of variables	F. Loading	C - Alpha	CR	AVE
Data Integration	DI1	Combining of Data affects the adoption	0.83	0.82	0.87	0.74
	DI2	Gathering of Data from several sources	0.87			
	DI3	Transferring Data to requisite sources	0.79			
Lack of Expertise	LE1	Employees lack the technical know-how to use technology, hence fear to adapt new things	0.91	0.83	0.91	0.78
	LE2	The organization has a smaller number of technical experts who can assist other employees	0.88			
	LE3	Employees have difficulty applying technology in real-time due to a lack of experience	0.87			
Technology & Infrastructure	TI1	The cost of buying technology is high	0.87	0.85	0.87	0.68
	TI2	The complexity of technology affects the adoption	0.83			
	TI3	Acquiring infrastructure is costly as an organization does not have adequate resources	0.79			
Data Understanding	DU1	Employees do not have adequate knowledge	0.84	0.83	0.9	0.77
	DU2	Employees lack understanding of data and its linkage	0.91			
	DU3	Employees need proper training to understand	0.88			
Regulation Barrier	RB1	Government rules and regulation	0.82	0.86	0.84	0.64
	RB2	Organizational rules and policies are rigorous to adapt to new technology	0.81			
	RB3	Industry guidelines affect the adoption	0.78			

Adoption of Big Data	ABD1	The value of technology is not known	0.77	0.87	0.88	0.65
	ABD2	Applying technology not known	0.73			
	ABD3	The usage of technology is not known.	0.84			
	ABD4	High cost of technology	0.89			
Patient Satisfaction	PSAT1	Delays in bill Processing affect patient satisfaction	0.81	0.84	0.9	0.7
	PSAT2	Syncing of patient data affects satisfaction	0.84			
	PSAT3	Coding of patient data and linking	0.83			
	PSAT4	Bringing financial and clinical data to one place	0.87			

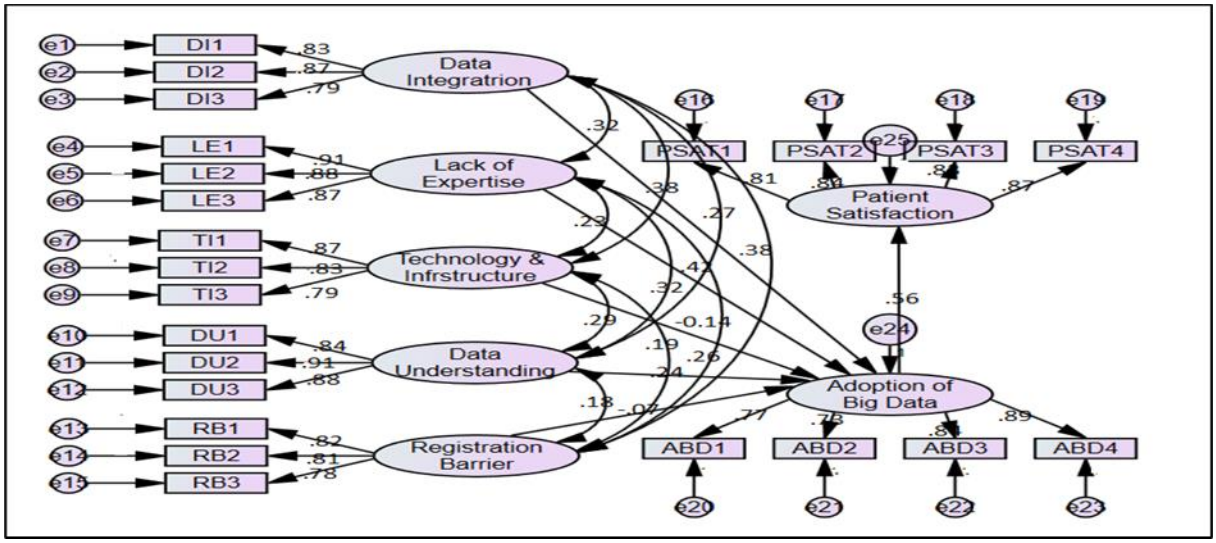
Source: Authors Compilation

TABLE 3: DISCRIMINANT VALIDITY

Discriminant validity	Data Integrity	Lack of Expertise	Technology & Infrastructure	Data Understanding	Regulation Barrier	Adoption of Big Data	Patient Satisfaction
Data Integrity	**0.86**						
Lack of Expertise	0.32	**0.88**					
Technology & Infrastructure	0.38	0.23	**0.82**				
Data Understanding	0.27	0.32	0.29	**0.87**			
Regulation Barrier	0.14	0.26	0.19	0.18	**0.8**		
Adoption of Big Data	0.38	.42	-0.14	0.23	-0.07	**0.8**	
Patient Satisfaction	0.36	0.36	0.18	0.33	0.17	0.55	**0.83**

Source: Authors Compilation

FIGURE2: ESTIMATE PATH ANALYSIS



Source: Authors Compilation

Convergent and discriminant validity meets the requirement of internal consistency from the assessment of the measurement model [30]. The findings of the validity study are displayed in Tables 2 and 3.

STRUCTURAL MODEL AND HYPOTHESIS TESTING

A connection between the endogenous and exogenous variables was made to achieve a model fit using SEM. The final model's parameters were as follows: AGFI = 0.911, CMIN/df = 2.83, GFI = 0.921, and RMSEA = 0.046 [31]. Evaluating the impact of the dependent construct on the independent construct is therefore essential in determining the validity of the hypothesis. Table 4 contains the outcomes of the hypothesis, and Figure 2 displays the path coefficient.

The estimate path coefficient analysis indicates that the biggest apprehension in the adoption of technologies as BD in healthcare organizations are data integration at (β=0.38, P=***), a lack of experience at (β = 0.42, P=***), and data comprehension at (β = 0.24, P=***). Therefore, the suppositions H1, H2, and H4 are accepted. When adopting BD, employees did not place much weight on technology, organizational structure, or regulatory issues. As a result, hypotheses H3 and H5 were disapproved. Additionally, the use of BD significantly impacted patient satisfaction. Therefore, at (β = 0.56, P = ***), the hypothesis H6 is likewise supported. From the data, it can be concluded that patients are more likely to be satisfied if technologies are effectively integrated and used by the HCI to help patients anytime by extracting patient health-related data anywhere.

The findings of this study have important managerial implications for healthcare leaders. Firstly, addressing the challenge of data integration is crucial. Robust data integration strategies and technologies must be developed to aggregate and analyse diverse data sources effectively. This will enable organizations to leverage the full potential of BD in improving healthcare outcomes. Secondly, the lack of expertise in working with BD emerges as a significant barrier. Investments in training and development programs can enhance the data analytics skills of employees, empowering them to utilize BD for informed decision-making and ultimately enhance patient satisfaction. Thirdly, data comprehension plays a critical role. Healthcare professionals need to understand how to interpret and analyse data effectively. Providing resources and support to enhance data literacy among staff is vital for leveraging the wealth of available data. By addressing these challenges, healthcare organizations can unlock the transformative power of BD, leading to improved patient care and satisfaction.

TABLE 4: HYPOTHESIS RESULTS

Hypothesis	Proposed Relationship	Effect	Path Coefficient	Result
H1	Data Integration ----------> Adoption of BD	Direct	0.38***	Accepted
H2	Lack of Expert ----------> Adoption of BD	Direct	0.42***	Accepted
H3	T & I ----------> Adoption of BD	Direct	-0.14NS	Rejected
H4	Data Understanding----------> Adoption of BD	Direct	0.24***	Accepted
H5	Regulation Barrier ---------->Adoption of BD	Direct	-0.07NS	Rejected
H6	Adoption of BD -----> Patient Satisfaction	Direct	0.56***	Accepted

Source: Authors' result analysis

CONCLUSION AND SUGGESTION

BD is a rapidly developing technology that connects various sources to provide vast data and information to satisfy customers. The adoption of BD in healthcare too had several challenges. Our study identified five key factors that impact adoption, including: data integration, data understanding, infrastructure and technology, a shortage of experts, and regulatory barriers. These factors account for a significant portion of the challenges faced. Patients often encounter issues with billing, patient identity, medical records, and doctor evaluation, which can affect their satisfaction. To address these issues, hospitals should prioritize measures such as integrating data effectively and leveraging the expertise of professionals. The study also confirmed that adopting BD can significantly impact patient satisfaction by enabling departments and doctors to analyze patient histories and provide better care. Organizations must invest in infrastructure, training, and

hiring experts to optimize data usage and enhance their marketability. These findings present opportunities for healthcare providers to improve patient satisfaction by aligning their strategies accordingly.

This study is relevant as it addresses the challenges faced by healthcare organizations in adopting BD technologies and highlights the impact on patient satisfaction. By identifying the key factors hindering adoption, the study provides valuable insights for healthcare leaders to make informed decisions and improve patient care delivery. However, one major limitation of this study is the reliance on self-reported data, which may be subject to response biases or inaccuracies. Additionally, the study focused on healthcare organizations within a specific region, which may limit the generalizability of the findings to other settings or countries. Further research with larger and more diverse samples is needed to validate the findings and ensure broader applicability.

Further research could explore the specific strategies and approaches that healthcare organizations can adopt to overcome the identified challenges in adopting BD. Additionally, investigating the long-term effects of implementing BD technologies on patient outcomes and healthcare system efficiency would contribute to the existing knowledge in the field. Furthermore, studying the ethical and privacy implications of using BD in healthcare would be essential for developing guidelines and policies that ensure data security and patient confidentiality.

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CONFERENCE ARTICLE

REVIEW OF TELEMEDICINE AND E-HEALTH: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The fields of telemedicine and e-health have grown in recent years due to advancements in technology and wearable devices. This research aimed to look back at the last 27 years of e-health and telemedicine studies to see how they've evolved. Article details for the selected papers were obtained from the Scopus database. Article details for the selected papers were retrieved using the Scopus database.

Existing data suggests an increasing tendency in the total number of publications, as well as an unusual distribution pattern for both authors and articles. Nine of the most influential researchers and the most often cited works were identified. VOS viewer software underwent keyword, author, and country co-occurrence analyses, as well as co-authorship analysis. According to a country-by-country research review, the United States, Italy, and Germany are the top three countries in article production in telemedicine and electronic health. Doarn (8 publications), Merrell R.C. (7 publications), Giansanti D. (7 publications), and Maccioni G (4 publications) were found to be the most prolific authors in the field of telemedicine and e-health. The study used bibliometric analysis to determine that the keywords "telemedicine," "human," and "e-health" were the most frequently used in the 69 publications chosen for the study.

This study is useful for telemedicine and e-health since it provides a thorough understanding of the literature in these subjects, highlighting the most studied and understudied areas from which to launch future research endeavours.

"This paper was selected from the Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-being on 10th and 11th December 2022 in India organized by Confab 360 Degree."

KEYWORDS

citations, e-health, telemedicine

INTRODUCTION

The health outcomes of various situations, such as an accident or a lifelong chronic health condition, can be greatly influenced by the prompt and effective interchange of information [1]. Innovations in information and communication technology have made it possible for more people to share and access health-related data [2]. The health sector has deployed several Information and Communication Technology (ICTs) worldwide to improve the efficiency of information sharing across all levels of health care. In addition to easing communication between specialists, modern ICTs have made formerly inefficient clinical and consulting services much more cost-effective. In addition to easing communication between specialists, modern ICTs have made formerly inefficient clinical and consulting services much more cost-effective. In addition to easing communication between specialists, modern ICTs have made formerly inefficient clinical and consulting services much more cost-effective. The term "e-health" has come to describe the practice of utilizing information and ICTs to provide medical treatment [3]. When information and communication technologies are applied to medicine, the result is known as "eHealth." Access, activity, and monitoring are the three primary areas where e-health aims to enhance healthcare delivery. Telemedicine is a related but more prevalent concept.[2]. The phrases "telemedicine" and "e-health" are often used synonymously with one another [3].

Telemedicine is a crucial part of the digital transformation of conventional medical practice [4]. Telemedicine is an answer to the problem of underserved areas lacking adequate medical facilities, with the overarching goal of giving universal healthcare access [5]. There has been a worldwide uptick in interest in deploying telemedicine technology among healthcare institutions to deliver care and services [6] better. Over the past two decades, telemedicine's function has expanded to include virtual doctor visits, critical care, mental health monitoring, chronic disease management, and other previously available services through in-person doctor and hospital visits. Rapid growth in the area of telemedicine makes it difficult to keep up with the most current research and developing trends. Fortunately, bibliometric analysis makes it possible to assess a large body of literature in order to identify the most productive authors, articles, and keywords. Even though the term "e-health" was developed far later than telemedicine (and its variants), telemedicine is currently the most talked about topic in the field of "e-health." The area of telemedicine and electronic health has been the subject of numerous systematic literature reviews and bibliometric analyses [7].

According to our understanding, this is the first study to present a bibliometric analysis of telemedicine and e-health literature based on Scopus-indexed papers from the previous decade (2000–2022). This study is distinctive in its incorporation of a thorough bibliometric examination (co-authorship analysis, co-occurrence analysis, and country-wise analysis) [8]. This study aims to determine these three research questions:

1. What is Long-Term Sustainable Growth in telemedicine and e-health based on current research trends?

2. Which are the most influential authors and articles regarding Scopus citations?

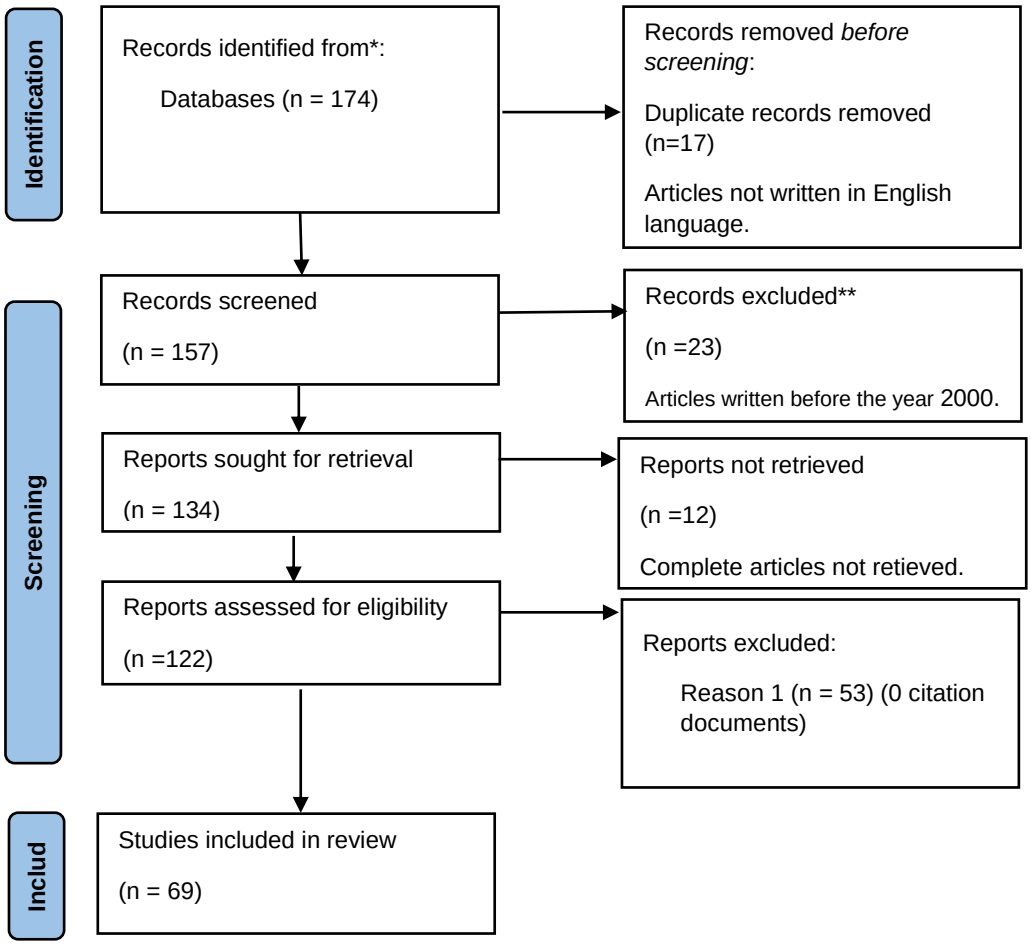
3. What are the predominant authors, co-authors and keywords in the domain of telemedicine and e-health?

METHOD

Selection Criteria of Articles in the Study:

The existing study used bibliometric analysis to review the topics of telemedicine and electronic health. The study followed a specific criterion for the inclusion and exclusion of articles by following a PRISMA flowchart. Articles not written in the English language were excluded from the study. Moreover, the existing study only took into consideration articles written from 1996 until August 2022. Researchers used the terms 'telemedicine' and 'e-health' to do a keyword search in Scopus. Meta-analysis and the "Preferred Reporting Items for Systematic Reviews" (PRISMA) were used to streamline literature search process in the study. [9] (Figure 1). This investigation uncovered 174 documents. One hundred five records were deleted due to their lack of relevance (Figure 1). Sixty-nine documents were discovered in the final database.

FIGURE 1: PRISMA ARTICLE SELECTION GUIDELINES MOHER, ET.AL., (2009)



The bibliometric data (authors, titles, and citations) of 69 documents were exported and saved for future data analysis. Bibliometric analysis was utilized to examine the data. This includes an examination of 'citation analysis,' which refers to the "visualization of commonalities" by reading 'author co-citations' and keywords that appear together [10-12]. Bibliometric analysis was also conducted using VOS viewer bibliometric software, Scopus analytical tools, and Microsoft Excel [12].

RESULTS

The results of a bibliometric analysis of the literature on telemedicine and e-health are presented here. In this study, we answered the three research questions in the following sequence:

LONG-TERM SUSTAINABLE GROWTH IN TELEMEDICINE AND E-HEALTH BASED ON CURRENT RESEARCH TRENDS

Articles from the years 1996–2022 were consulted for this overview. Scholarly interest (Figure 2) in this area did not spike until 2022 (n=23) when 13.21 percent more scholarly works were searched for. In 2018, over 6.32 percent of all articles were on "telemedicine and e-health;" by 2021, that number is expected to rise to 10.34 percent. All 174 articles that were found were used to create the trend analysis.

The geographical locations of the authors were explored (Figure 3) to see whether or not there is a concentration of academic interest in telemedicine and e-health research. Over half of the telemedicine and e-health articles used in this study had authors from only five countries: the United States (15), Germany (11), Italy (15), France (9), and the United Kingdom (7). The fact that this type of work has been produced in seven different countries worldwide demonstrates the widespread interest in the topic (Figure 3).

FIGURE 2: TRENDS IN TELEMEDICINE AND E-HEALTH FROM JANUARY 1996 TO AUGUST 2022 (N = 174).

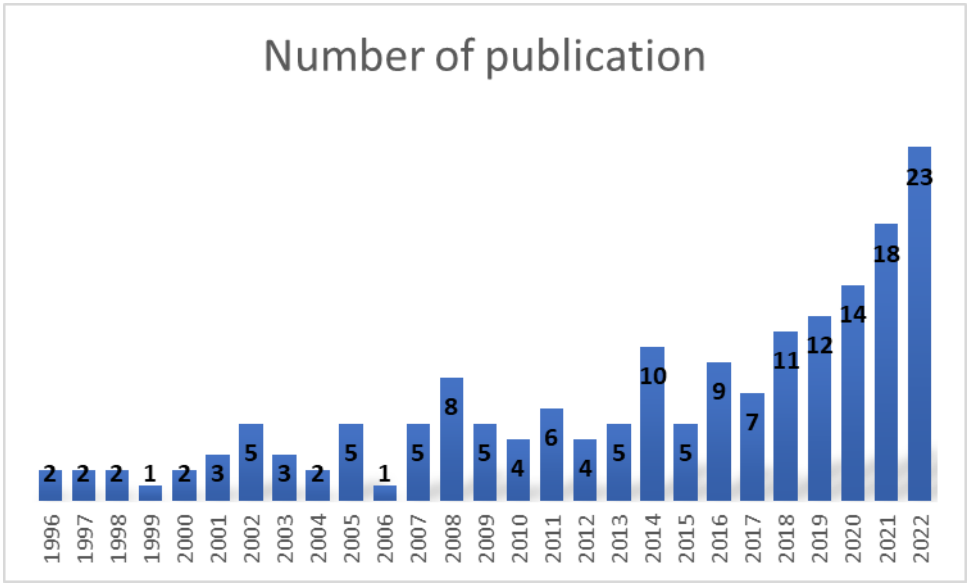
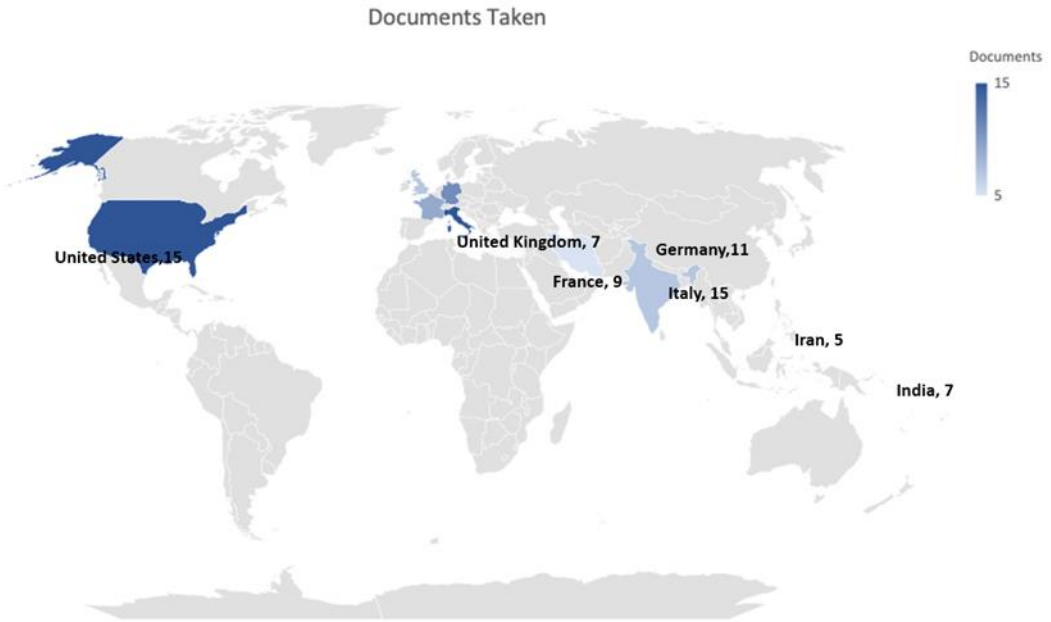


FIGURE 3: CONCENTRATED WORLDWIDE DISTRIBUTION OF TELEMEDICINE AND E-HEALTH, JANUARY 2000–APRIL 2022 (N = 69)



THE MOST INFLUENTIAL AUTHORS AND ARTICLES IN TERMS OF CITATIONS

The results of this author citation analysis can be seen in Table 1 below, which displays data from Scopus. Before anything else, we noticed that 69 authors were listed in our review database (not tabled). This suggests that there is considerable academic interest in this area. However, it is also clear that most contributors (Table 1) publish relatively few works relating telemedicine and e-health. For instance, the most prolific scholar in this discipline, Doarn, C.R. (2014) from the United States, has only published eight articles. The authors' areas of interest range from telemedicine to e-health. These results indicate the creation of an emerging sector of long-term sustainability in telemedicine and e-health, written by authors with various interests and perspectives.

United States (Doarn C.R., Merrell R.C., Latifi R.), Malaysia (Algaet M.A., Milad A.A., Shughatullah A.S.), followed by Italy (Giansanti D., Maccioni G.), Iran (Bahaadinbeigy

K.)are the highly cited countries and authors in the study These highly cited researchers looked into the potential of telemedicine and e-health, wireless personal communication, Wireless telemedicine for e-health services and mobile health (m-health).

As set out in Table 1, the most cited authors in the field of telemedicine and e-health are Della (135 Scopus citations), Tachakra (211), Niyato (94) and Fathehi (89). The current study also required at least three publications by each author for this study; because of this, the table does not include many additional highly referenced authors who only created a single impact paper.

Table 2 displays the top-cited publications in the subject of telemedicine and e-health, as compiled by the citation analysis tool Scopus. There were almost a hundred references in the first six texts [13]. These references are considered to be of fair quality in terms of their applicability to the widespread use of e-health and telemedicine today. "Readers used to gauge influence by the number of citations found in a publication's Impact Factor should be warned that the number of citations found in Scopus is almost invariably much lower for the same document or author mentioned in academic references cited by Google." It is clear from Table 2 that research review articles have played a crucial role in the development of this subject.

TABLE 1. SCOPUS CITATIONS AND PUBLISHED DOCUMENTS LIST THE "MOST INFLUENTIAL AUTHORS AND ARTICLES" ON TELEMEDICINE AND E-HEALTH (N=69)

Author	Country	Documents	Scopus citations	Citation per document	Focus
Doarn C.R.	Unites States	8	39	4.875	Telemedicine and e-health
Merrell R.C.	Unites States	7	34	4.857	Telemedicine and e-health
Algaet M.A.	Malaysia	3	34	11.33	Wireless personal communication
Milad A.A.	Malaysia	3	34	11.33	Wireless telemedicine
Shughatullah A.S.	Malaysia	3	34	11.33	Wireless telemedicine for e-health services
Giansanti D.	Italy	7	21	3	Telemedicine and e-health
Maccioni G.	Italy	4	12	3	m-health
Latifi R.	Unites States	3	12	4	Telemedicine and e-health
Bahaadinbeigy K.	Iran	3	14	4.66	Telemedicine and e-health

PREDOMINANT AUTHORS, CO-AUTHORS AND KEYWORDS IN THE DOMAIN OF TELEMEDICINE AND E-HEALTH.

TABLE 2. TELEMEDICINE AND E-HEALTH, JANUARY 2000-AUGUST,2022 (N = 69): THE MOST "INFLUENTIAL SCOPUS CITATIONS"

Authors	Title	Focus	Cited by	Type of Paper
(14)	"Provisioning quality of service of wireless telemedicine for E-health services: A review."	"Wireless telemedicine and E-health"	23	Review
(15)	"IEEE 802.16/WiMAX-based broadband wireless access and its application for telemedicine/E-health services."	Wireless telemedicine and E-health	94	Exploratory Study

(16)	"Telemedicine and e-Health Solutions for COVID-19: Patients' Perspective."	"Telemedicine and E-health"	45	Experimentation approach
(17)	"HEMAN: Health monitoring and nous: An IoT based e-health care system for remote telemedicine."	E-health care system	33	Conceptual
(18)	"Evaluation of the Education "clinical Telemedicine/e-Health" in the Curriculum of Medical Students at the University of Zurich."	"Telemedicine and E-health"	21	Clinical approach
(19)	"Telemedicine and e-health in disaster response."	"Telemedicine and E-health"	24	Exploratory Study
(20)	"Telemedicine, telehealth or e-health? A bibliometric analysis of the trends in the use of these terms."	"Telemedicine, telehealth and E-health"	89	Exploratory study
(21)	"Quality of Service consideration for the wireless telemedicine and e-health services."	"Telemedicine and E-health"	53	Conceptual
(22)	"E-health and the Universitas 21 organization: 2. Telemedicine and underserved populations."	Telemedicine	22	Exploratory study
(23)	"Mobile e-Health: The Unwired Evolution of Telemedicine"	Mobile e-health	211	Exploratory study
(24)	"What is e-health (2): The death of telemedicine?"	E-health	135	Descriptive Study
(25)	"Increasing the cost-effectiveness of telemedicine by embracing e-health."	E-health	57	Exploratory Study

Niyato (2007) conducted an exploratory study based on "Broadband wireless connection is the foundation of wireless telemedicine and electronic health records." Tachakra (2003) carried out an exploratory study based on mobile e-health and also stated the evolution of telemedicine. Della (2001) documented descriptive research and noted the relevance of e-health. The subsequent highly cited research was conducted by Fathehi (2012) based on telemedicine, telehealth and e-health. The study's findings stated the growing importance of e-health in the coming times.

Authors employed VOS viewer software for analyzing co-authorship to show the telemedicine and e-health field's underlying intellectual structure (Figure 4). Using an examination of co-authorship, the study counted how often each of the 69 review articles cited the others in their list of references. By analyzing the frequency of "author citations," In order to "visualise similarities," the VOS viewer software generates a network diagram. among the co-authors who are cited in the telemedicine and e-health databases. Based on the examination of co-authorship, it seems that academics frequently referenced by others have comparable areas of interest.

FIGURE 4: NETWORK VISUALISATION USED FOR CO-AUTHORS ANALYSIS

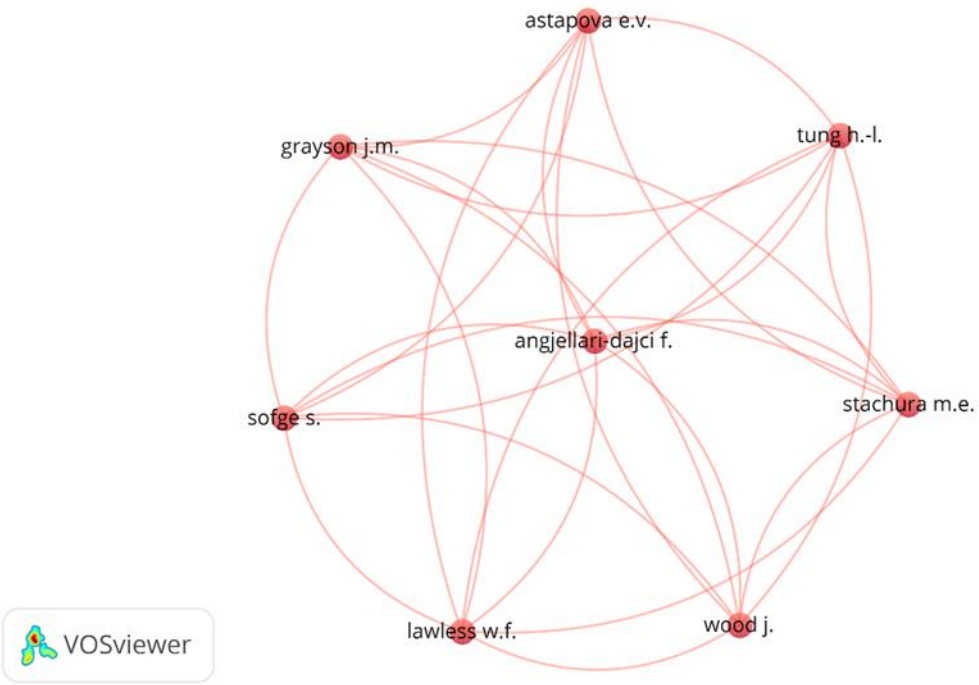


FIGURE 5: NETWORK VISUALIZATION OF MOST OCCURRED KEYWORDS IN THE STUDY

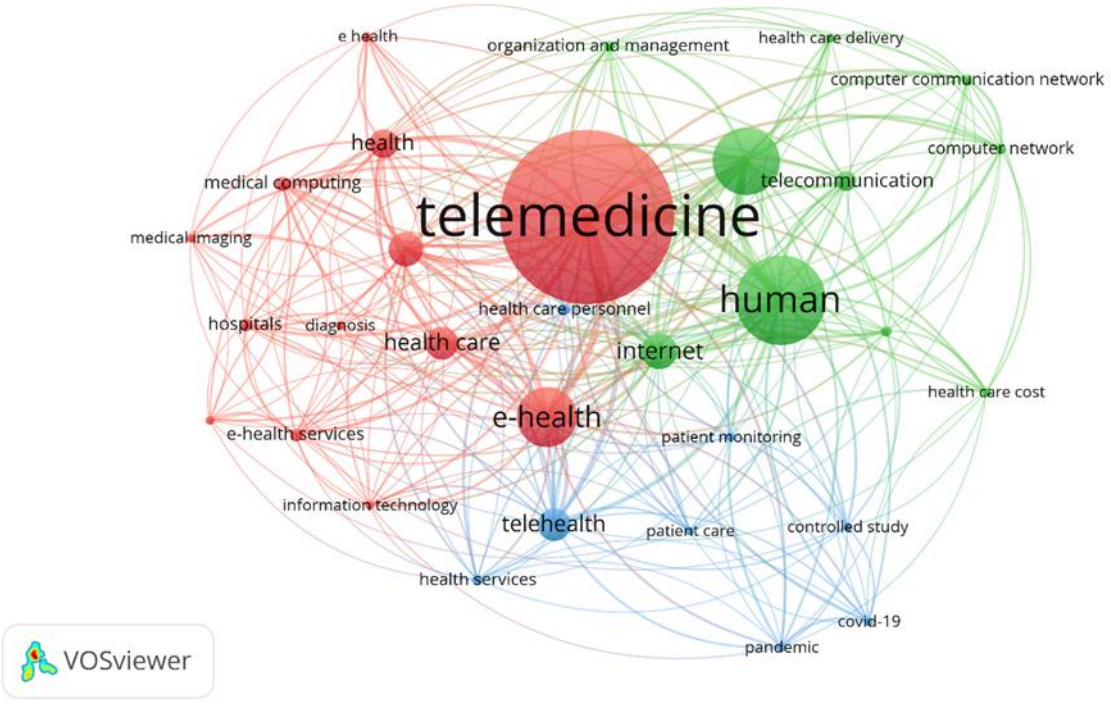


FIGURE 6: OVERLAY VISUALISATION OF MOST OCCURRED KEYWORDS IN THE STUDY

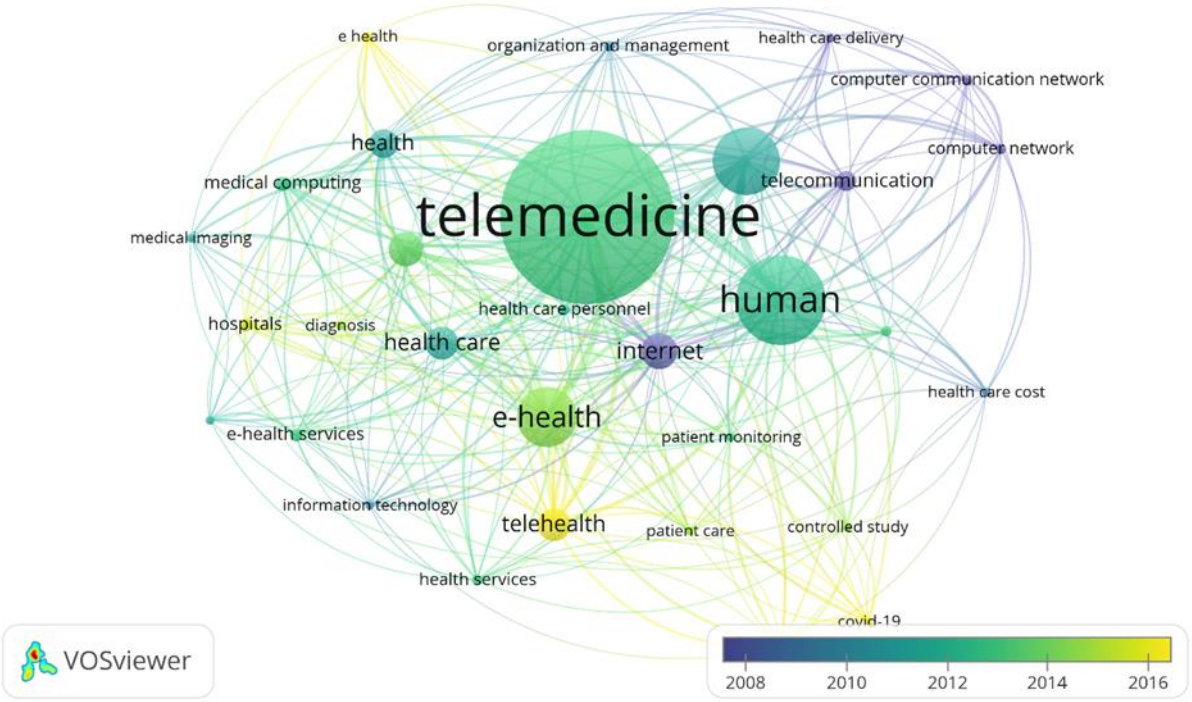
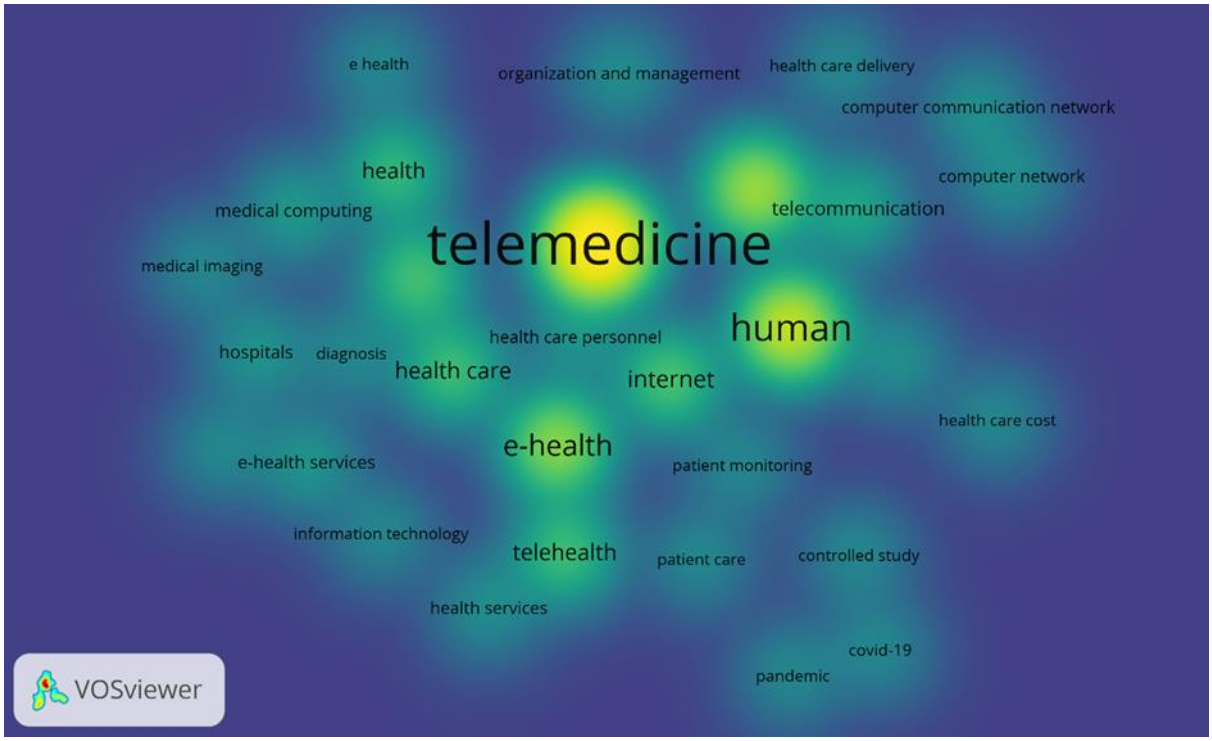


FIGURE 7: DENSITY VISUALIZATION OF MOST OCCURRED KEYWORDS IN THE STUDY



Keyword analysis was performed on the telemedicine and e-health literature. VOS viewer software was used to identify the "most frequent words." The "yellow/lighter tinted bubbles" depict the current focus of researchers in this field, while the "darker bubbles" depict more established concerns. Different maps, such as the density map (Figure 7) or the common network visualisation (Figure 5) or the overlay visualisation (Figure 6), describe the relationships between the topics or themes; for example, "the most frequently occurring keywords" were "telemedicine" (13 occurrences) or "human" (10 occurrences), "e-health" (13 occurrences), "telehealth" (13 occurrences), and "healthcare" (13 occurrences). The keywords used in the articles published between 2008 and 2016 are also shown

on the map as an overlay. The network was visually represented by the maps as three distinct groups. Cluster 1 (red in the Figure 5 network diagram) has 11 items that are keywords (diagnosis, e-health, e-health services, health, health care, hospitals, information technology, medical computing, medical imaging, quality of service and telemedicine). Cluster 2 (shown in green on the network visualisation map) has 10 items that serve as keywords (computer communication, computer network, health care cost, health care delivery, human, humans, internet, organisation and management, telecommunication and teleconsultation). Cluster 3 (in blue on the network map) contains keywords for a total of eight items (controlled study, COVID-19, health care personnel, health services, pandemic, patient care, patient monitoring telehealth). This VOS viewer trend supports findings from keyword occurrence analysis that emphasised the preponderance of telemedicine, human, and e-health terms in the 69 articles chosen for this study.

CONCLUSION

In this bibliometric study, we look at how telemedicine and electronic health care have evolved and what patterns we expect to see in the future. Hundreds of scholarly papers are published yearly, marking its emergence as a new field of study. The United States, Italy, and Germany have the most publications on telemedicine and electronic health care, according to a country-by-country examination of the literature. Doarn (8 publications), Merrell R.C. (7 publications), Giansanti D. (7 publications), and Maccioni G (4 publications) were found to be the most prolific authors in the field of telemedicine and e-health.

Based on a bibliometric examination of the 69 papers, this study found that the phrases "telemedicine," "human," and "e-health" were the most often used in the area of telemedicine and e-health. The findings of this study will be useful to researchers in the fields of telemedicine and electronic health care because it gives a comprehensive knowledge base of the literature in these fields, highlighting both the most studied and understudied areas from which to launch future research initiatives. The famous authors who have published works are also listed in this study. Most studies are undertaken in the United States, Italy, and Germany, but this opens the door for researchers in developing nations to conduct their investigations.

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CONFERENCE ARTICLE

RELATIONSHIP BETWEEN WORKPLACE INCIVILITY, EMPLOYEE PERFORMANCE AND EMPLOYEE ENGAGEMENT IN HEALTHCARE INSTITUTIONS

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ABSTRACT

Workplace incivility is a well-known problem that affects every firm and its environment. Employee engagement may result in physical and mental suffering, impacting how well people perform.

The study aims to ascertain the relationship between employee engagement, employee performance, and workplace incivility. For this, scales of the investigated variables were used to build a well-structured questionnaire. The survey questionnaire was sent out to workers and employees of Health Care Institutions. There were 212 valid responses in total. SEM, or structural equation modelling, was utilized to establish relationships. The study's findings rejected hypotheses H1 and H2 showing workplace incivility (WPI) has a detrimental effect on employee engagement (EENG) (at β= - 0.34, P >.05) and employee performance (EP) (at β = -0.27, P >.05). While the hypothesis that employee engagement positively affects employee performance (H3) shows that employee engagement had a favourable impact on the performance of employees. (at β = 0.36, P< 0.05).

"This paper was selected from the Global Conference on Emerging Technologies, Business, Sustainable Innovative Business Practices, and Social Well-being on 10th and 11th December 2022 in India organized by Confab 360 Degree."

KEYWORDS

employee engagement, employee performance and workplace incivility

INTRODUCTION

In recent years, the burden of healthcare personnel has grown dramatically, particularly since COVID-19, leading to rudeness, exhaustion, violence, and a poor attitude toward work. This is referred to as - workplace incivility (WPI).

Employee incivility impacts an employee's degree of engagement and performance in the organization. [1]

According to the definition of WPI, "Workplace incivility is low-intensity deviant behavior with ambiguous intent to harm the target, in violation of workplace norms for mutual respect.

Uncivil behaviors are characteristically rude and discourteous, displaying a lack of regard for others." [2 p.457]. In the workplace, incivility is defined as rude, disrespectful, degrading, and insulting behaviour. It is common in hospital settings and can spread over a whole workplace. It may have a detrimental effect on the long-term expansion of medical and healthcare organizations. [3] Unfortunately, workplace rudeness significantly impacts workers' emotional and mental health, frequently resulting in exhaustion, diseases, physical complaints, anxiety, and despair among workers. Incivility at work is widespread worldwide and has been shown to affect individuals' and organizations' growth negatively. Individual workplace rudeness can lower employee engagement and negatively impact job performance. [4]

Employee engagement entails our employees feeling pleased and committed to our firm, praising it to clients and customers. Employee engagement, as opposed to employee contentment, directly affects how well employees perform. Genuinely engaged workers significantly influence their businesses in the healthcare sector. Increased patient safety, higher patient happiness, and better treatment result from actively engaged healthcare staff. [5]

Workplace incivility is a sophisticated kind of workplace bullying that harms worker morale and productivity (such as mental health, burnout, turnover rates, and job discontent). [6] Mistreatment at work is common for employees who need more skills and abilities, raising their susceptibility to rudeness. There are many anecdotal accounts of the negative impacts of rudeness in healthcare settings. However, no empirical study has examined this issue among Indian healthcare employees.

Study goals: The present study intends to achieve the following goals:

(i) To determine the influence of workplace incivility on employee engagement and performance.

(ii) To build a link between employee engagement and performance.

LITERATURE REVIEW

According to the literature, workplace rudeness, engagement of employees, and employee performance at the workplace are the three crucial constructs that every firm must comprehend to succeed. Each element must undergo careful evaluation by the healthcare institution. This section also includes all pertinent data published in reputable magazines and journals to establish the link between these constructs.

Research publications, journals, and reports were evaluated (for the last 10 years) to comprehend hospital personnel's perspectives on these studied variables and the elements contributing to work rudeness. A complete summary of the research papers' findings is shown in Table 1.

TABLE1: DESCRIPTION OF THE FINDINGS FROM THE LITERATURE

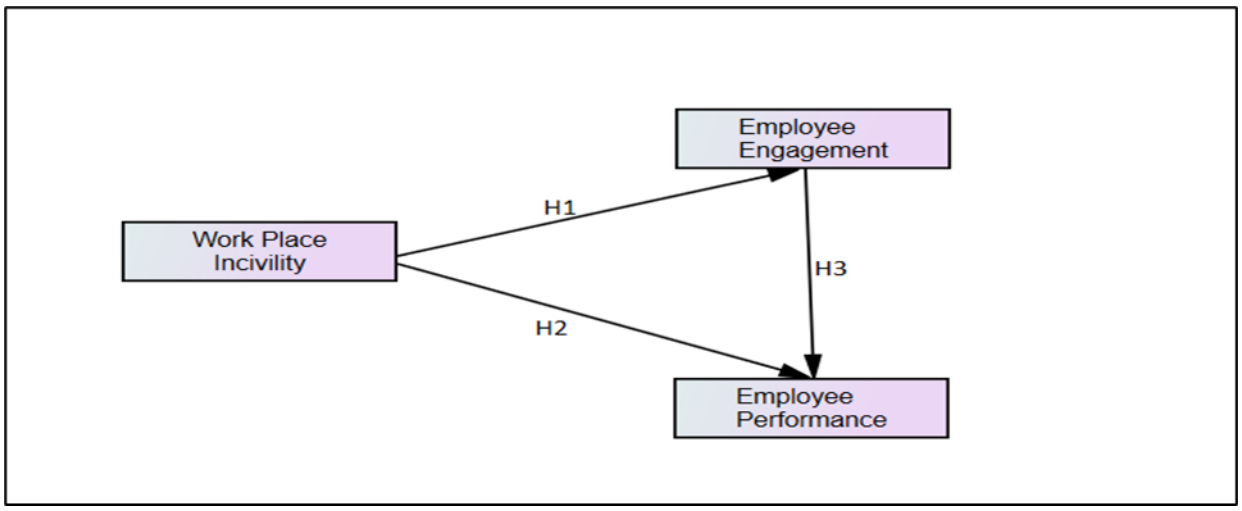
Authors	Description of the findings
[7]	Being rude and unprofessional at work increases the risk of experiencing workplace stress, distraction, dissatisfaction, absenteeism, and low productivity. Additionally, they are less likely to exhibit innovation, job satisfaction, performance, organizational citizenship, and teamwork. These employees are most likely to disengage and tend to leave the firm. Employees who only observe incivility (such as co-workers being maltreated) demonstrate high turnover intention, show less commitment to job roles and have high job burnout
[8]	The author's performed an essential study among Australian health officers. Their findings revealed that their stress levels rise when health officers face incivility, but strong support from seniors mitigates this impact. Incivility negatively affects job engagement, but only in those with poor self-esteem.
[9]	The author discovered that women are more likely than males to see workplace rudeness negatively impacting performance and behaviour.

[10]	Studies show that since workplace disrespect is a significant source of stress for people, it may lead to employees quitting their jobs. Researchers found that exposure to rudeness at work results in physical or psychological disengagement from the workplace. This withdrawal might be seen as actions of complete quitting during the worst times of agony or as absence during minor annoyances.
[11]	The authors thoroughly assessed 214 studies that looked into the definition, causes, and effects of engagement by analyzing 42 research outcomes. Also, Psychological states and organizational variables were considered to be the drivers for the performance of an individual in the organization.
[12]	Allegations of workplace incivility may grow in the modern workplace as traditional norms erode and the concept of appropriate behaviour becomes vague. As companies become more relaxed, altering psychological contracts may result in lower retention and loyalty and increased unprofessional behaviour at work.
[13]	The author analyzed that employee engagement in the organization affects employee performance. Superior customer service, innovation, productivity, minimal staff turnover, a devoted workforce, a solid dedication to their job, a willingness to put in more time, and pride in their work are all correlated with employee engagement.
[14]	The authors discovered that employees must exhibit dedication, professionalism, and initiative to achieve exceptional performance.
[15]	Increased engagement also results in lower turnover, higher quality, fewer mistakes, and cheaper unit costs. They also found that employee involvement has an impact on performance and retention.
[16]	According to a study done by the Chartered Institute of Professional Development, there are differences between businesses and organizations in the elements that influence employee engagement. They also found that companies may utilize no particular motivational factors to stimulate employees' interest and engagement. Because of this, there is no "one-size-fits-all" job, and different companies have different employee engagement elements.
[17]	A study by the authors on employee engagement discovered that effective workplace communication motivates and keeps workers engaged. Employee engagement is influenced by an organization's culture, particularly when that culture encourages creativity and innovation, integration, and strong internal communication.
[18]	According to experts, an organization's management and leadership may indirectly affect employee engagement habits by enabling leaders to foster a sense of trust among their workforce.
[19] [20]	Employee commitment, as well as a sense of self-efficacy, are two benefits of employee engagement. According to studies on the impacts of employee engagement, it can result in better health and attitudes about their jobs and the company. According to the authors' findings, happy workers are healthier and more comfortable overall. Engagement may lead to the development of intrinsic drive, creativity, honesty, non-defensive communication, and ethical behaviour. Employee engagement is an employee's emotional dedication to the company and its goals. Emotionally involved workers are concerned about their jobs and the companies they work for.

[21] [22]	Authors discovered co-workers' rudeness in healthcare facilities in US hospitals. Similarly, other researchers found that incivility negatively impacts nurses' performance, harming patient safety and mental and physical health, causing burnout and creating unsettling relationships between doctors and nurses. The researcher) looked at the incidence of rudeness among nurses at work and found a link between disrespect and surroundings.
[23]	Researchers have occasionally observed that, despite its modest intensity, workplace incivility nonetheless contributes to violence and other growing disputes inside companies. They also emphasized that workplace disrespect can sometimes have a negative impact on not only its immediate targets but also other team members. Therefore, it is no longer possible to ignore workplace incivility in the organization as it affects both employees and the organization.
[24][25][26]	Workplace disrespect can have a variety of effects on existing workers' capacity to fulfil their duties. First, employees subjected to rigour at work might be unable to do all the job-related activities within a minimal range of cognitive alternatives. Employees may have subjective emotional reactions to rude conduct and experience mental deterioration. For instance, negative emotional responses restrict employees' capacity to learn and comprehend several daily duties at once. Their capacity for information retention and execution will also be impacted. As a result, employees who experience rudeness at work are less likely to complete their tasks in the organizer and less likely to achieve resources that are diverted by impolite behaviour. Various types of selective prosecution are available for victims.

Source: Authors Compilation

FIGURE1: CONCEPTUAL FRAMEWORK OF THE STUDY



Source: Authors

Additionally, it is clear from the literature study we completed that no specialized research had been conducted in the past by researchers, indicating a gap in the body of existing knowledge. As a result, a conceptual framework is created to test the study's objectives, as shown in Figure1.

HYPOTHESES: The present research study is carried out to test the following objectives-

H1: Workplace incivility has a positive - effect on employee engagement.

H2: Workplace incivility has a positive effect on employee performance.

H3: Employee engagement (EENG) positively affects employee performance.

RESEARCH METHODOLOGY

The ethics clearance for this research has been waived (on 13-01-2023) by Graphic Era Deemed to be University, India.

A systematic questionnaire was created using the scale developed by [15] [20] and was given to staff working in hospitals, clinics, and pharmacy stores from June 2022 to September 2022. Data from the sample were collected using a practical sampling technique. To determine if the questions were thorough and transparent, a questionnaire pilot study was conducted utilizing the replies of 25 respondents. A structured survey was created using a Likert scale of 1 to 5, where one represents strongly disagree, and five indicates strongly agree. Out of 250 respondents, 212 valid replies were recorded. To comprehend the makeup of the sample population, the participant's demographic information was gathered through descriptive analysis.

Table 2 shows the socio-demographic profile of the sampling unit. The descriptive analysis feature of SPSS 25.0 was used to analyze the socio-demographic data that had been gathered.

DATA ANALYSIS AND INTERPRETATION

With SPSS AMOS 23.0, and SEM, data were analyzed using Likert scale data. Measurement and structural models are the two types of models used in SEM. Three constructs — workplace civility, employee engagement, and employee performance—made up the proposed paradigm. Employee engagement and performance are dependent factors, but workplace incivility is viewed as an independent construct. Confirmatory factor analysis (CFA), as recommended by Byrne [27] in Table 3, assesses the latent constructs

TABLE 2: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE POPULATION

Socio-Demographic Characteristics		Frequency	Percentage
Age	<30	83	39.15
	30-45	76	35.85
	46-60	53	25.00
Gender	Male	149	70.28
	Female	63	29.72
Education	Graduate (Technical / Non-Technical	111	52.36
	Postgraduate (Technical / Non-Technical	56	26.42
	Others	45	21.23
Position	Technical Staff	58	27.36
	Front Desk Executive	47	22.17
	Back End Executive	55	25.94
	Patient Caring Staff	52	24.53

Source: Authors

TABLE 3: RELIABILITY AND VALIDITY ANALYSIS

Construct	Eigenvalue	%of variance	KMO	Bartlett Test
Workplace Incivility	3.21	72.33	0.86	***
Employee Engagement	2.89	74.18	0.81	***
Employee Performance	2.57	73.15	0.82	***

Source: Authors Compilation

CFA was used to assess if the measurement model had a good fit for the data and whether all of the observed variables (also known as indicator variables) accurately reflected the underlying constructs (latent variables). Twenty-One questions, excluding the respondents' demographic information, were utilized to evaluate these three components. The model was re-estimated after three indicators were eliminated due to less factor loading.

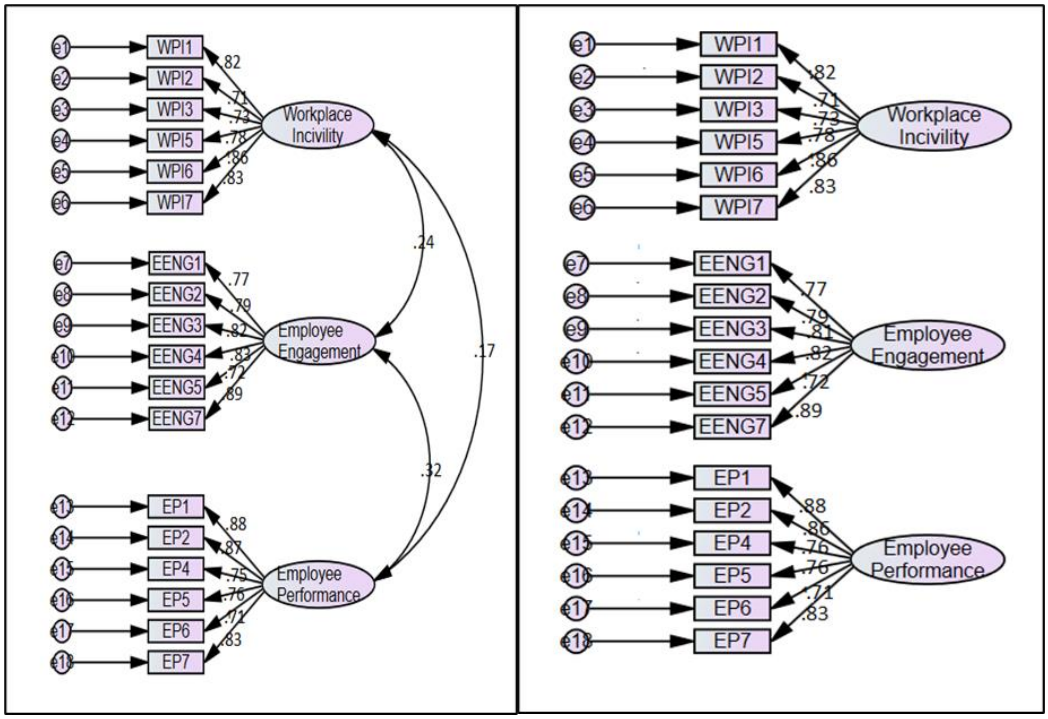
The internal correctness of survey items was evaluated using Cronbach's alpha coefficient. The measurement model was assessed to ensure it had built-in validity and reliability and an acceptable level of model fitness. Following that, the hypothesized causal link between the latent components was examined using path analysis. [27]

TABLE 4: FACTOR LOADING FOR WPI, EE & EP

Indicators	Items used in the study	Factor Loading	P-Value	CR	AVE	References
WPI1	Poor Leadership	0.82	***	0.908	0.62	[10][12]
WPI2	Managers take credit for others' work	0.71	***			
WPI3	Managers talk with rudeness	0.73	***			
WPI5	Managers ignore opinion	0.78	***			
WPI6	Managers avoid consultation	0.86	***			
WPI7	Supervisor insults in an inappropriate tone	0.83	***			
EENG1	The environment is pleasant to work	0.77	***	0.917	0.64	[15][20]
EENG2	The learning environment is sound	0.79	***			
EENG3	Adequate resources provided by management to remain engaged	0.82	***			
EENG4	Timely guidance and direction	0.83	***			
EENG5	Opportunity for growth and development	0.72	***			
EENG7	Flexibility in the workplace to share the workload	0.89	***			
EP1	360-degree feedback is used to assess the performance	0.88	***	0.915	0.63	[6][11][14]
EP2	Quantity/ quality assessed	0.87	***			
EP4	Revenue per employee	0.75	***			
EP5	Timelines of work	0.76	***			
EP6	The target of work achieved.	0.71	***			
EP7	Absenteeism rate	0.83	***			

Source: Author's analysis

FIGURE 2: MEASUREMENT MODEL: WORKPLACE INCIVILITY, EMPLOYEE ENGAGEMENT AND EMPLOYEE PERFORMANCE.



Source: Author's analysis

As shown in Table 5, the initial confirmatory analysis (CFA) suggested that one item needed to be eliminated from each study component to achieve model fit. This was based on modified and normalized residual covariance indices.

Additionally, the items seem not multicollinear based on the Confirmatory factor analysis of the first-order factor measurement model. We looked at composite reliability and average variance. The moderate conflict for the three latent components was 0.62 (WPI), 0.64 (EENG), and 0.63 (EP), which is more than 0.5. Composite reliability for all three constructs were above 0.7 supporting convergent validity. [29]

Discriminant validity refers to how much one measure varies from another and is unrelated to another idea [28]. And was confirmed by checking the diagonal values higher than the correlation. [29] Table 6 makes it clear that discriminant validity is established. Hence, construct reliability (CR), convergent validity (CV), and discriminant validity(dv) is higher since the average variance extracted (AVE) value is greater than the threshold requirement. As a consequence, the model fit is acceptable. [28] Table 7 displays the outcome of the measuring model.

TABLE 5: MEASURED MODEL

Item/Construct	CMIN/DF	CFI	GFI	RMSEA
Workplace Incivility	2.87	0.919	0.911	0.041
Employee Engagement	2.86	0.902	0.913	0.040
Employee Performance	2.86	0.903	0.912	0.042

Source: Authors Compilation

TABLE 6: DISCRIMINANT VALIDITY

Item/Construct	WPI	EMP. Engagement	Emp. Performance
Workplace Incivility	**0.78**		
Employee Engagement	0.26	**0.8**	
Employee Performance	0.34	0.45	**0.79**

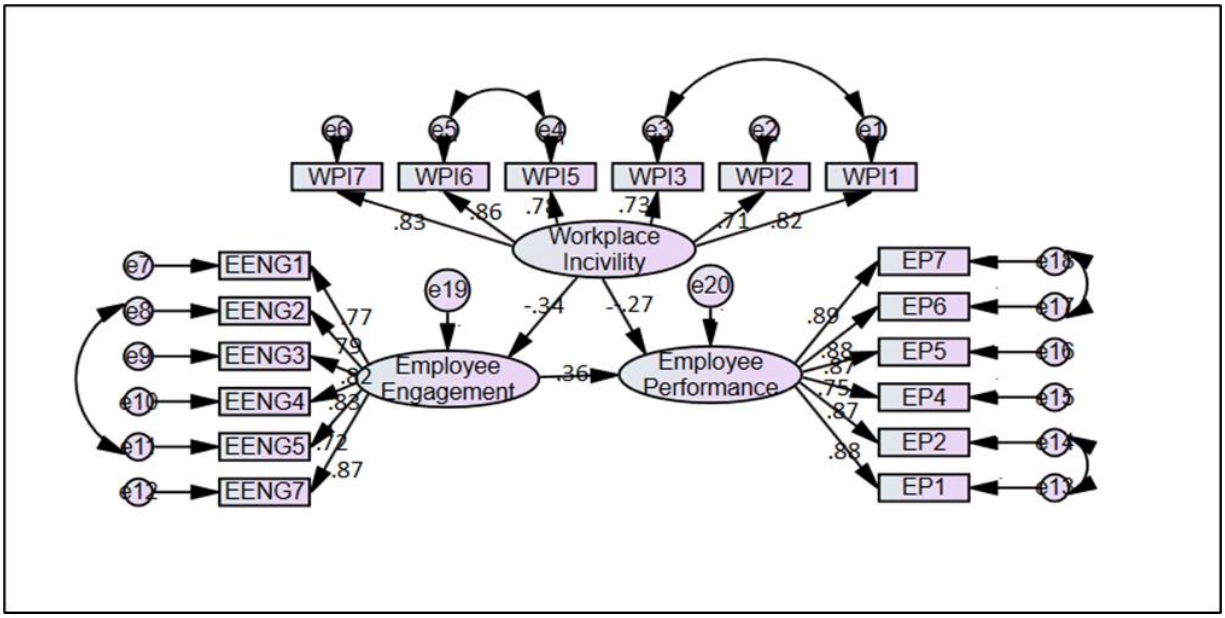
Source: Authors Analysis

TABLE 7: HYPOTHESIS RESULT

Hypothesis	Direct effect	Effect type	Path Coefficient	Result
H1	WPI-→EMP ENGAGEMENT	Direct	-0.34NS	Rejected
H2	WPI→EMP PERFORMANCE	Direct	-0.27NS	Rejected
H3	EENG→ EP	Direct	0.36 ***	Accepted

Source: Authors Analysis

FIGURE3: PATH ANALYSIS



CONCLUSION

The research objective for this study was to determine the link between WPI at work, employee engagement, and employee performance. Confirmatory factor analysis was conducted to establish convergent and divergent validity for this. Employee performance was also evaluated to determine the influence on employee engagement. Employee engagement is negatively impacted by workplace rudeness, according to the direct effect from path analysis (β=-0.34, P>0.05). Hence, hypothesis H1 is rejected. Similar findings were made regarding the direct impact of workplace incivility on worker performance, which was shown to be unimportant at β=-0.27, P>0.05. As a result, hypothesis H2 is likewise rejected. Therefore, it can be concluded that workplace rudeness in a health business must be seriously addressed to avoid harming employee engagement and productivity. Additionally, it was discovered that employee engagement positively impacts employee performance, supporting hypothesis H3 at (β=0.36, P 0.05).

IMPLICATIONS OF THE STUDY

This research suggests that managers should speak with employees and solicit their opinions on issues rather than only providing working conditions and pay to increase employee engagement and performance. Additionally, they must treat employees respectfully when they speak out to enhance working conditions and enable on-time performance.

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CONFERENCE ARTICLE

HEALTH BASED QUALITY LIFE AND THE FINANCIAL BURDEN AMONG THE PEOPLE OF INDIA EXPERIENCING CHRONIC DISEASES

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ABSTRACT

Financial burden influences elderly individuals' health-related quality of life (HRQoL). Very little is understood concerning the association between financial strain and HRQoL in vulnerable groups. This study aimed to examine the relationships among financial load and HRQoL of Odisha State, India who suffer from chronic illness, along with cancer. In this cross-sectional investigation, 72 Citizens of Odisha (aged 60-89) with one or maybe more chronic diseases took part in a randomized preliminary trial. We investigated financial burden components using factor analysis. A 27-point FACT-G (Functional Assessment of Cancer Therapy-General) was applied to measure HRQoL.

The correlations among financial burden and HRQoL sub-dimensions were investigated using multiple linear regression. The factor analysis showed three financial burden constructs: health costs issues, financial burden medication compliance, and monetary stress.

Financial burden was related to lower HRQoL throughout various areas in this research of older adults of Odisha with chronic conditions.

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KEYWORDS

health related quality of life, financial burden, chronic disease, medical cost, vulnerable community

INTRODUCTION

People suffering from chronic illnesses have continuing financial responsibilities, seek medical attention, and face a substantial financial burden [1, 2]. Financial obligations include food instability, a housing crisis, a need for more drug resources, an unwillingness to get medical attention, and an absence of healthcare. Financial burden could also manifest itself in the form of lower earnings or jobless following the discovery of a significant health problem, so this weight can remain across decades when people find it difficult to work again [3, 4]. Furthermore, when the illness worsens or patients are treated with other medical concerns, the financial burden might worsen [5-8]. According to the National Health Interview Survey (2015-2017), people aged 18-64 face a financial burden in the United States (U.S.). Some with lesser academic achievement and more medical issues had a more considerable financial burden from healthcare [9]. Furthermore, underprivileged groups are more prone to monetary difficulties and fears that have a detrimental influence on their lives.

Interestingly, Odisha makes up 3.4% of the Indian population. Having lesser economic status, a shortage of work, residential instability, and medical disparities are more exposed, including financial and health inequality [10]. Odisha faces a significant financial burden regarding medication due to the absence of comprehensive medical insurance. People in Odisha who rely on medical facilities have a higher prevalence of chronic illnesses, often dealing with one or multiple severe health conditions. Furthermore, Odisha people could face significant obstacles in health coverage if people do not have a regular supply of health insurance (such as no general practice provider); it could be mainly attributable to certain Odisha people having the lowest earnings or literacy levels, preventing them from losing their work because of health issues all of that restrict them financially [11].

The financial burden considerably influences health-related quality of life (HRQoL) in Odisha and is becoming more prominent when coping with chronic illness and health care. People's capacities to sustain interpersonal and physical functioning and emotions as a vital aspect of daily life and good life are referred to as HRQOL [12]. Patients suffering from a continuing, chronic condition may face an exponentially increasing economic burden due to their sickness and healthcare expenditures. Treating a chronic disease may be stressful, especially when the financial burden forces people and their families to confront painful choices about whether or not to seek medical treatment according to their earnings [13]. People who describe hardship, unemployment, and funds issues are also more prone to depression disorder than individuals who are not suffering such difficulties [14, 15].

There have been reports of relationships between financial burden and HRQoL results. The cancer-based financial burden is widespread across people with cancer. According to studies in patient care, it is linked to decreased HRQoL in the interpersonal, physical functioning, and emotional categories. There is limited information regarding these interactions between people with chronic conditions and much less for susceptible people of Odisha. Nevertheless, older adults with many chronic diseases are significantly more prone to have low HRQoL [16] and a pessimistic life perspective in general. [17, 18] Their unhappiness might grow more acute, with depressive symptoms occurring practically daily. Health disparities experienced by vulnerable communities can exacerbate mental distress [19].

Even though numerous studies have been published regarding financial burden in connection to psychological and mental hardship (e.g., anxiety, depression) [20] within and between cancer patients, there is a lack of research to assist us in comprehending the remarkable impacts of such burden for suffering from chronic ill Odisha populations suffering from a variety of chronic sicknesses. Throughout this research, we looked at the relationship between financial responsibility and HRQoL in older people of Odisha with chronic conditions.

DESIGN OF A METHODOLOGY

This study employed baseline data of cross-sectional analysis from a pilot experimental control trial, and the research methodologies have been available elsewhere. The KIIT Deemed to be University's Ethics Committee approved this work (Ref. KIIT-DU/KSFH/2023/454). Before participation in the study, respondents were vetted and after all verification the respondents were allowed to give their responses and they were given Rs. 1,000 gift cards as a mark of gratitude for expressing their time and views.

SETTING FOR RESEARCH

Respondents in this research lived along the tribal belt of Odisha. This area ranks among the poorest in the state of Odisha; several elderly Odisha residing in this zone have significant differences in food, housing, income insecurity, staying near the Indian poverty line, and without sufficient medical coverage [21-23].

CRITERIA FOR SELECTION

72 Odiyas (respondents) with chronic conditions participated in this research (i.e., those diagnosed with chronic disease or undergoing some treatment). Respondents became qualified if individuals self-identified as being from Odiya, were older than 50 years, and had any chronic medical disorders (e.g., stroke, renal/liver failure, hypertension, diabetes, HIV, heart disease, chronic disease, and cancer).

SAMPLING

Selection of respondents from tribal areas of the state of Odisha, involved a purposive sampling method being employed in a group method. Engaging with social ties and giving a chance to gain knowledge about Advance Care Planning (ACP) were used to select respondents for this research [22]. Individuals were recruited via meetings with governmental bodies, social assistance programs, below-poverty-line housing complexes, and grocery shops. Participants were initially provided with details on the research through the selection process. Participants were then informed if they wanted to participate. Individuals who showed willingness were engaged at the time. Several people asked that we approach again afterward. Participants gave their contact data and then were after that contacted by phone. Participants have also been provided an informative brochure and encouraged to distribute it to anyone else who may be willing to participate, who afterward reached us by telephone. Eligible participants were checked by the research adviser to see if they satisfied the eligibility requirements. Two researchers fluent in Odia and Hindi considered who delivered interview guide questionnaires through the telephone or by a person. Table 1 shows the financial burden. (8 are supplied in Hindi, 59 in Odiya, and 5 in both languages).

MEASUREMENT TOOLS

Medical condition and socio-demographics are assessed, and personal data comprised marital status, primary language, health insurance, gender, education, birthplace, and age. Chronic illness was examined using self-declaration. Respondents responded if they suffered from chronic diseases, ranging from experiencing just one ailment to having several co-morbid disorders, up to four. Hospital treatment in the previous six months was measured by inquiring respondents, "In the past six months, had already spent 24 hrs in a clinic as a patient?" with answer choices of "Yes" and "No."

TABLE-1 DESCRIPTIVE STATISTICS OF RESPONDENTS ON FINANCIAL BURDEN

Variable		Categories	Frequency	Percentage
Job Position		Presently working	8	11.1
		Jobless	42	58.3
		Retired	22	30.6
Healthcare Bills		I am concerned regarding the expense of hospitalisation.	42	58.3
		Have you had fears regarding the expenses of treatments?	36	50.0
		Have you had issues concerning the expenses of hospitalisation?	32	44.4
		Could your finances restrict you from receiving the care you require?	22	30.6
		Could your financial state restrict you from processing your treatments?	22	30.6
		Have always been you willing to pay for all of the treatments recommended by your doctor?	8	11.1

Salary Concerns	Are you going to have any cash left when the months end?	59	81.9
	Are you struggling to pay your expenses?	13	18.1
Money Considerations States	Are you concerned regarding the present economic situations?	44	61.1
	Did you believe the present monetary status will improve drastically?	21	29.2
	Can you describe the economic position is deteriorating?	7	9.7

Financial burden. We looked at financial burden utilizing questionnaires derived from research by Walker (2007) that looked at the impact of financial burden on life quality in economically poor cancer women. We examined financial responsibility in this research employing the underlying principles: details relating to work background, health care cost, pay issues, and monetary stress. The inquiries below were used to implement every notion. Respondents were questioned about their job situation: "Are they presently hired?" (Yes, working; no, jobless; and no, departed/retired). Details on healthcare bills considered: (Yes/No): "I am concerned regarding the expense of hospitalization."; "Have you had fears regarding the expenses of treatments?";"Have you had issues concerning the expenses of hospitalization?"; "Could your finances restrict you from receiving the care you require?"; "Could your financial state restrict you from processing your treatments?"; and "Have you always been willing to pay for all of the treatments recommended by your doctor?" Inquiries about salary concerns considered: (Yes/No): "Are you going to have any cash left when the month end?" "Are you struggling to pay your expenses?" Inquiries about money monetary stress: (Yes/No): "Do you concerned regarding the present economic situation?" "Did you believe the present monetary status will improve drastically?" and "Can you describe the economic position is deteriorating?" (See Table 1).

Quality of Life concerning Health. The Functional Assessment of Cancer Therapy-General (FACT-G) is a frequently employed evaluation of HRQoL in people with cancer, encompassing fundamental HRQOL dimensions in the social/family, physical, functional well-being, and emotional contexts [23]. For each of the 27 questions, the FACT- G employs a Likert scale of 5 points; responses vary between 0 (Not always) to 4. (Very much). Social/Family Well-Being (SFWB), Physical Well-Being (PWB), Functional Well-Being (FWB), and Emotional Well-Being (EWB) components were combined. The PWB (7-item scale, potential ranges 0 to 28) measures physical functioning, pain, nausea, and energy. The SFWB (7-item scale with a potential ranging of 0 to 28) measures sentiments of closeness to peers, emotional assistance from the family, and pleasure with family interactions. EWB (6 subscales, potential ranging from 0 to 24) concerns being unhappy, scared, giving up hope, having problems managing, being concerned regarding the condition worsening, and being concerned about death. The FWB (7-item scale with a potential ranging of 0 to 28) examines the willingness to function, find happiness, tolerate sickness, relax usually, enjoy pleasurable activities, and be satisfied with one's life quality. The FACT-G overall rating spans from 0 to 108, with larger numbers suggesting significantly better HRQoL. While significant study has supported the application of the FACT-G in investigating HRQoL in people with cancer, there has been little study on HRQOL and patient groups with chronic disease. According to a specific study, the FACT-G can be utilized appropriately with older adults with chronic diseases [24].

STATISTICAL EVALUATION

We began by looking at the ranges of HRQoL sub-dimensions and total well-being ratings. Adversely phrased questions were reversed encoded before totalling every construct and average well-being, with higher scores indicating greater HRQoL. The content validity of the elements in the subdimensions and the total score were assessed using Cronbach's Alpha. Furthermore, we identified components clustered closely concerning the financial burden queries using exploratory factor analysis (EFA), including an orthogonal rotation." The FA contained 11 measures estimating the age (in years) wise financial burden. We utilized a factor loading criterion of 0.5 and preserved factors with eigenvalues more significant than 1.0, as well as the regression scores for all three components that appeared for inclusion in the regression analysis. Cronbach's alphas were generated for every scale item to measure each component's internal reliability. The study then moved five multiple linear regression analyses to look

at the associations among the financial burden factors that have been recognized in the factor analysis and the total score of FACT-G, in addition to the four subscales of FACT-GSFWB, PWB, FWB, and EWB while controlling for unified and dominant variables such as demographics, comorbid health issues, and occupational condition.

RESULTS

AS set out in Table 2, most of such 72 Odiya respondents in the survey were female (n = 61), presently unmarried (n = 53), and graduated from higher education (n = 44). More than 50% of patients confirmed by themselves that they are experiencing two co-morbid health issues, with 41% experiencing three or even more.

The complete well-being aggregate value on the FACT-G (consistency reliability, Cronbach's alpha a) was used to represent HRQoL in Table 3, and well-being HRQoL was shown (ranging 68-110, M = 70.2., SD = 17.64, = 0.931). The FACT-G scores of a subscale for SFWB varied between 1 to 23 (= [0.817]), PWB varied between 4 to 23 (= [0.864]), FWB varied between 2 to 23 (= [0.897], and EWB went between 3 to 21 (= [0.832]).

FINANCIAL BURDEN

Factor Analysis with a cut-off of 0.50, the FA on the 11 elements indicating financial burden created three components composed of 9 parts; 2 elements failed to load on either of the components (Table 4).

TABLE-2 RESPONDENTS CHARACTERS (N=72)

Samples Character	Categories	Number, Mean	Percentage or Range
Age		67.72	60-89
Gender	Male	11	15.28
	Female	61	84.72
Marital Status	Married	19	26.39
	Unmarried	53	73.61
Education Background	Above high School	44	61.11
	Less or up to high school	28	38.89
Insurance Coverage (Health)	Yes	58	80.56
	No	14	19.44
Types of Coverage	Government Scheme	52	72.22
	Private Company	16	22.22
	None	4	5.56
Critical Health Condition (No. of Times)	1	24	33.33
	2	28	38.89
	3	8	11.11
	4	12	16.67
Stay in hospital for last 6 months	Yes	41	56.94
	No	31	43.06

TABLE-3 SUBSCALE AND TOTAL VALUE OF QUALITY OF LIFE

Subscale of Well being	Abbreviation	n	a	M	SD
Social/ Family	SFWB	72	0.817	15.33	4.92
Physical	PWB	72	0.864	21.06	5.61
Emotional	EWB	72	0.832	18.67	5.39
Functional	FWB	72	0.897	15.14	6.73
Sum Score	WBSS	72	0.931	70.2	17.64

TABLE-4 FINANCIAL BURDEN A FACTOR ANALYSIS

	Statement of Items	Item	1	2	3	Means	SD	a
Concerns for medical Bill	I am concerned regarding the expense of hospitalisation.	11	0.887			0.61	0.524	0.817
	Have you had issues concerning the expenses of hospitalisation?	3	0.837			0.52	0.511	
	Have you had fears regarding the expenses of treatments?	4	0.749			0.56	0.519	
Financial Burden for Adherence to Treatment	Could your finances restrict you from receiving the care you require?	1		0.766		0.31	0.501	0.701
	Have always been you willing to pay for all of the treatments recommended by your doctor?	5		0.739		0.22	0.422	
	Could your financial state restrict you from processing your treatments?	2		0.701		0.32	0.481	
Monetary Stress	Are you concerned regarding the present economic situations?	9			0.801	0.57	0.573	0.707
	Are you going to have any cash left when the months end?	7			0.768	0.81	0.497	
	Are you struggling to pay your expenses?	6			0.731	0.41	0.461	
	Eigenvalues		3.441	1.334	1.261			
	Percent variance		41.090	16.573	14.617			
	Number of Items		3	3	3			

The three components were kept with 1.0 as more significant as a cutoff eigenvalue, with 70.23% of shared variance. The three components were characterized as follows:

- Healthcare Cost Aspects, shown by three parts (= [0.817])
- Financial Burden Medical Compliance constructs, demonstrated by three parts (= [0.701])
- Monetary Stress, shown by three parts (= [0.707])

The items' mean of every component represents the minor common Financial Burden issues. Bartlett's sphericity test result was 179.354 (p =.001, df 36), suggesting the eligibility to maintain an FA. The Kaiser-Meyer-Olkin (KMO) was 0.746, which was sufficient for FA.

FINANCIAL BURDEN REGRESSION ANALYSIS FOR HRQOL

Table 5 depicts the findings of five multiple regression studies wherein the study regressed the overall FACT-G rating and all of the FACT-G sub-dimensions on the components of healthcare expenditure related to financial burden adherence to treatment and monetary stress. The first regression analysis (F [9,62] = 2.65, p.001) described 33.7% of the variation within FACT-G overall points. Being elderly, experiencing financial burden adherence to treatment, and currently suffering monetary stress have all been adversely linked with overall FACT-G values after adjusting for hospitalizations, gender, age in the last six months, and health coverage position. These variables were related to poorer FACT-G ratings. Surprisingly, seeking health expense worries was unrelated to the FACT-G rating or sub-dimensions. Furthermore, neither factor was significantly associated with the EWB subscale.

TABLE-5 HRQOL AND FINANCIAL BURDEN REGRESSION ANALYSIS

	Social Well-being			Physical Well being			Functional Well-being			Emotional Well being			Factor Total Score		
Summary of model															
F		2.772			2.314			3.416			0.947			2.65	
R2		0.304			0.271			0.322			0.171			0.34	
P value		0.009			0.039			0.007			0.561			0.01	
df		9,62			9,62			9,62			9,62			9,62	
N		72			72			72			72			72	
Covariates															
	SE	P	β	SE	P	β	SE	P	β	SE	P	β	SE	P	β
Age	0.113	0.033	-0.247	0.113	0.339	0.121	0.112	0.312	-0.119	0.091	0.408	-0.08	0.31	0.49	-0.3
Gender	1.86	0.764	-0.764	1.86	0.809	0.462	1.84	0.067	3.21	1.63	0.452	1.58	5.29	0.27	4.97
Hospitalised in last 6 months	1.63	0.552	-1.26	1.63	0.564	1.25	1.61	0.527	-1.38	1.43	0.931	-0.24	4.69	0.64	-1.62
Medical coverage	3.41	0.551	-2.71	3.41	0.866	-1.15	3.37	0.627	-2.13	2.98	0.663	-1.81	9.87	0.6	-7.33
Financial Burden															
	SE	P	β	SE	P	β	SE	P	β	SE	P	β	SE	P	β
Employment position															
Jobless	2.34	0.402	-2.07	2.34	0.312	-2.45	2.34	0.08	-3.64	2.07	0.237	-2.94	6.89	0.22	-9.67
Retired	2.68	0.148	-3.98	2.68	0.039	-5.28	2.66	0.004	-7.31	2.49	0.337	-3.72	7.88	0.02	-18.4
healthcare bills	0.755	0.207	0.971	0.755	0.476	-2.59	0.821	0.834	0.317	0.572	0.719	-0.24	3.12	0.89	0.617
Financial Burden Adherence to treatment	0.791	0.088	-1.44	0.791	0.003	-2.12	0.837	0.031	-1.83	0.549	0.725	0.882	3.38	0.02	-6.34
Monetary stress	0.877	0.011	-2.06	0.877	0.241	-1.36	0.739	0.027	-2.74	0.637	0.088	-1.37	3.67	0	-5.91

The second regression model (F[9,62] = 2.314, p =.039) of the variation in PWB described 27.1%. Retiring and financial burden influence on healthcare were adversely linked with PWB ratings after adjusting for hospitalizations, gender, age in the preceding six months, and health coverage position. PWB decreased by 2.12 units (SE = 0.791) for every one-unit rise in the financial burden influence on medicine component value.

The third regression model (F[9,62] = 2.772, p =.009) identified 30.4% of the variation in SFWB. Financial stress was related to lower SFWB ratings after adjusting for hospitalizations, gender, age in the preceding six months, and health coverage position. SFWB decreased by 2.06 units (SE = 0.877) for every one-point rise in monetary stress component value.

The fourth model of regression identified 17.1% of the EWB variation (F[9,62] = 0.947, p =.561). Although hospitalizations, gender, age in the preceding six months, and health coverage position have all been controlled for, neither of the financial burden characteristics was linked to EWB.

The fifth regression model identified 33.7% of the FWB variation (F [9,58] = 2.649, p =.001). When hospitalizations, gender, age in the preceding six months, and health coverage position have all been controlled for, getting older, financial burden adherence to treatment, and monetary stress have all been linked with FWB. One-point rises in the financial burden adherence of treatment component rating were connected with such a 1.83-unit (SE 0.837) drop in FWB. A one-point rise in the financial stress component level was significantly related to a 2.74-unit (SE = 0.739) reduction in FWB. Due to the worsening of FWB as the factors rose.

DISCUSSION

Throughout this research, we examined the association between HRQoL and financial burden in elderly Odiyas with chronic illnesses. In summary, Financial Burden, Adherence to Treatment, Monetary Stress, and getting retired were connected with HRQOL, although Healthcare Expense Issues did not. Significant statistical relationships exist between HRQoL and Financial Burden Adherence To treatment in Functional and Physical Well-Being sub-dimensions, but not for the Well-Being of Social/ Community and Mental. The Financial Burden Adherence to Treatment component shows that individuals had difficulties paying for medications, obtaining the required treatment, or acquiring drugs recommended by doctors. In this negative connection, there is a fall in the well-being of functional and physical with an increase in Financial Burden and Adherence to Treatment. Financial Burden Adherence to Treatment was found to be adversely connected to respondents' Physiological Well-Being, which meant they had problems with fatigue, experiencing discomfort, unwell, or sickness, experiencing difficulties fulfilling the demands of someone's household, were troubled by medication adverse reactions, and also being compelled to devote time spent lying down. Financial Burden Adherence to Treatment was found adversely connected to Functional Well-Being respondents, indicating that they had been unable to take a job, had difficulties experiencing life or doing the work they generally are doing for pleasure, had trouble reconciling the disease, had sleep problems, or have been dissatisfied with their existing HRQoL. Our earlier study looked into the association between HRQoL and financial burden between people with Odiya cancer and discovered a significant statistical link between monetary problems and lower well-being Emotional, affective, and functional. The results of this analysis align with the previous studies on this topic; for instance, the cancer-based financial burden between neck cancer and head victims was strongly associated with worse well-being emotional, functional, and physical. Our findings add to the increasing collection of information that financial burden is related to worse HRQoL in people with chronic conditions [25]-[27].

Nevertheless, the research with elderly Odiyas found that, despite a significant statistical link between Financial Burden Adherence To treatment and the well-being of functional and Physical, Monetary Stress remained the only factor connected to the well-being of functional and Social/Family. The sensation of anxiety regarding one's present economic status is known as monetary stress. Most survey participants (68%) reported having no cash available towards the month's end, reflecting the financial situation. These worries have a detrimental impact on individual connections and social well-being. People suffering monetary stress may experience fewer ties with the primary supporting people, like family members and friends, as well as poorer people's understanding of and openness regarding the condition.

This research never connected the financial burden to the FACT-G sub-dimension of Psychological Well-Being. Whereas prior studies have found a link between financial burden, psychological well-being, and emotional distress [20], especially among people with cancer, the research was not to examine such [28]. Psychological issues sometimes compound the pairing of financial pressure and low HRQOL, although such was hardly the case in our research. Individuals may have adapted cognitive skills that help people deal with financial stress and chronic disease. Although economic concerns tend to be relevant

while coping with chronic conditions, they are unlikely to be connected to Odiyas persons' psychological well-being as defined by the topics given in this research (For example, whether you experience depression or worried, give up hope, are concerned over expiring or that your illness will worsen, or are you comfortable the way you are adjusting? Odiya people with chronic diseases may previously confront different problems that render people susceptible (e.g., low pay and an absence of medical coverage) [10], implying why individuals have learned to cope with these concerns throughout their lives in the past. Furthermore, Odiya cultural practices must be considered because many are inclined to recognize their challenging situations and place them all in God's eyes in an attempt to adapt. Odisha people also likely choose a family-centered strategy for chronic illness support [29]; hence, maintaining parental involvement may mitigate the overall psychological state of a financial burden.

Whereas earlier studies have corroborated similar results, our research emphasizes the perspective of elderly Odiyas with chronic illness. Elderly Odiyas under medication for anyone or maybe more chronic disease might be increasingly prone to financial burden, compromising their HRQOL via well-being through emotional, functional, and physical. The inability to spend money on health care or medicines might harm daily HRQOL. Response from a financial burden to deal with a chronic health situation is frequently linked with numerous different problems, a form of spiraling out of control impact caused by various issues in well-being and illness affecting professional, social, and day-to-day life that are difficult to deal with. While dealing with the vulnerable communities included in this research, the consequences of financial burden seem to be particularly essential to address (for instance, elderly Odiyas that are surrounded by various co-morbid chronic situations). People towards the final stages of their lives who seem severely sick and have spent their monetary capacity may require greater intensive hospital attention, raising their financial burden by raising medical expenses and diminishing household economic capacity" [30]. Aged and disabled Odiya people with chronic diseases and their dependents describe many barriers to medical treatment and financial burdens. Moreover, individuals face challenges in various groups due to dealing with and treating a chronic condition. The above extra medical care constraints are causes of stress that might cause discomfort, increasing the challenges of staying with more than one chronic condition.

Addressing the issues while they emerge (for example, to enhance decision-making, manage compliance, and minimize emotional discomfort), medical services practitioners must be conscious of the effects of a financial burden on HRQoL with elderly Odiyas with chronic medical conditions. Medical, social work, and nursing practitioners must collaborate to detect financial obligations while diagnosing and treating a chronic ailment. Throughout health treatment and diagnosis, medical service clinicians can link families and case managers, financial navigators, patient navigators, and social workers across their health industry to connect individuals to monetary help for sickness.

LIMITATIONS

The above research, like other specific exploratory investigations, has constraints. The first one is the procedure of sampling that uses the sampling technique as purposive to acquire respondents for the research. Because of self-selection in the study, the research results might be biased. However, the Odiya people with various vulnerabilities communities should be studied more. Hence this sample strategy is highly suitable. Secondly, we used a cross-sectional approach to explore the association between HRQOL and financial burden. An observational design was adopted for the pilot project to develop hypotheses for a more extensive investigation. Research based on longitudinal might be better helpful in determining when the financial burden becomes significant in HRQoL. The FACT-G test, utilized to analyze research results, was designed for people with cancer. However, the research covered individuals with various chronic illnesses, both non-cancerous, and cancerous.

Furthermore, the Financial Burden assessment has never been validated for accuracy or reliability. Lastly, because the research had a limited sample size, the study advises against generalizing the results. The sample size influenced the Financial Burden component analysis outcomes, which produced two sub-dimensions with consistency as low. The results might not be reflective of the realities of certain other elderly Odiya people with financial burdens, as well as of the effects on HRQoL. Nonetheless, this research offers insight into the link between financial responsibility and HRQOL and may pave the way for additional studies in this area.

CONCLUSIONS

Throughout this study, researchers discovered that higher financial burden was related to decrease HRQoL in social, family, functional, and emotional well-being. The outcomes of this research add to the rising body of literature on the relevance of recognizing financial burdens in the presence of chronic illness. As the population of Odisha states ages, one should address in what ways several chronic medical issues to manage to decrease the financial burden that comes with spending life with a chronic disease.

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CONFERENCE ARTICLE

NUTRITION INFORMATION POST COVID-19: A TWITTER CONTENT ANALYSIS

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ABSTRACT

Realizing social media's importance, many doctors, nutritionists, health coaches and general users have registered on social media and actively share health information. Users may easily access and exchange health information. It benefits both users and practitioners.

Qualitative data analysis is employed to study Twitter communication content to understand better the relationship between users' interest in healthy eating and information seeking on Twitter post COVID-19. The research examined Twitter nutrition health information using hashtags. The frequency of hashtags was ranked. The content analysis undertaken quantifies social media healthy diet hashtags. Theme modification and word and phrase recurrence analysis was used to identify two primary themes and significant sentiments relating to COVID-19 and nutrition. Python and NLP languages are used to analyze and interpret the data to help acquire in-depth information.

Twitter users linked nutrition to happiness and sadness post-pandemic, discussing health food, skincare, nutrition, and lifestyle. The research highlighted Twitter's nutrition education significance, including mental and physical health, diet, and natural remedies.

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KEYWORDS

twitter, content analysis, social media, nutrition-related information, python

INTRODUCTION

SOCIAL MEDIA AND HEALTH INFORMATION SHARING

Social media is becoming essential to communication. Social media may aid in disseminating preventive information and warnings and tracking the spread of viruses [1]. The Internet, particularly social networking sites (SNS), is a popular source of health information and assistance. Knowledge-sharing practices, knowledge-sharing culture, and improved communication are all things that may benefit from the use of social media and cross-platform apps [2]. This ensures that the content is shared widely and visible to a diverse population. Previous research suggests that individuals are likelier to pay close attention, trust, and act on various issues when the message is communicated via influencers and celebrities [3]. The COVID-19 outbreak has introduced unique challenges for public health practitioners and health communicators, which warrants an expansion of existing health communication guidelines to take into consideration the following: the new infodemic (or disinfodemic) challenge – particularly as treatment options

and vaccines are being developed, communication of risk and uncertainty, health-information behaviours and the instantaneous nature of social media, as well as the relationship between media legitimacy and health-information dissemination [4]. Extensive research has been done on patients' and caregivers' use of websites, forum discussions, and SNS in the context of many health-related concerns, including social support, illness management and information sharing [5]. 50% of participants received replies to their health expert inquiries within a few hours, and 60% of health professionals agreed that social media would improve patient care [6]. According to the findings of another research, feelings not only indicated who would forward a message but also indirectly impacted how the communication was processed [7]. To build digital healthcare, artificial intelligence (AI) should be used early. It is crucial to combine developing technology to address a pandemic's massive hurdles [8], as social media sites may be manipulated by software-controlled personas called social bots.

COVID-19: SOCIAL MEDIA AND NUTRITION-RELATED INFORMATION SHARING

The global COVID-19 pandemic made healthy eating more complicated for most individuals. Lockdown affected eating, sleeping and exercise habits. Confinement enhances sedentary behaviours, primarily performed while sitting or lying down, requiring little energy expenditure [9]. The effects of COVID-19 on dietary intake and health have already spread beyond local communities and national borders [10]. Twitter and Facebook helped spread information during the COVID-19 epidemic. Some social media users "seed" misinformation, while others "spread" it to "receivers." Risk communication standards need the information to be accurate and credible, yet the initial COVID-19 pandemic's origin, consequences, and prevention were rapidly changing. In the wake of epidemics, people have begun to rely on social media to gather information about the sickness and communicate it in real time with their neighbours and friends [11]. In addition to being tedious, being subjected to constant media coverage of COVID-19 may be a source of anxiety. Overeating, particularly sugary "comfort foods," is correlated with increased stress levels in people. Furthermore, the risk of developing problematic eating habits may be elevated due to psychological and emotional reactions to the pandemic [12;13]. Overeating, or "emotional eating," is a typical response to negative emotions, as is well-documented [14].

TWITTER AND NUTRITION RELATED INFORMATION SHARING

Since 2006, Twitter has functioned as an efficient and effective platform for communication, enabling users to share information in real-time and occasionally engage in a two-way discussion. More than 100,000 people working in healthcare throughout the globe tweet an average of roughly 300,000 times each day, reaching a total of more than 135 million subscribers. According to a review of various papers, Twitter is an efficient communication medium that medical professionals and health coaches often use to interact with the public [15]. Government agencies often use Twitter to disseminate information to the general public [16]. Twitter is the world's fourth most common platform for obtaining critical information during an emerging infectious disease (EID) [17]. There is a different level of vetting and quality control of health information through social media than in traditional public healthcare or commercial settings [18].

The population regularly consumes and distributes diet and nutrition information through social media. Users use Twitter for emotional contact with scheme information produced via podcasts and mobile phone apps [19]. Because an ever-increasing number of organizations are now using SNS to distribute information and create awareness connected to social concerns, it is essential to be attentive to the factors that predict shareability to guarantee the success of a campaign [20]. Many dietitians and nutritionists utilize social media, particularly Twitter, to communicate with their large and influential audience, which includes the general public, to influence their eating habits. Usage of social media by dietitians and nutritionists may also help them interact with peers and enhance public health while advancing their professions [21].

Food and nutrition research on social media has primarily employed manually coded tiny datasets. Twitter creates big data that is more extensive, varied, and faster than health monitoring and research data. The top 15 hashtags linked to diet and nutrition were identified and analyzed in the light of this information. The study will explore and answer the following research objectives.

1. To determine which nutrition-related search terms were most frequently used by Twitter users worldwide.
2. To determine the positive and negative feelings associated with tweets about specific diet and nutrition-related subjects posted soon after COVID-19.

3. To determine the significant theme of the post based on the content posted by different users.

RESEARCH METHOD

DATA COLLECTION

Hashtags are a social media tool for aggregating posts on a particular subject. Users may get a feed of information tagged with a specific hashtag by clicking on that hashtag or by searching for that subject in English. Initial data for this research included a list of 15 nutrition-related hashtags gleaned from a Twitter search of diet, nutrition, and weight-related material, with emphasis on the most popular and widely used hashtags. The 15 hashtags included in the study were Diet, Healthy Eating, Covid Diet, Immunity Diet, Immunity Food, Nutrients, Vitamin C, Clean Eating, Corona Diet, Corona Food, Covid Nutrition, Detox, Healthy Diet, Immunity and Food. The database has 36,792 tweets and 23,252 retweets for 60,281 entries (61.28% tweets and 38.72% retweets). In the study, we excluded hashtags like physical activity, fitness, obesity and dietary supplements.

Python has emerged as a complete programming solution searching for a solid programming language over which numerous data science applications may be constructed. Pandas let Python users analyze real-world datasets. Library construction began in 2008 [22]. Developers load, prepare, manipulate, model, and analyze data using it. The Natural Language Toolkit (NLTK) is a set of programs and libraries used in natural language processing [23]. Python-based English natural language processing (NLP) is used.

Tokenizing a word may be accomplished with the help of a fantastic collection of libraries. Nevertheless, NLTK, the Natural Language Tool Kit, is the most widely used Python package. With the help of the Python library, we can extract the most popular terms from tweets and retweets after removing the usual organizing words like articles and relational words and consolidating words like a, an, the, yet, and so on. Tokenization, word normalization, word segmentation (for dividing hashtags), and spelling corrections were performed using the software program Ekphrasis, a text preprocessing tool. Additionally, it helped separate hashtags. In addition, regex was used to strip out HTTP links, punctuation, and other potentially confusing elements [24].

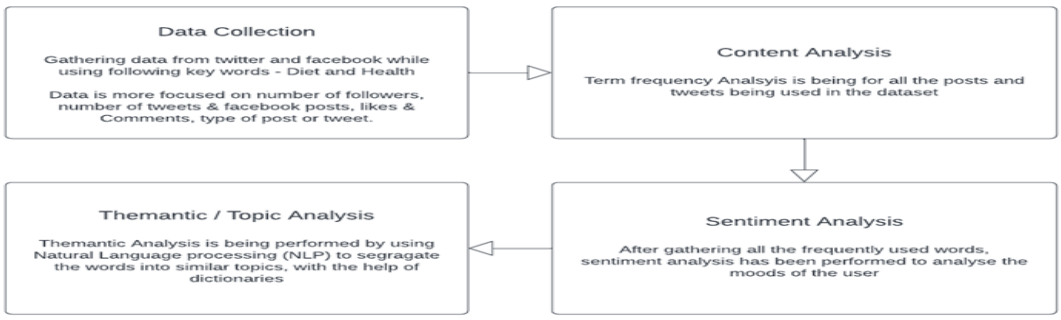
A theme analysis requires making choices to guarantee the study's validity and reliability; undoubtedly, these decisions must be identified [25]. We also conducted a sentiment analysis on the tweets using Python as well as the Vader Sentiment Analysis (SA) library [27] to compare the positivity as well as the negativity of tweets involving similar keywords to see if there were any differences in the way each keyword is typically used; this could provide insight into how the general public perceives these diets and issues.

RESULT AND DISCUSSION

GATHERING INFORMATION

This research aimed to analyze Twitter's healthy eating discussion by finding the most common themes and subjects. Twitter data is analyzed by time and person. Hyderabad and New Delhi in India have the most postings. Both cities had over 300,000 posters. As the dataset is imported from an Excel file, the programme also retrieves the necessary NLP libraries. OMW is a massive English wordnet library. Cognitive synonyms (synsets) are nouns, verbs, adjectives, and adverbs with the same meaning. Synsets work together due to conceptual-semantic and linguistic relationships. Synsets work together due to conceptual-semantic and linguistic relationships. Figure 1 depicts the process of gathering information from the following steps: Data Collection, Content Analysis, Thematic/ Topic Analysis and Sentiment Analysi

FIGURE 1: INFORMATION GATHERING APPROACH



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CONTENT ANALYSIS

The NLTK library cleaned data from posts and tweets. To make data-driven forecasts, stop words and punctuation marks were removed, and words were shrunk to their roots. Gensim analyses the data and visualizes it using pyLDAviz. The NLTK python package was used to analyze and clean data for a term frequency analysis (TFA) with above 70% accuracy. Each word was tokenized and isolated from dictionary terms to maximize dataset word occurrences. The dataset's word count affected the accuracy rate. The data businesses have 60,000 items, including 36,792 tweets and 23,252 retweets (61.28% tweets and 38.72% retweets).

TFA (TERM FREQUENCY ANALYSIS)

Excluding unnecessary columns cleans the data. For further study, we did a frequent-terms analysis on the cleaned tweets. The code following removes punctuation as we did not need it for analysis. Tokenizing words prevent repetition. We add terms to a list to justify each phrase, counting only the unique values (because certain words, like "good," "better," and "best," may be expressed in several ways)—dataset word count. Seeing the phrases makes it easy to count them. Twitter users typically tweet and retweet about healthy food items, daily routine hacks, skincare routines, eating habits, health recommendations, and other subjects linked to a healthy lifestyle (Figure 2). After attending several recent events, people are arguing about health, diet, vitamins, and weight loss. After eating a lot, they write about weight loss.

SENTIMENT ANALYSIS

After sorting lemmatized words into emotional categories, the terms linked with each emotion are recorded and shown in a bar chart. The cleaned text is shown in an LDA model. We also count nutrition-related phrases to assess tweets' emotional content. Every tweet term that communicates an emotion was found and evaluated using sentiment vocabulary. Standardizing the amount of positive (or negative) sentiment words relative to the tweet's overall word count calculates positive and negative sentiment ratings. The graphic shows the findings (Figure 3). People are optimistic yet worried. The second most prevalent feeling was "fearful," which was linked to worries about one's lifestyle, health, family, and powerlessness. "Happy" and "sad" also accompanied nutrition-related tweets after COVID-19.

FIGURE 2: TERM FREQUENCY ANALYSIS

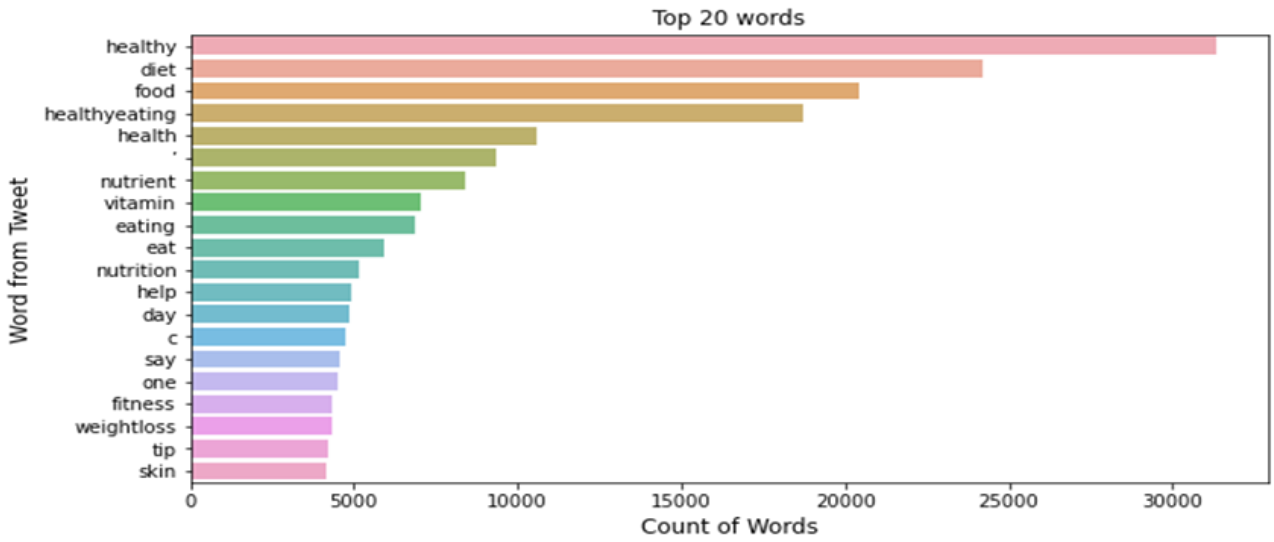

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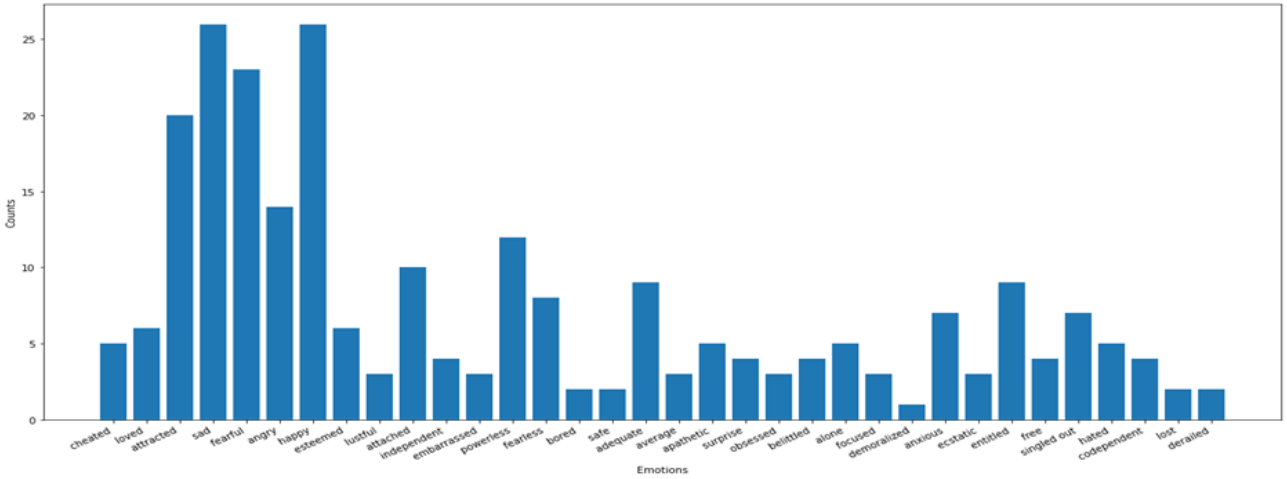
FIGURE 3: SENTIMENT ANALYSIS



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THEMATIC ANALYSIS

The cleaned text is shown in an LDA model. This utilizes cleaned texts to construct a vocabulary the model can search, then uses the dictionary to classify words into a terms matrix that can be used to extract each user's chosen topic from their comments. The next cell shows the two main themes, and the training model is run fifty times over the material.

Central Theme – Health Food

During the research, one of the themes emerged: "Healthy Food"(Figure 4). Social media can effectively spread nutrition information. People are tweeting how to enhance mental and physical health, food intake, and impunity. People are also posting about nutrition and children's health. Ayurvedic and herbal therapies are sought during the epidemic. People post on social media about their struggles or how they began their fitness journey to inspire lazy people. This conversation is about how to stay healthy or become fit rapidly.

Central Theme – Immunity

An "infodemic" driven by unrestrained COVID-19 news, propaganda, and misinformation provoked widespread anxiety and unscientific reactions. India, the world's most connected nation, has many Twitter users seeking COVID-19 information. "Immunity-boosting foods" were popular during the epidemic to avoid COVID-19, a second central theme (Figure5). Many people are discussing and exchanging knowledge about foods that may boost the immune system, such as seeds, fruits, and diets.

FIGURE 4: THEME 1

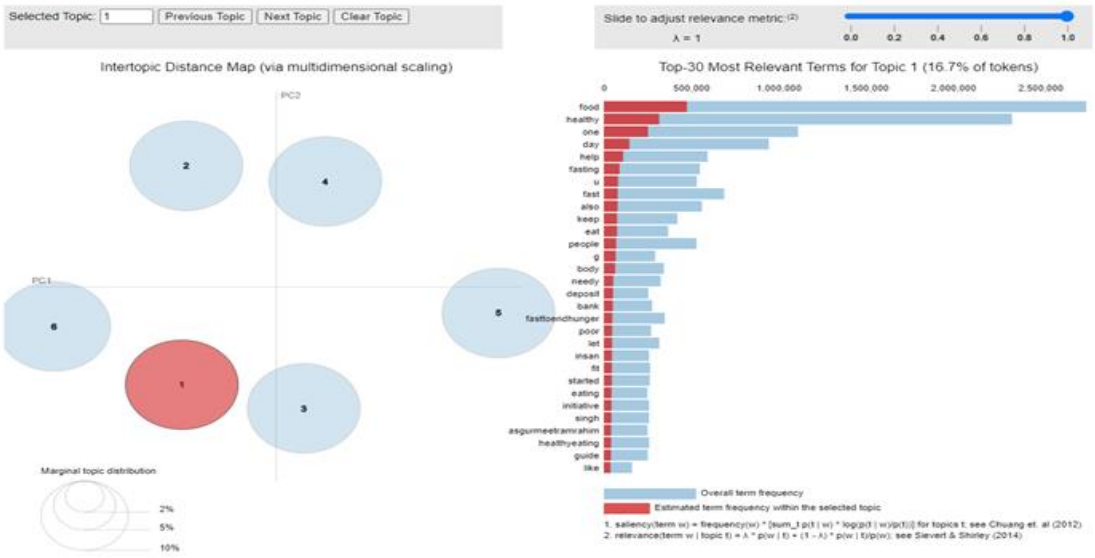

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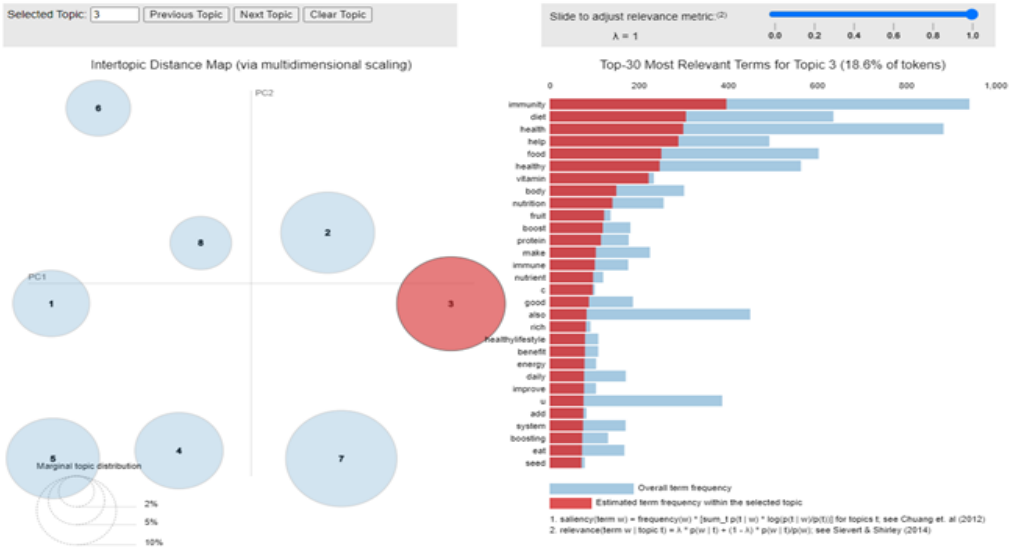
FIGURE 5: THEME 2



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Topics related to nutritious eating on Twitter were analysed. People on Twitter spoke about anything from healthy eating to beauty advice to their daily routines. Lemmatized words were sorted into emotional categories via Sentiment Analysis. More people were upbeat than worried. The second most prevalent feeling was "fearful," which was linked to worries about one's own lifestyle, health, family, and feelings of powerlessness. There were both "happy" and "sad" tweets on nutrition after COVID-19. Thematic analysis using LDA yielded the subjects. There were two major considerations. In the first forum, titled "Health Food," participants spoke about the psychological and physiological effects of their diets. The effects of diet, physical activity, and Ayurvedic and herbal treatments for the pandemic were investigated. The second was "immunity," which was spurred by the COVID-19 pandemic. Seeds, fruits, and diets that may help prevent COVID-19 were topics of conversation. The COVID-19 epidemic brought to light the value of social media in the fields of nutrition and health.

LIMITATIONS

Few studies combine enormous social media datasets and machine learning tools to analyze nutrition and food concerns, but a new methodology should be studied. This study has limitations, but they suggest future research directions. First, the dataset checked comprises much data, but it's just a small sample of social media's nutrition, diet, and food topic. It also has a limited group of terms used for search. Second, we gather data from one social media site, Twitter only, and language was English only. In the future, further research should examine food, fitness, obesity, and dietary supplements.

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