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# WELCOME TO THIS ISSUE OF THE COLLEGE'S ASIA PACIFIC JOURNAL OF HEALTH MANAGEMENT

*Dr Neale Fong FCHSM*

President of Australasian College of Health Service Management

As I write we are just reviewing the extremely positive feedback from our first in person ACHSM Asia-Pacific Health Leaders Congress since 2019 which had over 550 health leaders attending 21-23 September 2023 in Perth, Western Australia. Everyone who attended thoroughly enjoyed the opportunity to catch up with peers they had not seen for some time and meet new members of the College. If you missed this opportunity, put the dates of 11-13 October in your diary as next year we plan for this event in Canberra, capital of Australia.

Just prior to this year's Congress at the Annual General Meeting we conferred Fellowship to our largest contingent ever and also recognized our very first few Associate Fellows and Fellows who have chosen to undertake the Certification Program to attain the Certified Health Manager / Executive credential. With all of our existing Associate Fellows and Fellows automatically opted in to this credential prior to June 2021, we have been pleased to welcome so many new members who have chosen to undertake this credential and commit, along with many of their College peers, to lifelong learning as a leader in health.

The College has been busy in other areas as well in the past few months as we continue to work to ensure that our members get truly incredible value from their membership. Our twice monthly webcasts with health experts continues at pace with many of our Branches also providing deep, local content through this digital medium as well. Many have returned to some face to face events and all who attend enjoy this chance to network as we did prior to the pandemic.

In the past six months we have undertaken a project to review our ACHSM Master Health Service Management Competency Framework that underpins all of the College programs to ensure it is the most globally up to date description of the skills needed to be a great health leader. This project is now finalized and the reviewed and revamped framework was launched at the Congress. All our members have had a chance to have input into this process and in October they will be able to self assess against this new Framework through our online assessment portal.

Finally, we will be updating our digital and physical collateral over the coming months as we shift to a refreshed and modern logo. Keep an eye out for the new look.

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, it is a key element in achieving what I hope is our shared goal of "Better Leadership. Healthier Communities."

*Dr Neale Fong*
*College President*

# ADAPTATION, CHANGE AND LEADERSHIP

*Dr Mark Avery*

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

The second issue of the journal this year presents publications related to leading and managing within the health sector environment as well as a selection of papers based on presentations made at the recent International Conference on Embracing Change and Transformation.

In mobilising and enabling learning, growth and development in health organisations, the important linkages of adaptation, change to the leadership continuum provides both challenges and opportunities.

Adaptation involves adjustment in organisational systems and involves the connections between the organisation and the environment that it operates within. Adaptation has regular occurrence in complex systems and relates to how organisations are able to cope in uncertain situations and times. Change embraces making something different by transiting from a current through transitional to a future state. Variation within systems (first order change) involve procedures ad processes while change to the system or organisation (second order change) involve redefining the business of the organisation.

Leaders and their leadership achieve impact in relation to engaging with others to achieve vision and direction for healthcare stakeholders. This is a critical part of the improvement process for health organisations and teams. Creating opportunities and impact for sustainable health systems that are safe, innovative, accessible and affordable is a critical part of the future of health organisations and the people that comprise them. Adaptation and change are critical parts of the success that needs to be achieved through leadership in the health sector.

In this issue there are many contributions related to adaptation, change and understanding of health operations and system opportunities.

The critical agenda in relation to workforce has been addressed by Michael Ireland and colleagues to examine doctor attrition is a significant contributor to problems and issues associated with the health workforce world-wide. Their study looks at the necessity for change and adaption place environments to nurture intrinsic motivation and maintenance of work-life balance. Richard Olley presents research findings regarding stress-related to the regulatory environment for aged care services employees. Changes to system processes and compliance assessment are recommended and represent addressing a driving force to deal with the necessary reduction in distress experienced by staff. Fahimeh Ghardashi and colleagues surveyed nurses working in teaching hospital environments in around so as to evaluate the relationship between organisational justice, organisational commitment and human resource productivity. This study offers the opportunity for leaders and managers to strengthen justice and organisational commitment so as to improve human resource productivity.

Several contributions in this issue offer opportunities for first-order change such as the work by Nur Syazana Mad Tahir and colleagues who developed a comprehensive protocol for influenza management amongst the elderly in Malaysia. Samaa Faramawy and Sameh Reda examined the issue of sterilisation using light rays by focusing on definite spectral bands to prevent infection spread in the current COVID-19 pandemic. David Noble and colleagues completed a review of previous research regarding tele-psychiatry demonstrating Meriton equivalents to face-to-

face review thereby providing benefits of access and timeliness of care.

***7th International Conference on Embracing Change & Transformation: Innovation and Creativity 2022***

Selected papers from the 7th International Conference on Embracing Change & Transformation are included in this issue.

**Guest Sub-Editor:** Assistant Professor Anuj Kumar – Conference Co-Convenor

Apeejay School of Management, Dwarka, Delhi

Associate Professor Anuj Kumar, as the conference' Co-Convenor, reports on the conference deliberations that were around that creativity and innovations are indispensable for the growth of business and the success of organizations and are important factors which help traditional companies and educational institutions in foreseeing potential threats and rising competition. Organizations cannot thrive without matching the pace of change and transformation which is taking place in the market.

**Mark Avery**
**Editor-in-Chief**

# SHIELD OR SWORD? MORAL DISTRESS IN AUSTRALIAN AGED CARE EMPLOYEES RELATED TO REGULATION AND COMPLIANCE

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## ABSTRACT

This paper reports on one finding of a qualitative study using interpretive phenomenological analysis (IPA) in a mixed-methods study examining the relationship between leadership style and job satisfaction in Australian aged care employees. The qualitative data suggest that aged care employees are experiencing moral distress relating to the regulatory environment that governs the aged care sector and the compliance processes adopted by regulators and accreditors.

One of the reasons for the design and operationalisation of the regulatory environment is to protect vulnerable consumers, the public and the workforce. However, the findings of this research are that it is this environment that also causes damage to the aged care workforce. The question is whether compliance requirements and the regulatory scheme are a shield or sword. The causes of the moral distress were different for leaders and raters. This paper reports on this finding. Moral distress is one of three undesirable outcomes identified in the study and labelled as Workplace Maladies.

Moral distress due to regulatory systems and processes experienced by leaders appears to be caused by different factors than the moral distress experienced by raters. Leaders experienced moral distress because of the system and methods of regulatory and standards compliance. In contrast, their followership experienced other regulatory processes such as the scope of practice for health professionals and the requirement to supervise and accept responsibility for unregulated workers who do not have a scope of practice. Unregulated workers reported that the absence of scope of practice is a cause of moral distress.

Recommendations are made for changes to the system and processes of compliance assessment and action and for developing a scope of practice for unregulated workers to reduce the moral distress experienced by aged care employees and thus reduce workforce turnover in an already scarce workforce.

## KEYWORDS

Aged Care; Regulation; Compliance; Moral Distress; Workforce

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# INTRODUCTION AND BACKGROUND

With the demand for aged care growing rapidly in Australia and globally, there is a consistent demand for an aged care workforce. The Australian Royal Commission into Aged Care Quality and Safety handed down its final report in February 2021. They found significant issues in aged care, and many of the recommendations in the final report represent a failure of leadership. The implementation of many of the recommendations of the Royal Commission requires well-trained and insightful leaders. These leaders will need to deal with the funding system's economic constraints, workforce shortages, safety and quality issues with the care delivered, and the system's ability to meet consumers' expectations. For these reasons, it is critical to understand what makes an effective aged care leader through their followers' eyes at all levels.

The mixed-methods study from which this paper is an output sought to answer questions relating to the effects of leadership style on organisational identification (OID) and job satisfaction (JS) in aged care employees. The study sought to determine what associations existed with leadership style and the strategies deployed to increase OID and JS. This research had ethics approval from the Griffith University Human Research Ethics Committee number MED/2017/030).

One qualitative finding was that Leader and rater participants experienced significant moral distress due to their work in aged care as the basis of this paper. There were two other undesirable outcomes identified in the study. These undesirable outcomes were role stress that affected leaders' and raters' groups, and disengagement that was related only to members of the raters' group. The three undesirable outcomes were labelled as "Workplace Maladies" that are the subject of other papers that report on those findings in the future. Figure 1 details the streams of consciousness identified and the workplace maladies that resulted.

The design of the regulatory environment is to protect consumers and employees, yet the findings of the study suggest that the regulatory environment and compliance actions that result from the regulation cause damage in the form of moral distress for aged care workers. The researcher questioned whether compliance requirements and the regulatory scheme itself acted as a shield to protect the aged care consumers and its workforce or whether they are a sword damaging what they were designed to protect. The causes of the moral distress were different for leaders and raters. This paper discusses one of those workplace maladies, Moral Distress, related to the regulatory environment of aged care.

## LITERATURE REVIEW

Moral distress occurs when the health or aged care worker makes a moral judgment about the care they are involved in delivering, and others in authority make it difficult or impossible for the care worker to act on that moral judgement [1-3]. The literature extensively reports moral distress in health and social care [2, 4-6].

The potential consequences of moral distress are that staff may become morally numb to situations that cause them an ethical challenge and render them unable to recognise or engage in situations requiring moral sensitivity [7]. The most damaging consequence of ongoing moral distress is job burnout [8]. Burnout is a psychological syndrome involving chronic emotional and interpersonal stressors that individuals' experience at work and their subsequent responses to their tasks, organisations, co-workers, clients, and themselves [9] and there are reports that care staff have considered leaving their position or profession due to moral distress [10, 11]. The findings of two studies record workforce attrition and turnover in aged care and that experienced aged care workers and professionals are at a premium. Moral distress is associated with job burnout and reduced JS [12-15], which is related to the provision of lower standards of care [14]. The current shortage of staff in the aged care system [16-18] means that the sector cannot afford to lose valuable and morally invested aged care workers at any system level.

A qualitative study reported in 2016 found that the primary source of moral distress arose from conflicts between their leaders and the expectations of the follower group of their role and their perception of insufficient resources in terms of time, staffing, technology, and poor support from leaders [19]. In a 2016 reported study that examined moral distress in intensive care nurses, Mealer and Moss categorised strategies to prevent and deal with moral distress that described three groups of interventions. These interventions are, educational interventions, interventions focusing on enhancing the work environment, and interventions focussed on helping individuals cope with their work environment [20] and discussed interventions to

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promote resilience, such as mindfulness-based stress reduction, self-reflection, cognitive flexibility, self-awareness programs, journaling, and professional networking. Leadership development programs must be central in training leaders in these strategies and must equip leaders with the skills to prevent and manage moral distress and job stress for their followers [21].

## METHOD

The research used a mixed-methods approach that consisted of two separate but inextricably related studies. Study 1 was quantitative in approach and examined differences in responses between the Leaders who self-rated and those who rated them in the quantitative study labelled as Raters in this study. The online questionnaire contained three prior validated tools of the Multi-Factor Leadership Questionnaire [22], the Identification with a Psychological Group Scale [23] that measured OID and the Measure of Job Satisfaction [24].

Analysis of the response data for the differences identified in the two groups of leaders and raters was the basis of the

agenda for semi-structured interviews deployed in the qualitative study (study 2). Study 2 implemented Interpretive Phenomenological Analysis (IPA) to understand better the Leaders' and Raters' lived experiences from transcripts of semi-structured interviews designed around the areas of difference found in study. The IPA provided a more granular understanding of the identified differences and why they occur. The researcher used the Consolidated Criteria for Reporting Qualitative Research (COREQ) [25] for reporting guidance for the qualitative synthesis derived from the IPA.

## FINDINGS AND DISCUSSION

The participants of the quantitative study demonstrated similar demographics to those reported in the 2016 Aged Care Workforce study [26], and the participants of the qualitative study were drawn from the participants of the quantitative study. The IPA revealed four themes by clustering the streams of consciousness interpreted from the transcripts. Figure 1 shows the lower level threads (streams of consciousness) and clusters them to form a theme.

**FIGURE 1- CLUSTER MAP OF EMERGED STREAMS OF CONSCIOUSNESS**
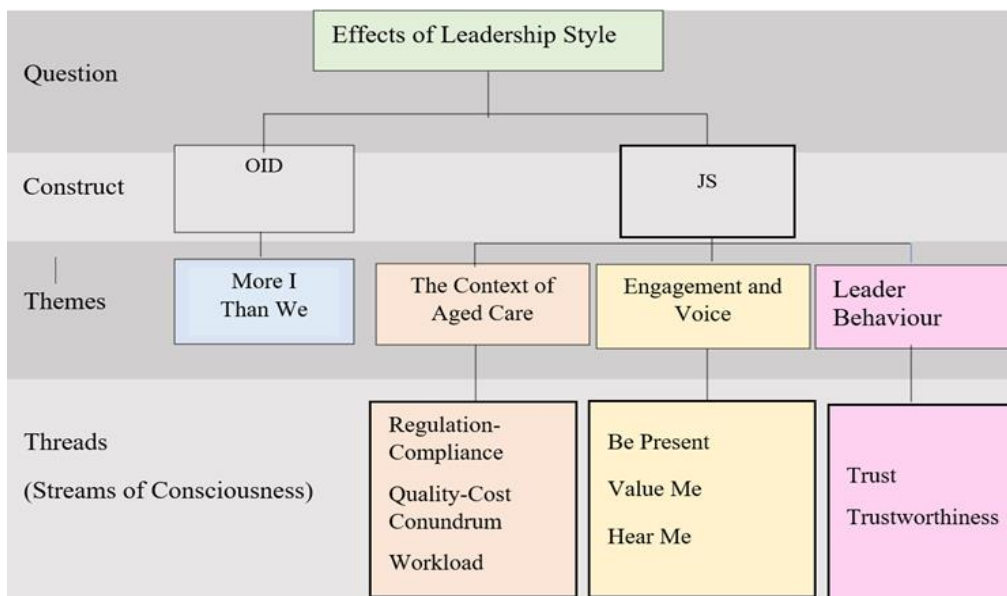


Leaders and raters reported different causes of the moral distress they experienced. Participants of both groups raised legitimate concerns about the intersection of their employing organisation's policies and procedures and the regulatory environment of aged care. Concerns about regulation and compliance were evident in the accounts

of both groups for different reasons. These concerns revealed a level of distress among the participants, which sometimes involved the participant being tearful when describing their lived experiences.

Leaders were directly asked about their experience of the regulatory environment in aged care to determine whether their meaning-making had a task or outcome focus, as identified as a difference between leaders and raters' quantitative study responses. Leaders tended to describe outcomes because that is the term used in the Aged Care Quality Standards [27], whereas raters were more focused on task completion. The responses by some of the Leaders group demonstrated a high level of concern, some to the point of becoming distressed about regulatory compliance, their experiences, and the processes for assessing compliance by regulator representatives and the resultant outcome of a negative assessment.

The leaders described concerns and recounted lived experiences with regulation and compliance in the aged care sector. They outlined the difficulties of conforming with what they regarded as the copious amount of legislation and the anachronistic nature of the *Aged Care Act 1997 (Cth)*. Leaders further flagged the behaviour of assessors employed by the Aged Care Quality and Safety Commission and the restrictive nature and interpretation of the Aged Care Quality and Safety Standards as a significant concern. There was a pervading sense of an adversarial flavour of these compliance-driven interactions.

> *They came in for an unannounced [visit]. The unannounced [visit] caused them to come back a week later because they had some tweaking concerns, which led to a review, which led to monitoring. So, they were there for another four days auditing. For me, getting a phone call saying, "Just letting you know, we are really concerned about this place, so an auditor will be there nine o'clock Saturday morning", which was the next day (as I'm finding out at four o'clock on a Friday afternoon) to monitor the facility. (L3)*

L5 described the consequence of this interaction style as creating a task focus rather than focusing on outcomes for care recipients. This change in direction was evident to her despite the aim of consumer-directed care environment in community aged care and developing in residential aged care:

> *The organisation has now switched to becoming more task-focused and quite transactional – waiting for stuff to come in rather than being proactive (L5).*

The outcome of this is that government-funded aged care recipients may miss out on the benefits of innovative thought and translating that into better, appropriate, more efficient and effective care for older people receiving government-funded aged care.

> *We can innovate around the edges of the regulatory form and regulatory funding, so we take pride in innovation that mostly operates outside of government funding. But that's well and truly away from the regulatory constraints of residential age care (L1).*

Some leaders observed that regulators, bureaucrats, and politicians had adopted legal and regulatory responses to address contentious issues arising from poor practice, which increased the regulatory and compliance requirements in the aged care sector, as exemplified in the following quote from L1.

> *The compliance in aged care is dreadful, and I think every time something goes wrong, the department's natural reaction in Canberra or the politician is to introduce more regulatory oversight (L1).*

L5 revealed that many staff, including managers, were now more reticent to do anything new or different.

> *Being innovative, or in any way different, creates a situation in which the care service will be very visible to regulators because of the difference in the way services are provided. This leads to further review and possible compliance action, so we mostly wait for another aged care provider to innovate or change care practices before implementing the changes (L5).*

The reluctance to attempt something new or innovative described by L5 was consistent with other leaders' lived experiences expressing a sense of frustration with the regulatory system and processes and described the degree of regulation as:

> *Crippling and stifling of innovation in care practice. I think the incredible levels of regulation and compliance are extraordinary compared to any other age care sector in the world and it cripples or at least stifles innovation (L1).*

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Aged care organisations must adhere to the Government's consumer-directed care (CDC) requirements, which emphasise choice, control, and information and knowledge to provide the means for care recipients to make informed decisions about their care. Meeting CDC requirements are mandated to receive government subsidies to support home aged care, and there is a phased introduction of CDC principles in residential aged care. Some leaders expressed anxiety about deploying innovative care strategies, perceiving this as a high risk to their accreditation status.

Aligning with the reported lived experience of participants in this research, Bradley in 2018 reported on a study that enquired into the issues and challenges experienced by care recipients, informal carers, and staff with the introduction of the CDC [28]. These researchers found that existing industry regulation, culture, and practice supports an established service model in Australia that stifles translation of the CDC objectives into practice [28]. Another study by Biggs and Carr in 2019 also concluded that aged care regulation is not keeping up with contemporary aged care practice models [29], and a previous study reported in 2017 by Nusem and colleagues had similar findings concerning new business models for aged care service delivery [30].

Leaders' responses often conveyed a sense of anxiety and foreboding during visits from aged care assessors employed by the Aged Care Quality and Safety Commission. One leader participant perceived a noticeable change in the attitudes of aged care quality assessors undertaking accreditation audits and reviews:

> Unannounced visits have changed … the agency's attitude has certainly changed since the Royal Commission was announced. We have certainly seen a change. They want to find fault so that some compliance action was [sic] required, justifying the role of the aged care assessors and the Aged Care Quality and Safety Commission and giving the impression that the Government is doing something to protect those in our care (L2).

A strong sentiment emerged in the Leaders group that the present regulatory control methods (including accreditation standards compliance) created risk-aversion, rather than risk-awareness, impacting compliance risk management. Leaders described feeling powerless and at the mercy of regulators, expressed their opinions on regulatory controls, and described anachronistic requirements and processes.

Raters related various work practices and regulatory requirements and were particularly concerned with medication management and unregulated workers. No raters mentioned accreditation standards compliance during interviews, and it was as if the compliance with accreditation requirements is the responsibility of others who are not involved in direct care. No Raters provided any comment on the Royal Commission's findings into Aged Care Quality and Safety. From their collective responses to direct questions about the Royal Commission, the raters regarded this as a management issue rather than something that directly affected their present or future work.

The regulatory compliance concerns raters mentioned were related to the state or territory jurisdictions laws such as the *Drugs and Poisons Acts* in each of the State and Territory jurisdictions and their regulations and workplace health and safety provisions. Many raters provided accounts of being placed in vulnerable and anxiety-evoking medication administration and management situations, such as being required to administer medications outside what they perceived as their scope of practice, which created moral distress for many nurses and personal care workers. The raters recounted lived experiences of organisations changing medication management policies and procedures that might contravene drugs and poisons provisions operating in the various state and territory jurisdictions.

One Rater participant described an experience where she felt compromised over instructions provided by policy and practice changes that ignored the poisons regulations' obligations. The non-verbal behaviour observed during this part of her interview echoed frustration and anger at what the researcher interpreted as moral distress and conveyed this was an ongoing issue with incomplete resolution and causing ongoing and considerable moral distress.

> We had a client palliating, and from my understanding as a personal care worker, [the patient] was prescribed an S8 medication [dangerous drug of addiction], and I was not trained in it. I knew I wasn't to give it. But then, after management had their conversation, it came in that we could provide S8 drugs. It could be drawn up before you could give it, so from a nurse. Yes, so

*when that first came in, I refused to give the medication. I refused because; (1) I didn't know what was drawn up and what was put in there, and (2) they were S8 drugs. This caused me significant personal grief and also with my managers (R1).*

Another rater was concerned about liability in undertaking a care procedure without, in her view, the authority or training to do so. Her anxiety about the situation led her to avoid providing care to the client rather than giving the medication that she believed was unlawful, causing what the researcher interpreted as considerable moral distress.

*A letter came out stating that personal care workers had been trained to give medication and administer S8 medications. So, when we had to administer the S8 medication, I just asked if I could be put off the client so that I didn't have to give it. Then it ended up being that I had to. I had no choice. It was in my scope of practice. Apparently, I had to give it. I felt very compromised and angry that I was put in this position (R2).*

R2 became upset when recounting this experience, and it became apparent that it was quite a personally painful situation that she would have preferred to have avoided. While R2 did not want to withdraw from providing care for the client, she found herself in a conflicted situation where compliance with the employer's instruction would be acting, in her view, in breach of the law. As a result, she attempted to avoid being in such a position by asking to provide care for another resident and reassigning the resident to someone else to provide care. As background, the gravity of the experience, R2 disclosed during the interview. R2 had previously responded to a subpoena to give evidence in a coronial enquiry related to the administration of schedule 8 medication and the unexpected death of a resident in care, which added to her distress.

Another rater participant expressed a similar concern, reporting experiences where many unregulated care workers operated outside the poisons regulations' provisions but did not feel supported by her employing organisation when she questioned the practice. She recounted that her manager provided her with written advice that it was acceptable and legal. This rater participant felt this placed her in a situation where she either complied with her employer's instructions, and she

firmly believed that this would cause her to act outside the law. The concerns expressed appeared to be rational and reasonable, but she stated her manager did not address these.

*I was not sure of the laws about the scope of practice for an AIN [assistant-in-nursing] to administer an S8 drug in the community. I was questioning if an AIN can administer oral morphine, liquid morphine to a palliating client. Here, there is no restriction because the organisation insists we are trained in measuring medication doses. Whether it's S8 or Panadol or anything, how would they calculate the strength? Is it within their scope of practice to measure medication (R4)?*

The researcher's experience is that many aged care providers view unregulated care workers as equivalent to an informal carer who administers medication to a home care person. The limits on the role of unregulated carers are unsettled without a clear scope of practice from regulating this important workforce group. This absence of a scope of practice statement causes confusion and anxiety in aged care employees for licensed health professionals and unregulated aged care workers.

Similarly, but not explicitly relating to medication administration safety, another Rater related other experiences that caused her concern about compliance with the scope of practice and professional practice requirements set down by the Nursing and Midwifery Board of the Australian Health Practitioners Regulation Agency related to licensed nurses:

*We have to trust our personal care workers. They're left here alone. When we're on-call, we have to trust that they give us the correct information over a phone to say whether a client has had a fall, got chest pain, or had a head strike. We rely on what information we're given. It's hard some days; it's really hard (R3).*

The experience recounted by R3 appeared to cause her ongoing anxiety relating to care recipients' welfare and care workers and protection of her practising license as a registered nurse. She described making decisions based on the information provided with the best intentions from unqualified and often poorly trained personal care workers acknowledging that her decision-making in the face of a clinical information deficit caused frustration, anxiety and

distress, with referral to acute care services often being her only option.

> *If in doubt, I just ring an ambulance because I've got a registration to be looking after, it's my livelihood, and I've got a PCW telling me what's happening kilometres away and [I'm] not seeing the client. They're not able to do a set of observations on a client, which could be majorly helpful at times sometimes. So, things like that, I think, get a bit frustrating (R3).*
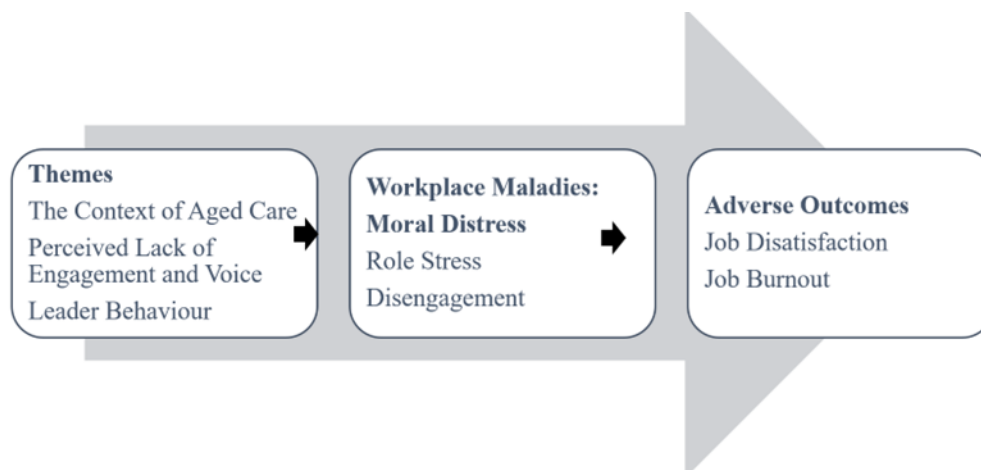
Most raters described anxiety and distress relating to their scope of practice and legal liability, which they ascribed to their organisation either maximising revenue or containing costs at the expense of safety and quality. For example, one Rater described her experience of being the only enrolled nurse on duty in a large, aged care facility. There was no registered nurse or medical practitioner on-site, resulting in concern about working beyond her scope of practice out of necessity in support of aged care consumers.

> *After office hours, I am here on my own. I feel very overwhelmed. There's a lot – I'm always taking a pad with me because if someone calls me and tells me someone's very unwell, I'm basically doing what an RN would do. After all, someone's lacking the confidence to call an RN. I'm supposed to be on the floor doing things, and the on-call RN is supposed to take that call, give advice, and the person who is there is meant to follow through (R4).*

R4 described her experience as a common event, and she was clearly on the verge of tears, which appeared to be related to the ongoing distress caused by this problem. While not stated explicitly, the ongoing situation appeared to further contribute to her feelings of being overwhelmed at work, carrying the full weight of responsibilities that she believed were unfairly placed on her when she was not qualified nor paid to take them.

Figure 2 conceptualises the findings of the IPA and identifies the workplace malady of moral distress addressed in this paper.

**FIGURE 2- ADVERSE OUTCOMES EXPERIENCED FROM PERSISTENT EXPOSURE TO THE WORKPLACE MALADIES**



**Themes**
The Context of Aged Care
Perceived Lack of Engagement and Voice
Leader Behaviour

**Workplace Maladies:**
**Moral Distress**
Role Stress
Disengagement

**Adverse Outcomes**
Job Disatisfaction
Job Burnout

## CONCLUSION

Leaders described the problematic interface between regulatory controls and quality assessment at the corporate level impacting their approvals or licenses to provide aged care and the provision of care itself. Raters described moral distress relating to the scope of practice concerns. They felt the organisation expected them to perform at a level where they believed they had not received adequate training or lacked statutory authority to undertake the expected functions. The distress experienced by the Rater participants appears to be

related to medication management or direct supervision of unregulated workers by licensed health professionals or by unregulated care staff who believe they are working beyond their training and skill level.

Raters provided numerous accounts of being placed in vulnerable and anxiety-evoking situations relating to medication administration, and these were a common cause of concern among raters. The administration of medicines was an issue of significance and a source of moral distress for them. Their leaders' actions or inactions

caused Rater distress related to changing medication administration policies and procedures without observing the various drugs and poisons provisions operating in state and territory jurisdictions. Concerns about the scope of practice under the national law regulating health professionals were prevalent among the Raters group members. The dilemma for employers, licensed nurses, and unregulated care workers concerning staff retention and quality failures in aged care are well described in the literature [31, 32].

The lived experiences described system issues related to the copious amounts of legislation, regulation and policies that increase work complexity and implementing compliance auditing for the leaders. There was a perception that the amount and types of regulation and compliance auditing confounded innovation and engendered a risk avoidance approach, causing only a task focus rather than an outcome focus. There were also numerous examples of poor relationships and mistrust in the officers charged with industry regulation responsibility. The system of increased unannounced visits during the Royal Commission's proceedings into Aged Care Quality and Safety caused great anxiety and distrust between the leaders and regulators. There was a belief that the system was under strain, causing considerable moral distress and role confusion. Raters stories related to moral distress appeared to be caused by a lack of understanding about the dimensions of unregulated care workers' role by members of that workgroup and some of their leaders. Licensed health professionals were also concerned about their supervision responsibilities, accountabilities, and impact on their practicing licenses. It is contended that urgent changes to the regulatory environment and the process of accreditation and compliance action is needed, along with statutory reform of the Aged Care Act, 1997 (Cth) that has not had substantial review since enactment. These statutory and process reforms would then focus on protecting and shielding consumers and the aged care workforce rather than being perceived as a sword that has the potential to cause further harm.

The findings and conclusions of this research demonstrate the need for a leadership development program that addresses concepts related to authentic and ethical leadership at all levels of the aged care system, including aged care providers, regulators, funders and line managers to manage the contested terrains evident in the aged care system. Additionally, there is an urgent need to deal with staff numbers and the skill mix available to provide care and a clear scope of practice for unregulated care workers.

## IMPLICATIONS

Resolution of these regulation and compliance stressors will assist in maintaining the aged care workforce at the leader and worker level. Failure to address this will result in ongoing and increasing workforce shortages.

## LIMITATIONS OF THE STUDY

The nature of qualitative research does not aim for generalisability or validity in the scientific sense of these terms and may be considered a limitation. However, recording the lived experience opened a valuable window enabling explanation and authenticity as a starting point for further exploration.

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# MIND OVER BODY CONNECTION: AGING EXPECTATIONS AND SUBJECTIVE HEALTH AND WELL-BEING AMONG OLDER ADULTS

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## ABSTRACT

**BACKGROUND:**

There is credible evidence that a person's beliefs about the aging process are linked to and influence a variety of health outcomes.

**PURPOSE:**

This study determined whether aging expectations predict health-related quality of life. Furthermore, the study determined whether engagement in healthy lifestyles mediates the relationship between these variables.

**METHODS:**

This descriptive-correlational study enlisted a total of 95 respondents aged 60 to 85 years old in a large metropolitan area. Data were analyzed using linear regression and mediation analysis.

**RESULTS:**

Aging expectations and engagement in healthy lifestyles are a significant predictor of health-related quality of life ($p < 0.05$). Moreover, engagement in healthy lifestyles is found to be a significant mediator between the variables.

**CONCLUSION:**

Older adults who have positive aging expectations and engage in health promotion activities are more likely to report better health. Therefore, programs that promote a positive aging expectation and engagement in health-promoting activities should be implemented.

**KEYWORDS**

aging expectations, subjective aging, older adults, health behaviors, healthy lifestyles, quality of life

# INTRODUCTION

Over the past few years, there has been a considerable increase in life expectancy of people [1]. Old age, currently, is a phase in life that is attainable for most people. The idea of aging expectations, that is, the way by which persons perceive their own aging process, may be more significant than ever before. Although there is an increase in life expectancy, people are likely to live longer but with more chronic illnesses. Aside from physical health, there is also a need to consider the importance of health-related quality of life which is a more holistic outcome for older people. Health-related quality of life may include physical health, psychological health, degree of independence, relationships, and perceived social support [2].

Moreover, there is dependable evidence suggesting that a person's beliefs about the aging process relate with, and determine, several health and illness outcomes [1,3,4]. This development happens both intentionally and unintentionally [5]. Levy [6] showed that disability and disease processes that are related with aging may be partly explained by the effect of psychosocial factors of the aging self. Findings from both observational and experimental research have revealed that age-related preconceptions can become significant determinants of an older adult's well-being [1]. Several studies have shown that having more positive depictions of one's aging process and feeling younger are related with better subjective well-being and physical health [7-9]. Moreover, a longitudinal study by Levy, Slade, and Kasl [10] suggested that people with more positive aging expectations were able to sustain and improve their health over twenty years. Sarkisian and colleagues [11] studied the association between aging expectations and physical activity and found a positive relationship between positive aging expectations and aerobic activity. Therefore, negative aging expectations may be a hindrance to physical activity in older adults [11]. Moreover, positive self-perception of aging can also affect a person's engagement in other health-promoting behaviors such as participating in exercise, eating a healthy balanced diet, using health care resources, having regular physical examinations, and limiting the use of alcohol and/or tobacco [12]. These studies show the role of aging expectations towards engagement in health behaviors and subjective well-being. One correlational study showed that positive aging expectations were also linked to improved self-reported mental and physical health [13].

This association between aging expectations and health was partially mediated by engagement in health-promoting behaviors such as interpersonal relations, stress management, and physical activity [13].

Finally, there is limited evidence that investigates the possible mediating effect of engagement in healthy lifestyles between the aging expectations and quality of life. Determining the relationships between these variables is crucial since these outcomes may be major factors of successful aging and may be used to modify wellness and health programs among older adults.

# OBJECTIVES

This study aimed to determine whether aging expectations significantly predicted health-related quality of life. Furthermore, the study determined whether engagement in healthy lifestyles mediated the relationship between aging expectations and health-related quality of life.

# METHODOLOGY

## DESIGN, SAMPLE AND PROCEDURES

A descriptive-correlational study was used to determine the relationship between the variables in the study. Respondents were individuals who are 60 years old and above. The computed sample size was 90 people based on a power analysis using G-power software (power=0.90; a = 0.05; medium effect size = 0.15) and 95 respondents were recruited for the study. F test for linear multiple regression: Fixed model, $R^2$ deviation from zero was utilized for the sample size computation. Respondents were recruited from a highly urbanized city in the Philippines using consecutive sampling. This was done once a week for one month. Participants provided written informed consent prior to initiating the study. The purpose of the study was explained, and emphasis on voluntary participation, anonymity, and the right to refuse was indicated in the letter and was reinforced verbally if needed. It was also indicated that the return of the questionnaire would indicate implied consent to participate in the study. Recruitment and distribution of the questionnaire were done during the monthly meetings of the various local senior citizen's associations. There were no advertisements done for recruitment. But to enhance representativeness, aside from their meetings, questionnaires were also distributed in the different households with older adults with the assistance of community personnel once a week for

one month. This was either through face-to-face interviews or through direct individual or group administration, depending on their preference or their capabilities. There were no dropouts during the duration of the study.

Prior to gathering the data, the research was approved by the Velez College Ethics Review Committee.

## MEASURES

The main research instruments that were used for this study are three (3) standardized tools, namely: Expectations Regarding Aging (ERA-12) Survey, Health-Promoting Lifestyle Profile II (HPLP-II), and RAND 36-Item Health Survey (RAND-36). All the tools were translated using a forward-and-back translation process. This was done independently by two bilingual nursing clinical instructors whose expertise are in community health nursing and gerontology nursing. One of them translated it from English to local dialect then the other one translated it back from vernacular to English. The two versions were then checked for semantic equivalence and cultural applicability. There were no significant changes with the translated version after the process.

The different standardized questionnaires, along with the demographic questions, were combined into one document. The demographic profile of the respondents included were age, sex, marital status, educational attainment, and employment status. The Expectations Regarding Aging (ERA-12) was used in the questionnaire [11]. It is a twelve-item survey that measures expectations regarding aging with three 4 item scales (expectations regarding physical health, expectations regarding mental health, and expectations regarding cognitive function), and one global expectations regarding aging scale combining all 12 items. The ERA-12 scales demonstrated acceptable levels of reliability and construct validity in two very different samples of community-residing older adults (n=429; a = 0.88 and n = 643; a = 0.89). The statements are followed by four responses: ''Definitely True,'' ''Somewhat True,'' ''Somewhat False,'' and ''Definitely False.'' Possible scores range from 0-100, with higher scores indicative of expecting achievement and maintenance of high physical and mental functioning with aging (for self and others), and low scores indicate expecting decline with aging. In addition, there are no cut points for what is optimal.

Additionally, the Health-Promoting Lifestyle Profile II (HPLP-II) was also included which consists of fifty-two questions related to current engagement in health-promoting lifestyle factors [14]. These lifestyle factors are quantified using six subscales (i.e., Health Responsibility, Physical Activity, Nutrition, Spiritual Growth, Interpersonal Relations, and Stress Management). The construct validity of these subscales was analyzed using factor analysis, which confirmed the six-dimensional structure of the HPLP-II [14]. The HPLP-II has an alpha coefficient of .94, and the subscales have alpha coefficients ranging from .79 to .87, suggesting that the measure and its subscales are internally consistent [14]. A total score can also be calculated by scoring responses to all of the items on the survey (i.e., items from every subscale). Each statement on the survey is followed by four responses: "Never," "Sometimes," "Often," and "Routinely". Individual responses are scored on a one to four scale, with the overall score being obtained by averaging all of the responses.

Finally, the RAND 36-Item Health Survey (RAND-36) was also included. It is a measure of health-related quality of life, which refers to how health affects general functioning and perceived physical, mental, and social well-being. The survey consists of eight subscales including physical functioning, role limitations caused by physical health problems, role limitations caused by emotional problems, social functioning, emotional well-being, energy/fatigue, pain, and general health perceptions. The eight subscale scores yield two summary scores that more generally measure physical and mental health. General function is measured by assessing engagement in basic self-care activities (e.g. bathing) as well as engagement in work-related activities (e.g. housework or job). Questions related to physical, mental, and social well-being assess the individual's subjective perception of their well-being in the related domain (e.g. whether the individual feels happy or whether they are in pain [15]. The RAND-36 survey's alpha values ranging from 0.71 to .93, suggesting the measure and its subscales are internally consistent [16]. High score defines a more favorable health state. In addition, each item is scored on a 0 to 100 range so that the lowest and highest possible scores are set at zero and one hundred, respectively. Scores represent the percentage of total possible score achieved.

## DATA ANALYSES

The data collected was analyzed using IBM SPSS statistical software version 23. Descriptive statistics including means, standard deviations, were calculated for the continuous

variables and percentages and frequencies for categorical variables. Linear regression and mediation analyses using PROCESS version 3 were applied to analyze the data for the main variables. Mediation analysis is done to understand a known relationship by studying the underlying process by which one variable influences another variable through a mediator variable [17]. Finally, post hoc power analysis was done to examine the observed effect size based on the sample size of the study.

## RESULTS

There was a total of ninety-five respondents aged 60 to 85 years old in this study. Table 1 shows that majority of the participants were categorized as: young old, females, widow/ widower, unemployed, and college level or college graduates aged 60 to 85 years old. Furthermore, the mean age of the participants is 68 years old (SD=6.6). To compute post-hoc achieved power, a probability error was set to 0.05, and with two predictors in the model, the effect size was computed based on the results using an effect size ($f^2$) of .64. The results show a post-hoc power estimation of 0.99 suggesting that the sample has substantial power that strengthens statistical conclusion validity.

**TABLE 1. PROFILE OF RESPONDENTS (N=95)**

| Profile | f | % |
|---|---|---|
| **Age** | | |
| **Young Old (60-69)** | 59 | 62 |
| **Middle Old (70-79)** | 30 | 32 |
| **Oldest Old (80 & up)** | 6 | 6 |
| **Gender** | | |
| **Male** | 18 | 19 |
| **Female** | 76 | 81 |
| **Marital Status** | | |
| **Single** | 5 | 5 |
| **Married** | 41 | 43 |
| **Widow/Widower** | 43 | 46 |
| **Separated** | 6 | 6 |
| **Employment Status** | | |
| **Employed** | 10 | 10 |
| **Unemployed** | 85 | 90 |
| **Educational Attainment** | | |
| **No formal education** | 1 | 1 |
| **Elementary Level** | 10 | 10 |
| **Elementary Graduate** | 11 | 12 |
| **High school Level** | 12 | 13 |
| **High school Graduate** | 15 | 16 |
| **College Level** | 21 | 22 |
| **College Graduate** | 21 | 22 |
| **Post Graduate** | 4 | 4 |

To test if expectations regarding aging and health promoting lifestyle significantly predicts health-related quality of life, a regression analysis was done. Table 2 shows the prediction model that shows path b and c' was statistically significant, $F (2, 92) = 21.49$, $p < .001$ and shows that the regression model has an $R^2$ of .39. This means that about 39% of the variability of the dependent variable, which is health related quality of life, is predicted by the independent variables included in the study. The remaining 61% of the variability in the dependent variable is still unaccounted for and may be caused by other variables or external factors that were not included in the study.

Expectations regarding aging, and health promoting lifestyles were used in the regression analysis to predict

health-related quality of life. The unstandardized and standardized regression coefficients of the predictors are also shown in Table 2.

Figure 1 and Table 2 indicate that the independent variables – expectations regarding aging ($\beta$ = .51, $p$ < .001), and health promoting lifestyles ($\beta$ = .22, $p$ = .039) are significant predictors to the dependent variable, health-related quality of life. Both expectations regarding aging and health promoting lifestyles have positive coefficients which means that an increase or decrease of its value will subsequently increase or decrease the level of health-related quality of life, respectively. Further, it means that for every one-point increase in the independent variables there will be a corresponding increase equivalent to the value of its beta coefficient in the level of health-related quality of life. Finally, expectations regarding aging received the strongest weight in the model followed by health promoting lifestyle.

To determine if health promoting lifestyle mediated the relationship between expectations regarding aging and health-related quality of life a mediation analysis was done. The mediation analysis is summarized in Table 2 and illustrated in Figure 1 to show the paths of the relationships between the variables.

The total effect of the independent variable, expectations regarding aging, to the dependent variable, health-related quality of life, is shown as path c. This is the effect without the mediator included. As shown in Table 2 expectations regarding aging's total effect is significant ($\beta$ = .60, $p$ < .001). In comparison, path c' shows the direct effect of the independent towards dependent variable with the inclusion of the mediator variable. Table 2 and Figure 1 shows that it is significant ($\beta$ = .51, $p$ < .001), but the direct effect is less than the total effect (c': $\beta$ = .51 < c: $\beta$ = .60). This reduction in the beta coefficient means that including path b as a mediator may have influenced the effects of the independent variable.

FIGURE 1. MEDIATION MODEL OF EXPECTATIONS REGARDING AGING, HEALTH PROMOTING LIFESTYLE, AND HEALTH-RELATED QUALITY OF LIFE. STANDARDIZED BETA COEFFICIENTS ARE SHOWN.
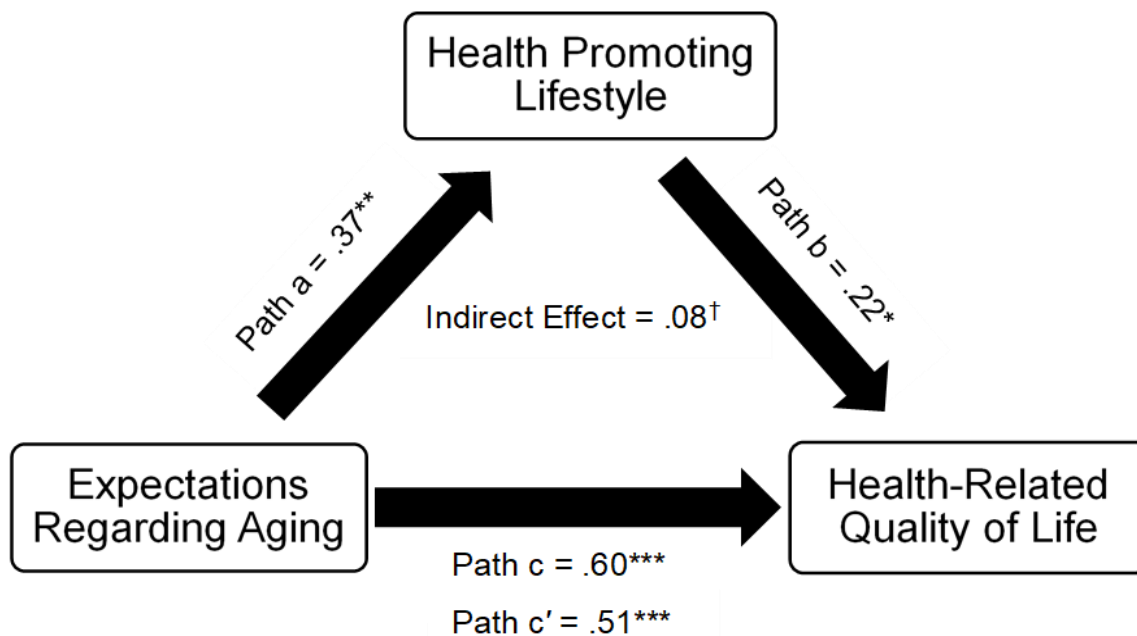


*$p$ < .05. **$p$ < .01. ***$p$ < .001. † significant indirect effect.

**TABLE 2. REGRESSION AND MEDIATION ANALYSIS OF EXPECTATION REGARDING AGING, HEALTH PROMOTING LIFESTYLE, AND HEALTH-RELATED QUALITY OF LIFE**

| Path Model | $R^2$ | F | B | SE (B) | 95% CI | β |
|---|---|---|---|---|---|---|
| **Path b and c': DV = health-related quality of life** | .39 | 21.49*** | | | | |
| **Path b: IV = health promoting lifestyle** | | | 7.44* | 3.52 | [0.40, 14.48] | .22* |
| **Path c': IV = expectations regarding aging** | | | 16.20*** | 3.26 | [9.70, 22.70] | .51*** |
| **Path c: DV = health-related quality of life** | .35 | 36.63*** | | | | |
| IV = expectations regarding aging | | | 18.76*** | 3.10 | [12.57, 24.95] | .60*** |
| **Path a: DV = health promoting lifestyle** | .14 | 10.80** | | | | |
| IV = expectations regarding aging | | | 0.34** | 0.11 | [0.14, 0.55] | .37** |
| **Indirect effect: DV = health-related quality of life** | | | | | | |
| IV = expectations regarding aging  Mediator = health promoting lifestyle | | | 2.56† | 1.33 | [0.01, 5.31] | .08† |

Note. n = 95. B = unstandardized beta. SE = standard error. CI = confidence interval. β = standardized beta. DV = dependent variable. IV = independent variable.

*p < .05. **p < .01. ***p < .001. † significant indirect effect.

Furthermore, path a illustrates that the independent variable, expectations regarding aging, is a significant predictor of the mediator variable, health promoting lifestyle (β = .37, p = .002). This indicates that mediation is present in the model. This would indicate that the independent variable can affect the dependent variable through its effect on the mediator.

The indirect effect of the independent variable towards the dependent variable with the mediator variable was tested using bootstrapping (N = 5,000 samples). These results indicated that the indirect effect coefficient was significant, β = .08, 95% CI [0.10, 5.31]. This mediation analysis is significant because the confidence interval does not include 0.0. Therefore, people can say that they are 95% confident that the true indirect effect is positive.

## DISCUSSION

The results show that aging expectations significantly predicted health promoting lifestyle and health-related quality of life. This means that the older adults who have more positive expectations are more likely to engage in health promoting activities and are more likely to report better health. Moreover, the relationship between aging expectations and health-related quality of life was significantly mediated by health promoting lifestyle. Expectations regarding aging can directly affect health-related quality of life but it can also have an indirect effect through health promoting lifestyle. This suggests that older adults who have positive expectations about their aging are more likely to report of having better health when it is complemented with engagement in health promoting activities.

The results are supported by existing literature that shows that an aging individual's beliefs about the aging process predict health, illness, and health behavior outcomes [6]. Studies have found that aging expectations can become essential determinants of the well-being of an older adult [5]. Numerous studies have shown that having more positive images of one's own aging process and feeling younger are related with better subjective well-being and physical health [7-9].

Expectations of aging can also affect a person's engagement in other health-promoting behaviors such as participating in exercise, eating a healthy balanced diet, use of health care resources, having regular physical examinations, and limiting the use of alcohol and/or

tobacco [12,18]. Empirical evidence further supports the findings which indicates that participation in healthy aging behaviors (i.e., physical activity and a proper diet) offers older adults the greatest opportunity for avoiding or postponing the onset of chronic diseases, and increasing the likelihood of living an active, long life [19]. Warburton and colleagues [20] mentioned the immense literature indicating the health benefits of consistent physical activities including the prevention of several chronic diseases such as osteoporosis, depression, obesity, hypertension, cancer, diabetes, and cardiovascular disease. They also conveyed a dose dependent association with the variables. This means that increase amounts of physical activities lead to better improvements in health. Wen and colleagues [21] showed a reduction in mortality in older persons with and without disabilities who engaged in minimal physical activities only. Positive aging expectations were also linked to an improved self-reported physical and mental health and this association between aging expectations and health were partially mediated by engagement in health-promoting behaviors such as interpersonal relations, stress management, and physical activities [13].

## LIMITATIONS

The current study was limited in using a descriptive correlational design. These potential limitations should be considered in the generalizability of the findings to other settings and populations. Specifically, due to the sampling design, the results may not be applicable to other populations or settings outside the study and may not represent the older adult population. Furthermore, since the design is cross-sectional and non-experimental, causality cannot be inferred between the variables. These limitations can guide the future direction of research in this area of interest.

## CONCLUSION

The findings suggest that older adults in the study who have positive aging expectations and engage in health promotion activities are more likely to report better health. Based on the findings, it is recommended to promote activities that develop or enhance positive and realistic expectations towards aging. There should also be activities that would promote engagement in health-promoting activities that will positively affect the health status of older adults. Moreover, interventions should be designed in a

way that will promote synergy of the of having positive aging expectations and doing health-promoting activities that can favorably impact the older adults' health and well-being. Further, studying the effects of older adults' expectations and engagement in healthy behaviors towards health and well-being can provide crucial information on how to design appropriate health and wellness programs. These programs could be organized by non-government organizations, local government units, and health care practitioners especially nurse gerontologists.

Furthermore, future researchers may explore the possible factors that may influence aging expectations and engagement in health promoting behaviors. Researchers could conduct a longitudinal study to establish the clear temporal and causal link between aging expectations, engagement in health-promoting behaviors, and health and well-being. Researchers may investigate other objective measures that would assess health and well-being such as physical examinations or diagnostic tests. Lastly, future researchers could look into effective interventions to enhance aging expectations and engagement in health promoting behaviors.

### CONFLICT OF INTERESTS
The author declares no potential conflicts of interest concerning this research.

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# DOCTOR WORKPLACE ATTRITION: AN EXAMINATION OF PATHWAYS FROM WORK DEMANDS TO ORGANISATIONAL COMMITMENT

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## ABSTRACT

Health workforce shortages worldwide are approaching crisis point, further burdening systems already struggling to meet demand. Doctor attrition has been identified as a major contributor to this problem and therefore, the current study examined links between workload demands and stressors, and doctors' commitment. Based on prior research and key psychological theories, pathways were hypothesised that were initiated by workload demands and stressors, proceeding through work-life conflict and psychological distress, intrinsic motivation factors, through to commitment. A sample of 208 medical doctors completed self-report measures of these constructs. Among workload hassles and demands, quantitative demands, representing the extent that workload exceeds available resources (e.g., time) emerged as the strongest predictor. Meaningfulness of work was the strongest direct predictor of commitment, followed by work-life conflict, job satisfaction and burnout. This study highlights the importance of workplaces providing an environment that nurtures doctors' intrinsic motivation and manages doctor workloads to ensure work-life balance is maintained.

### KEYWORDS

turnover; attrition; job satisfaction; doctor burnout; doctor stress

## INTRODUCTION

Health workforce shortages currently present a critical problem in Australia and internationally, placing tremendous pressure on already overburdened healthcare systems. (1, 2) These shortages are escalating, with a global shortfall of 12.9 million workers predicted in coming decades. (2) This places additional burden on a system already struggling to cope with demand. (3) Overburdened healthcare systems drive increased strain on individual practitioners, poorer quality of work and health outcomes, and can lead to workforce attrition, thus further compounding the problem. (4, 5)

Concerns regarding health workforce, work performance, and attrition have long been recognised. For example,

almost a quarter of a century ago, Williams, Michie, and Pattani (6) highlight an array of issues relating to doctor workloads, job pressures, work-life balance, and the enormous economic burden of understaffing and staff absence; themes that have been repeatedly echoed up to the current day. However, these challenges remain poorly understood, in part due to our limited understanding of the factors that contribute to the attrition of medical practitioners. The current study is both novel and ambitious in its scope and draws on several lines of evidence and theoretical propositions to articulate a model that explains workplace attrition among doctors. The model stipulates pathways initiated by workload demands and stressors, proceeding through work-life conflict and psychological distress, intrinsic motivation factors, and terminates at workplace commitment (hereon, commitment). The complexity of this model requires introducing multiple bodies of evidence and theoretical positions. Figure 1 is a useful reference point to navigate the following material.

For the current investigation, the outcome variable 'commitment' is adopted as an inverse proxy operationalisation of workplace attrition as it is expected to be easier for doctors to contemplate and report on their level of commitment rather than intentions to quit. Therefore, variation in workplace commitment is a useful means of measuring attrition, as these two constructs are conceptually strongly, though inversely correlated. The definition and operationalisation of workplace commitment used in the current study is derived from its conceptualisation within the Copenhagen Psychosocial Questionnaire subscale 'Commitment to the workplace'. This is defined as "...the degree to which one experiences being committed to ones' workplace." (p. 497). (7) Unfortunately, the scale developers do not elaborate on the conceptual bases of this construct though, of the three generally acknowledged types of organisation commitment (8), it appears closest to affective commitment or wanting to remain due to an emotional attachment rather than a perceived need to stay (i.e., continuance commitment) or a sense of obligation (i.e., normative commitment).

Despite the broader context of the study being health workforce shortages, this study focuses on the more immediate context of a doctors' current workplace commitment. Attrition to the current workplace is considered a useful reference frame within which to test important hypotheses that have implications for broader contexts.

## ATTRITION AS A FUNCTION OF DOCTOR MOTIVATION

Motivation has an important role to play in driving doctor attrition and workplace commitment. Self-determination theory (SDT) is an influential framework that has been successfully applied to understanding motivation across a range of contexts including work motivation. (9) Medical work can be rich in both extrinsic and intrinsic motivators, however extrinsic motivators appear less important for doctors. Medical students rate intrinsic factors (internal rewards and fulfilment) as more influential in their career choice with person-oriented factors, such as the opportunity to work and care for people, considered more important than extrinsic factors such as money and prestige. (10, 11) This emphasis on intrinsic motivation appears to remain an important driving force throughout a doctor's career. For example, the majority of senior doctors (i.e., those successfully retained in the workforce) report being intrinsically motivated, identifying with medicine as a calling, which is associated with the sense of meaningfulness of their work, workplace commitment, and job satisfaction. (12, 13) This emphasis on the importance of intrinsic motivation is consistent with evidence that extrinsic motivators, such as financial incentives are insufficient for producing job satisfaction and enhancing workplace commitment. (13, 14) The importance of intrinsic motivation is further underscored by evidence that doctors who fail to derive a sense of satisfaction from their job are two to three times more likely to leave. (15) A more recent study involving nurses showed that intrinsic motivation also significantly predicted their work engagement. (16)

High workplace demands and stressors can interfere with the ability of doctors' work to support their intrinsic motivation. This is most readily observed in a reduction of doctors' sense of meaningfulness in their work and the degree of satisfaction with their work. Therefore, lower job satisfaction (H1a) and meaningfulness of work (H1b) are expected to predict decreased commitment. Recognising the importance of a sense of meaningfulness of work for sustaining job satisfaction, it is also hypothesised that lower meaningfulness of work will predict lower job satisfaction (H2).

## BURNOUT AMONG DOCTORS

Burnout is defined as a specific form of stress associated with prolonged exposure to occupational stressors, which results in a condition characterised by emotional exhaustion, depersonalisation, and reduced feelings of accomplishment. (17) Key indicators and outcomes of burnout involve exhaustion accompanied by personal

distress, decreased motivation, feelings of reduced effectiveness, dysfunctional behaviours and attitudes toward work, and job withdrawal. (18, 19) Burnout is prevalent among doctors at an alarming rate, which is almost twice that of the general working population. (20) In fact, more than half of Australian and US doctors experience symptoms of burnout (20, 21) with the prevalence among junior doctors as high as 75%. (22) Concerningly, many doctors do not access support to deal with stress and burnout citing time constraints, availability of services, and stigma among the greatest barriers. (23, 24) This is especially unfortunate given psychosocial support has been found to be helpful in many circumstances. (25, 26)

The results of burnout can be both wide-ranging and damaging. The personal consequences of burnout among doctors include psychological disorder, ill-health, disrupted relationships, and suicidal ideation. (27-29) The consequences of doctor burnout for patients include increased medical errors and suboptimal patient care. (30, 31) At the organisational level, burnout diminishes intrinsic motivation and appears to be the single greatest predictor of job dissatisfaction. (32, 33) Burnout can also lead to a decrease in the meaningfulness of work and reduced personal and professional satisfaction. (20, 28) Burnout has also been associated with low physician productivity (resulting in reduced working hours), absenteeism, low organisational commitment, greater intention to leave the practice or profession, early retirement, and turnover. (34-37)

This evidence supports the notion that burnout decreases intrinsic motivational factors necessary to sustain commitment. Therefore, higher reported burnout is hypothesised to predict decreased job satisfaction (H3a) and meaningfulness of work (H3b). It is also hypothesised that higher burnout will directly predict lower commitment (H4).

## CAUSES OF BURNOUT

A number of factors have been associated with burnout. Occupational stress has been strongly associated with burnout among medical professionals. (38, 39) Work-life conflict combined with ongoing work stress represents a chronic strain that often results in burnout. (40, 41) Studies of varying professional populations show individuals experiencing work-life conflict are more likely to suffer stress and burnout. (42, 43) This is also the case with doctors, for whom work-life conflict is a strong predictor of burnout and

stress. (21, 44) Doctors also face unique factors contributing to burnout such as moral distress arising from their "… inability to act in accord with their individual and professional ethical values" (p. 409). (45) Finally, maladaptive coping strategies such as behavioural disengagement has also been linked to increased burnout among doctors. (46) For the current study, an increase in stress (H5a) and work-life conflict (H5b) is predicted to predict increased burnout.

## STRESS AND WORK-LIFE CONFLICT

The transactional theory of stress and coping (47) stipulates that stress results from interactions between an individual and their environment. These interactions trigger a two-stage appraisal process that determines whether, and to what degree, stress is experienced. Primary appraisals involve assessing the stressor (stimuli or situation) to determine its 'threat' level, whereas secondary appraisals involve evaluating available resources to cope with the threat. (48) Accordingly, work-related stressors represent demands placed on the individual that are appraised as potentially threatening and straining available resources. The often-excessive work demands faced by doctors, such as high-pressure environments, high-stakes decision-making, heavy workloads, and long hours, place them at elevated risk of experiencing high levels of stress. (20, 28, 49) Consequently, work demands have been shown to be an important contributor to the alarmingly high rates of stress observed among Australian doctors. (21, 23, 50) Doctors in both Australia and the UK have indicated that work demands were their greatest source of stress. (49, 51)

One means by which work-related demands contributes to stress is by generating work-life conflict, which is particularly likely in cases of work overload. (52) Work-life conflict occurs when work demands interfere with private life and has been a noteworthy problem for doctors with almost two thirds of doctors reporting dissatisfaction with their work-life balance, which is almost twice that of the general population. (20, 28) In fact, work-life conflict is the second most frequently reported cause of stress for doctors. (49, 51) A nationwide study found that 44.3% of doctors had experienced a work-life conflict associated with work demands within the past three weeks. (44)

A fulfilling private life can be an important protective factor against stress and burnout for professionals. (53) That is, it can support a positive secondary appraisal of sufficient resources leading to lower total stress. However, when work demands begin to interfere with doctors' private life, it

represents a loss of this resource and may produce a compound effect on stress. An increase in job demands combined with the resultant work-life conflict is associated with an increase in both stress and burnout. (43)

Therefore, increased work-life conflict is expected to predict greater reported stress (H6). Further, greater workload demands (e.g., increased work hours, shift-work, additional shifts, on-call work, working late, as well as perceived quantitative, cognitive, and emotional demands) is expected to predict greater stress (H7a), and work-life conflict (H7b).

## WORK-RELATED DEMANDS AMONG DOCTORS

Medical work involves many stressors including excessive workloads, workplace inefficiencies, unhealthy occupational cultures, a lack of work-life balance, abuse from patients, fear of making errors, and a lack of control and autonomy. (21, 30, 50, 54, 55) The determination of factors to incorporate in the current study was made considering evidence showing stressors relating to excessive workload demands are the most commonly reported cause of strain for doctors, with the volume of work, shift work, and on-call work being particularly problematic. (21, 23, 49, 51)

Previous research has established links between heavy workloads with burnout, work-life conflict, and stress. (21, 23, 28, 39, 56, 57) These issues also have influences on reduced job satisfaction and turnover intention. (53, 58) Excessive work hours have been associated with increased stress, burnout, and work-life conflicts, and decreased job satisfaction and quality of life. (59, 60) On-call work, shift work, and night work when combined with high job demands has also been associated with stress, burnout, turnover intention, and early retirement. (58, 61, 62)

Consistent with the transactional model of stress, a combination of both objective and subjective (perceived) demands are liable to be appraised as stressful and straining available resources. Specifically, the perception of excessive demands is likely to contribute to stress even for doctors not working long hours, overtime, or extra shifts.

Therefore, the current study incorporated self-perceived quantitative, cognitive, and emotional demands. Quantitative demands represent the perception of the amount of work to be done relative to the resources (e.g., time) available to do it. Doctors commonly report a belief that their workload exceeds the available time and resources resulting in elevated stress. (49, 51, 63) Cognitive demands represent the cognitive effort required to carry out tasks. This is high among doctors whose work is often intellectually demanding, highly technical, and requires high-stakes decision-making. (5, 20) Emotional demands represent the amount of emotional effort required to complete the work. Emotional demands of medical work can be challenging due to the nature of their 'helping role'. (63) Doctors are also required to regulate their own emotional state in a context that is often highly emotionally charged. (64) Emotional and quantitative demands have previously been found to strongly predict burnout in doctors indirectly via increased work-life conflict. (65)

The current study assesses five objective demands (hours worked, shift work, working additional shifts, on-call work, and working late) and three subjective demands (cognitive, emotional, and quantitative). It is hypothesised that increased objective and subjective demands will predict an increase in stress (H7a) and work-life conflict (H7b). No hypotheses are specified about the relative influence of these eight demands. Rather the current analysis examines the role of each as an independent predictor of stress and work-life conflict.

## THE CURRENT STUDY

The aim of the current study was to examine pathways that link workload demands and stressors to doctors' work commitment. The hypotheses stated above represent pathways (shown by arrows in Figure 1) initiated by workload demands and stressors, proceeding through work-life conflict, emotional difficulties (stress and burnout), and reduction in intrinsic motivators (meaningfulness and satisfaction of work) through to commitment to the workplace (as a proxy operationalisation for attrition). This current study aims to test the plausibility of this causal chain and the parameters within it.

FIGURE 1. HYPOTHESISED MODEL PREDICTING WORKPLACE COMMITMENT WITH DIRECT EFFECTS REPRESENTED BY ARROWS AND INDIRECT EFFECTS IMPLIED BY VARIABLES LINKED BY MORE THAN ONE ARROW.
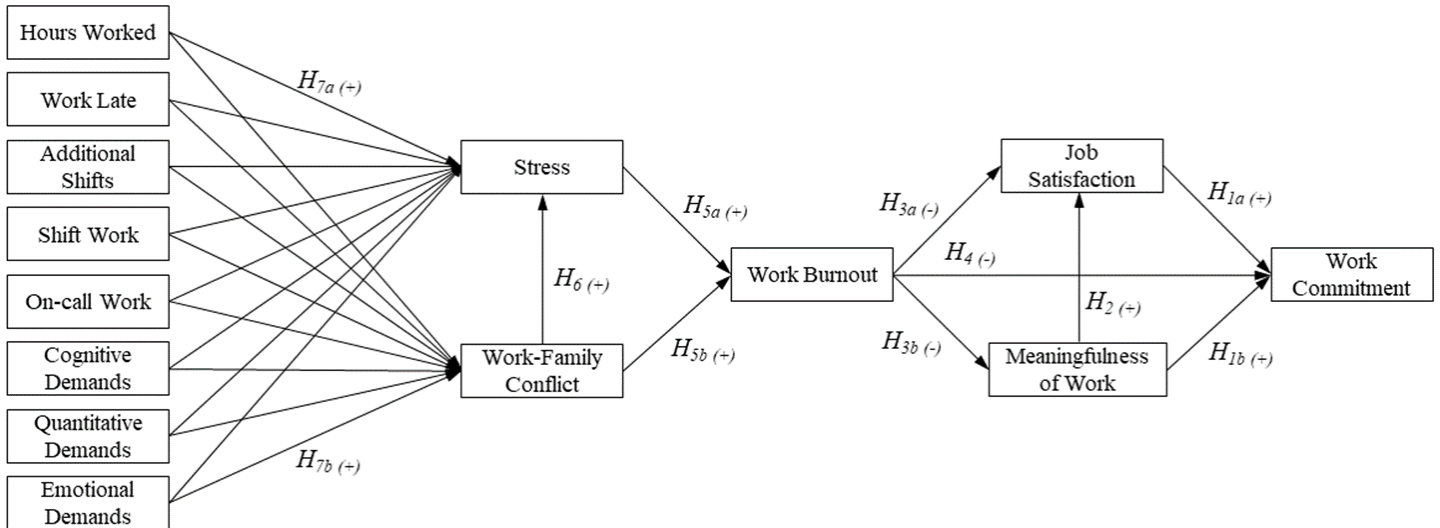


## METHOD

### PARTICIPANTS

Participants were 208 Australian registered medical doctors, 80.9% women and 19.1% men, aged between 24 and 82 years (M = 37.96, SD = 9.61). Most were married or in de facto relationships (77%) and had children (60.8%). The average number of years worked as a doctor was 12.56 (SD = 9.70). Most participants were in full-time employment working 30 hours or more per week (72.7%).

### MEASURES

**COPSOQ-II.** Seven variables were measured using subscales of the Copenhagen Psychosocial Questionnaire, second version (COPSOQ-II). (66) The subscales used were Quantitative Demands, Cognitive Demands, Emotional Demands, Meaning of Work, Commitment to the Workplace, Job Satisfaction, and Work-family Conflict (items on this scale reference conflict between work and private life rather than family, so we refer to as Work-life conflict for clarity). Each scale contains three to four questions such as 'Do your friends or family tell you that you work too much?' (work-life conflict subscale), and 'Do you feel that the work you do is important?' (meaning of work subscale). Participants rate each item on a 5-point Likert-type scale from 1 to 5 with value labels varying by question (e.g., from "Always" to "Never/hardly ever" or from "To a very large extent" to "To a very small extent"). Subscales utilised in the current study have demonstrated acceptable reliability (a = .74 to .87, and .71 to .85 in the

current sample) and supporting convergent and discriminant validity.

**Burnout.** Work-related burnout (hereon, burnout) was measured using the 7-item Burnout subscale from the Copenhagen Burnout Inventory (CBI). (67) Participants respond to items (e.g., 'Do you feel worn out at the end of the working day?') on a 5-point Likert-type scale (1 = "always or to a very high degree" to 5 = "never/almost never or to a very low degree"). The CBI has demonstrated excellent reliability (a = .85 to .87, and .85 in the current sample) as well as corroborating convergent and discriminant validity. (67)

**Stress.** Stress was measured using the stress sub-scale of the Depression and Anxiety Stress Scales, 21-item version (DASS-21). (68) This subscale contains seven items describing negative emotional states such as "I found it hard to wind down". Participants rate how much each applied to them over the past week on a 4-point Likert-type (0 = "not at all" to 3 = "very much, or most of the time"). The stress sub-scale has demonstrated excellent reliability (a = .90 to .91, and .85 in the current sample) and good convergent and discriminant validity. (68-70)

### PROCEDURE

Convenience sampling was used to recruit participants through advertisements on social media (i.e., Facebook forums and groups); advertisements placed in medical journals and newsletters; and snowball sampling (i.e., at the

completion of the survey, participants were asked to share a study invitation with relevant friends and colleagues). Participation was anonymous, and responses were confidential. No incentives were offered for participating in the study. The study was approved by the host institution's ethics review committee and the study was carried out in compliance with APA ethical standards for the treatment of human samples.

### DATA SCREENING AND ANALYSIS

Analyses were conducted using Mplus (Version 8) (71) and SPSS Statistics (Version 25). To accommodate non-normality among several variables, the robust maximum likelihood estimation approach will be used since it can accommodate non-normality. (71) This estimation method is also able to accommodate the count and ordinal indicators used in the model. For bivariate correlation analyses, bias-corrected bootstrapped confidence intervals (BCa CIs) will be calculated.

Regarding sample size requirements, the model contained 14 variables, 208 observations, and 37 free parameters to be estimated. Therefore, N:q = 5.62 exceeding the recommended observation (N) to parameter (q) ratio of five. (72) Furthermore, the 14.86 cases per variable also exceeds the recommendation of 10 cases per variable. (73) Eight percent of total values were missing completely at random, Little's $\chi2(df = 32) = 37.28$, $p = .239$. Therefore, the full information maximum likelihood (FIML) estimation method will be used to estimate model parameters in order to retain the full sample. (74)

Model fit will be assessed using chi-square tests along with indices of incremental fit (CFI), and 'badness-of-fit' (RMSEA and SRMR). RMSEA and SRMR values <.08 (≤.05 for excellent fit), and CFI and TLI values >.90 (≥.95 for excellent

fit) will be interpreted as confirming the fit of the model. (75, 76)

## RESULTS

Preliminary correlation analyses were first conducted to determine the relationships among variables and the plausibility of the modelled pathways (see Table 1, square bracketed values below represent the BCa CIs). Strong positive relationships were found between the dependent variable commitment and both meaningfulness of work [.57, .75] and job satisfaction [.52, .69] with a strong negative relationship found between commitment and burnout [-.64, -.42]. A moderate positive relationship was found between meaningfulness of work and job satisfaction [.32, .58] with moderate negative relationships found between burnout and job satisfaction [-.59, -.34] and burnout and meaningfulness of work [-.52, -.24]. Strong positive relationships were also found between stress and burnout [.50, .67]; work-life conflict and burnout [.57, .73]; and work-life conflict and stress [.47, .66].

All work-related demands, both objective and subjective, were found to have a positive relationship with work-life conflict. Quantitative demands [.33, .58] and working late [.17, .44] exhibited a moderate relationship, while hours worked [.09, .37], shift work [.07, .32], being on-call [.01, .27], working extra shifts [.01, .29], cognitive demands [.13, .39] and emotional demands [.06, .34] exhibited small associations. In contrast, only three of the work-related demands were related to stress such that quantitative demands [.25, .49] exhibited a moderate relationship, whereas working late [.09, .36] and emotional demands [.10, .39] exhibited a small relationship. Interestingly, a moderate inverse relationship emerged between number of hours worked and emotional demands [-.31, -.03].

**TABLE 1: CORRELATIONS AMONG ALL STUDY VARIABLES (N=208)**

|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Hours | - | | | | | | | | | | | | |
| 2. Shift work | .15* | - | | | | | | | | | | | |
| 3. On-call work | .22* | .19** | - | | | | | | | | | | |
| 4. Extra shift | .31*** | .30*** | .35*** | - | | | | | | | | | |
| 5. Work late | .28*** | .09 | .05 | .30*** | - | | | | | | | | |
| 6. Q Demands | .11 | -.03 | .15* | .27*** | .51*** | - | | | | | | | |
| 7. C Demands | .06 | .16* | .25*** | .26*** | .21** | .21** | - | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8. E Demands | -.18** | -.02 | -.10 | .08 | .18** | .17* | .38*** | - | | | | | |
| 9. Conflict | .24** | .20** | .14* | .16* | .31*** | .46*** | .26*** | .20** | - | | | | |
| 10. Burnout | .03 | .14* | .05 | .11 | .29*** | .41*** | .31*** | .39*** | .66*** | - | | | |
| 11. Stress | -.08 | .12 | .09 | .08 | .23*** | .38*** | .13 | .25*** | .57*** | .59*** | - | | |
| 12. Meaning | .00 | -.05 | .05 | .06 | .01 | -.07 | .11 | .10 | -.19** | -.39*** | -.22 | - | |
| 13. Satisfaction | -.06 | -.13 | -.19** | -.18* | -.18** | -.32*** | -.16* | .03 | -.35*** | -.47*** | -.28*** | .45*** | - |
| 14. Commitment | -.07 | -.06 | -.01 | -.01 | -.03 | -.24*** | -.03 | -.02 | -.28*** | -.53*** | -.34*** | .67*** | .61*** |

Note: Hours = number of hours worked in an average week; Burnout = work-related burnout; Q Demands = quantitative demands; C Demands = cognitive demands; E Demands = emotional demands; Meaning = work meaningfulness; Commitment = work commitment
*p < .05, **p < .01, ***p < .001.

## OVERALL MODEL FIT

Overall, the model fit to the data was marginal to acceptable, χ2(38) = 94.70, p < .001, RMSEA = .085, CFI = .90, SRMR = .050. Adequate model fit was achieved according to CFI and SRMR but not χ2 or RMSEA.

The proportion of variance in the endogenous variables explained by the model is summarised in Table 2. The model accounted for between 15% (meaningfulness of work) and 60% (commitment) of variance in the outcomes modelled. These represent large effect sizes for all outcomes except meaningfulness of work, for which the effect size was medium.

Model modification indices suggest improvements in fit would be achieved by freeing pathways regressing burnout onto emotional demands (β = 0.23), meaningfulness of work onto cognitive demands (β = 0.24), and meaningfulness of work onto emotional demands (β = 0.26). These modifications yielded a good fitting model according to all indicators, χ2(35) = 52.21, p = .020, RMSEA = .051, CFI = .97, SRMR = .038.

## HYPOTHESIS TESTING

The specific hypotheses were modelled and tested by estimating standardised and unstandardized regression coefficients (see Table 3 and 4). Parameter estimates for the significant pathways are included in Figure 2, with non-significant pathways represented in grey.

**TABLE 2: MULTIPLE COEFFICIENT OF DETERMINATION FOR MODELLED ENDOGENOUS VARIABLES**

| Variable | $R^2$ |
|---|---|
| Stress | .42 |
| Work-family conflict | .32 |
| Work-related burnout | .50 |
| Job satisfaction | .31 |
| Meaningfulness of work | .15 |
| Work commitment | .60 |

**TABLE 3: UNSTANDARDISED ESTIMATES OF THE MODELLED DIRECT AND INDIRECT EFFECTS**

| Predictor | Direct Effects | | | | | | Indirect Effects | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Conflict | Stress | Burnout | Meaning | Satisfact | Commit | Stress | Burnout | Meaning | Satisfact | Commit |
| IVs | | | | | | | | | | | |
| Hours worked | 0.01** | -0.13*** | - | - | - | - | 0.06** | 0.09 | <-0.01 | <-0.01 | <-0.01 |
| Shift work | 0.10** | 0.30 | - | - | - | - | 0.55** | 2.03** | -0.03** | -0.02** | -0.05** |

| Predictor | Conflict | Stress | Burnout | Meaning | Satisfact | Commit | Stress | Burnout | Meaning | Satisfact | Commit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| On-call work | 0.03 | 0.58 | - | - | - | - | 0.13 | 0.92 | -0.01 | -0.01 | -0.02 |
| Additional shifts | -0.13 | -0.07 | - | - | - | - | -0.71 | -2.38 | 0.03 | 0.03 | 0.06 |
| Work late | 0.01 | 0.36 | - | - | - | - | 0.03 | 0.39 | -0.01 | -0.01 | -0.01 |
| Quant demands | 0.37*** | 1.18 | - | - | - | - | 1.99*** | 7.48** | -0.09*** | -0.09*** | -0.18*** |
| Cognitive demands | 0.11 | -1.29 | - | - | - | - | 0.57 | 0.77 | -0.01 | -0.01 | -0.02 |
| Emotional demands | 0.14* | 1.36 | - | - | - | - | 0.77** | 3.66** | -0.05* | -0.04* | -0.09** |
| Mediators | | | | | | | | | | | |
| Hours worked | - | 5.37*** | 12.99*** | - | - | - | - | 4.51*** | -0.22*** | -0.20*** | -0.42*** |
| Stress | - | - | 0.84*** | - | - | - | - | - | -0.01*** | <-0.01** | -0.02*** |
| Burnout | - | - | - | -0.01*** | -0.01*** | -0.01*** | - | - | - | -0.01*** | -0.01*** |
| Meaning | - | - | - | - | 0.25*** | 0.63*** | - | - | - | - | 0.14** |
| Satisfaction | - | - | - | - | - | 0.56*** | - | - | - | - | - |

Note: IVs = Independent variables; Quant demands = Quantitative demands; Burnout = Work-related burnout; Meaning = Work meaningfulness; Satisfact = Satisfaction; Commit = Work commitment

*p < .05, **p < .01, ***p < .001.

## TABLE 4: STANDARDISED ESTIMATES OF THE MODELLED DIRECT AND INDIRECT EFFECTS

| | Direct Effects | | | | | | Indirect Effects | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Predictor | Conflict | Stress | Burnout | Meaning | Satisfact | Commit | Stress | Burnout | Meaning | Satisfact | Commit |
| IVs | | | | | | | | | | | |
| Hours worked | .21** | -.23*** | - | - | - | - | .11** | .06 | -.02 | -.03 | -.03 |
| Shift work | .20** | .06 | - | - | - | - | .10** | .14** | -.06** | -.07** | -.08** |
| On-call work | .13 | .08 | - | - | - | - | .02 | .05 | -.02 | -.02 | -.03 |
| Additional shifts | -.13 | -.01 | - | - | - | - | -.07 | -.08 | .03 | .04 | .05 |
| Work late | .01 | .06 | - | - | - | - | .01 | .02 | -.01 | -.01 | -.01 |
| Quant demands | .42*** | .13 | - | - | - | - | .22*** | .32*** | -.12*** | -.15*** | -.17*** |
| Cognitive demands | .10 | -.11 | - | - | - | - | .05 | .03 | -.01 | -.01 | -.01 |
| Emotional demands | .14* | .13 | - | - | - | - | .07** | .13** | -.05* | -.06* | -.07** |
| Mediators | | | | | | | | | | | |
| Hours worked | - | .52*** | .48*** | - | - | - | - | .17*** | -.25*** | -.30*** | -.35*** |
| Stress | - | - | .32*** | - | - | - | - | - | -.12*** | -.15** | -.17*** |
| Burnout | - | - | - | -.39*** | -.35*** | -.22*** | - | - | - | -.12*** | -.32*** |
| Meaning | - | - | - | - | .07*** | .44*** | - | - | - | - | .10** |
| Satisfaction | - | - | - | - | - | .31*** | - | - | - | - | - |

Note: IVs = Independent variables; Quant demands = Quantitative demands; Burnout = Work-related burnout; Meaning = Work meaningfulness; Satisfact = Satisfaction; Commit = Work commitment

*p < .05, **p < .01, ***p < .001.

FIGURE 2. HYPOTHESISED MODEL CONTAINING SIGNIFICANT PARTIAL STANDARDISED REGRESSION COEFFICIENTS AND MULTIPLE COEFFICIENTS OF DETERMINATION. SIGNIFICANT PATHWAYS ARE REPRESENTED BY BLACK LINES, NON-SIGNIFICANT PATHWAYS ARE GREYED OUT.
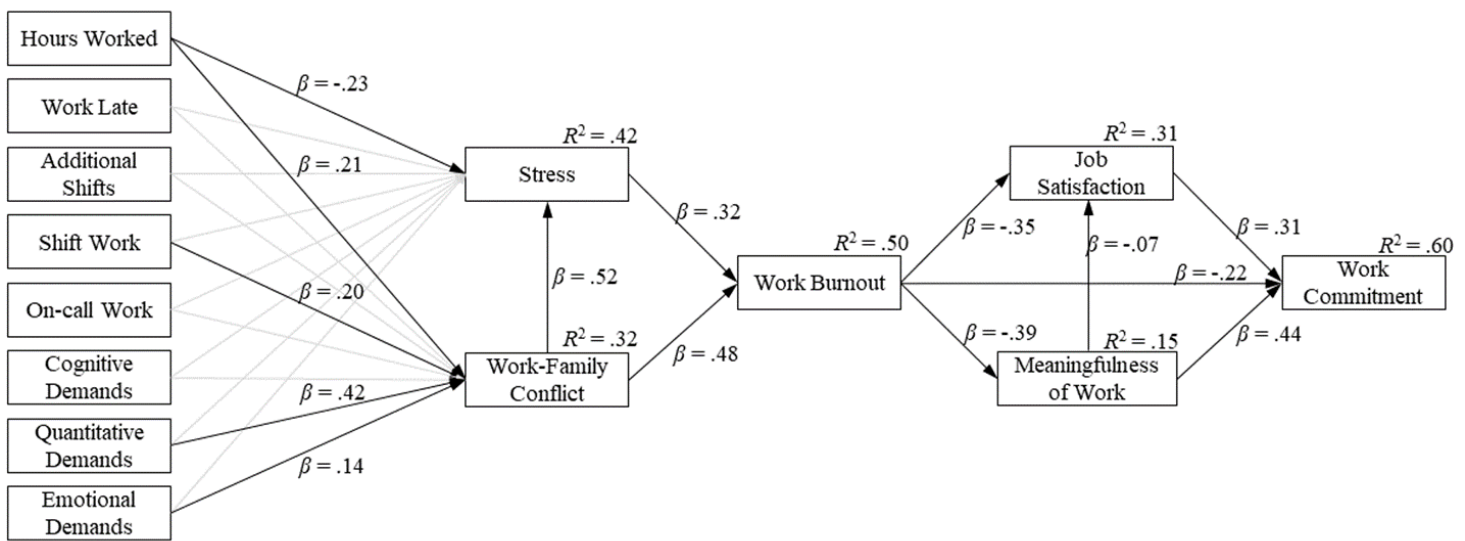


Meaningfulness of work was a direct, moderate positive predictor of commitment, as well as an indirect, weak positive predictor via job satisfaction. It was also a direct, weak positive predictor of job satisfaction, while job satisfaction was a direct, moderate positive predictor of commitment. Burnout was a direct, moderate negative predictor of meaningfulness of work, job satisfaction, and commitment. In addition to being a direct predictor of commitment, burnout was an indirect, moderate negative predictor of commitment via meaningfulness of work and job satisfaction. Likewise, in addition to being a direct predictor of job satisfaction, burnout was also an indirect, weak negative predictor of job satisfaction via meaningfulness of work. Work-life conflict was a direct, strong positive predictor of stress and moderate positive predictor of burnout. It was also an indirect, moderate negative predictor of commitment, job satisfaction and meaningfulness of work via burnout; and an indirect, weak positive predictor of burnout via stress. Stress was a direct, moderate positive predictor of burnout and an indirect, weak negative predictor of commitment, job satisfaction and meaningfulness of work via burnout.

Not all work-related demands were unique predictors of stress and work-life conflict. Quantitative demands was a direct, moderate positive predictor of work-life conflict while also being an indirect, moderate positive predictor of stress and burnout and an indirect, weak negative predictor of meaningfulness of work, satisfaction, and commitment. Hours worked was a direct, moderate positive predictor of work-life conflict and a direct, moderate negative predictor of stress while being an indirect, weak positive predictor of stress. Shift work was a direct, moderate positive predictor of work-life conflict, while emotional demands was a direct, weak positive predictor of work-life conflict with both shift work and emotional demands being indirect, weak positive predictors of stress and burnout and indirect, weak negative predictors of meaningfulness of work, job satisfaction, and commitment. The indirect predictive effects observed for all work-related demands result from small to moderate relationships with work-life conflict.

## DISCUSSION

The aim of the current study was to examine links between work-related demands and stressors and doctors' workplace commitment (serving as a proxy for attrition). An examination of doctor attrition is urgently needed given that health workforce shortages are rapidly approaching crisis point and are further burdening a system already struggling to meet demand. The current study tested a set of theoretical and empirically derived hypotheses regarding the causes and processes involved in workplace attrition. The results of the hypotheses testing are summarised in Table 5. A structural path model representing these hypotheses (Figure 2) showed marginal fit to the data. Overall, the modelled relationships were successful in explaining large proportions of variance in all outcome variables except meaningfulness of work (for which a moderate amount of variance was explained).

**TABLE 5: SUMMARY OF THE RESULTS OF HYPOTHESES TESTING**

| | Hypothesis | Supported |
|---|---|---|
| $H_1$ | Lower ratings of job satisfaction ($H_{1a}$) and meaningfulness of work ($H_{1b}$) will predict decreased ratings of work commitment | Yes |
| $H_2$ | Lower ratings of meaningfulness of work will predict lower ratings of job satisfaction ($H_2$) | Yes |
| $H_3$ | Higher work-related burnout scores will predict decreased job satisfaction ($H_{3a}$) and meaningfulness of work ratings ($H_{3b}$) | Yes |
| $H_4$ | Higher work-related burnout scores will directly predict lower ratings on work commitment ($H_4$) | Yes |
| $H_5$ | Increase in ratings of stress ($H_{5a}$) and work-family conflict ($H_{5b}$) will predict increased work-related burnout | Yes |
| $H_6$ | Higher ratings of work-family conflict will predict greater reported stress ($H_6$) | Yes |
| $H_7$ | Higher scores on work-related demands will predict greater reported stress ($H_{7a}$); and increased ratings of work-family conflict ($H_{7b}$) | Partially |

It was hypothesised that lower job satisfaction (H1a) and meaningfulness of work (H1b), and higher burnout (H4), would predict decreased commitment. The results corroborated these hypotheses, with job satisfaction and meaningfulness of work positively predicting, and burnout negatively predicting commitment, all with moderate effect sizes. Meaningfulness of work was the strongest independent predictor of commitment, being almost twice as strong as burnout (and 41.9% greater than job satisfaction). These results suggest that doctors who are intrinsically motivated by deriving meaningfulness and satisfaction from their work are much more likely to be committed to their workplace, and that doctors suffering from burnout are likely to have lower commitment. Stress and work-life conflict were indirectly associated with commitment, which suggest that mitigating burnout, by targeting stress and work-life conflict may be an effective approach to increasing commitment, likely resulting from an increase in the meaningfulness of work. These findings are consistent with several premises of SDT, according to which, doctors engaging in their work by choice due to it being meaningful to them, will derive a greater degree of satisfaction from it and be more committed. (77, 78) These findings are also consistent with those of Tak, Curlin, and Yoon (13) who found that intrinsically motivated doctors were more likely to be satisfied with their job, derive meaning from their work and have a higher level of commitment; while burnout served to erode these positive outcomes.

Lower meaningfulness of work was hypothesised to predict lower job satisfaction (H2). The results corroborated this

hypothesis with meaningfulness of work being a positive, albeit weak predictor of job satisfaction (though this is a partial coefficient representing the association independent of variance shared with work burnout). Therefore, independently of work burnout, doctors who do not find their work to be meaningful are also less likely to be satisfied with their job. This finding is also consistent with SDT, as well as with previous findings by Berdud et al. (12) who demonstrated that a lack of intrinsic motivation is associated with reduced meaningfulness of work and job satisfaction.

Increase stress (H5a) and work-life conflict (H5b) were hypothesised to predict increased burnout, which in turn, would predict decreased job satisfaction (H3a) and meaningfulness of work (H3b). The results also corroborated these hypotheses, with stress and work-life conflict emerging as moderate positive predictors of burnout, while burnout was a moderate negative predictor of both job satisfaction and meaningfulness of work. Work-life conflict was the greatest independent predictor of burnout, being 50% stronger than stress. Work-life conflict (medium effect) and stress (weak effect) also emerged as indirect negative predictors of meaningfulness of work and job satisfaction. Therefore, predictably, doctors reporting greater stress and work-life conflict are more likely to report burnout and doctors reporting greater burnout are likely to be less satisfied and find less meaning in their work. This is consistent with prevailing conceptualisations of burnout, which indicate that ongoing occupational stress results in burnout, which constitutes a lack of personal accomplishment, depersonalisation and emotional

exhaustion. (17) This finding is consistent with those of Dyrbye et al. (79) who reported that work-life conflict was strongly associated with burnout and stress. These findings are also consistent with those of Shanafelt et al. (20) who also found that burnout was linked to a decrease in satisfaction and meaningfulness of work.

It was hypothesised that greater work-life conflict would predict greater stress (H6). The results corroborated this hypothesis and showed that work-life conflict was a strong unique positive predictor of stress. The current results also show that work-life conflict is potentially a greater source of stress for doctors (i.e., a stronger correlate) than work demands and stressors. This finding is consistent with the premises of the transactional theory of stress, according to which, work-life conflict may represent the elimination of one important coping resource; namely, time outside of work in which they can recharge with family and recreational activities. A greater level of perceived stress is expected when work-demands interfere with access to this coping resource.

It was hypothesised that greater work-related demands would predict higher stress (H7a) and increased work-life conflict (H7b). The results partially corroborated these hypotheses since not all work-related demands predicted higher stress and work-life conflict. Only hours worked uniquely predicted stress after controlling for all other predictors and also controlling for the influence of work-life conflict. Hours worked emerged as a moderate negative predictor of stress, which is in the direction contrary to what was expected. However, this relationship makes some sense when interpreted in conjunction with the indirect positive relationship between hours worked and stress. Consequently, working hours appears to play a dual role as both stress-reliever and stress-producer. The indirect positive relationship is transmitted through work-life conflict and therefore, while working more hours may be an active and productive way to reduce work stress, to the extent that it creates work-life conflict, increased work hours is associated with higher stress.

Hours worked, shift work, quantitative demands, and emotional demands (all moderate except for the weak association of emotional demands) were all positive predictors of work-life conflict as well as being indirect positive predictors of stress through work-life conflict (weak effects except for the moderate indirect association of quantitative demands). Quantitative demands was the strongest direct predictor, being twice as strong as hours

worked or shift work. Shift work, quantitative, and emotional demands were indirect negative predictors (small effects) of meaningfulness of work, satisfaction, and commitment, with shift work (small effect) and quantitative demands (moderate effect) also being indirect positive predictors of burnout. All work-related demands, both objective and subjective, were bivariately associated with increased work-life conflict (small to moderate correlations).

In addition to quantitative demands being the strongest direct predictor of work-life conflict, it was the strongest bivariate correlate of both work-life conflict and stress. Quantitative demands (the perception that the quantity of work exceeds the resources available to do it) has the greatest ability to predict work-life conflict and stress (more than twice as strong at predicting stress as indicators of objective demands such as hours worked and shift work). This finding is consistent with the transactional theory of stress, according to which stress is a product of doctors' appraising work-related demands as exceeding available resources (such as time and energy). For several demands, the relationship with stress was mediated through work-life conflict, rather than direct, suggesting that work-related demands may create stress primarily as a function of degrading work-life balance. This finding is consistent with previous results from Dyrbye et al. (79) who found high work demands increased the risk of work-life conflict.

## IMPLICATIONS

This study's primary aim was to explain workplace commitment in order to identify potential drivers and mechanisms of attrition among doctors. The strongest unique predictor of commitment was meaningfulness of work, followed by the indirect effect of work-life conflict. Therefore, doctors' work-life balance and sense of meaningfulness from their work should be prioritised and maximised in order to minimise workplace attrition. The results suggest that meaningfulness of work has less to do with the stressors measured and more to do with burnout and work-life conflict. Therefore, focusing on burnout and factors known to increase a sense of meaningfulness in work should be the primary targets of attrition-reducing initiatives. For example, according to the SDT, strategies that enhance doctors' sense of autonomy, competence, and social connectedness are likely to increase their sense of meaningfulness and satisfaction with work.

Indirectly, work-life conflict was the second strongest predictor of attrition. Work-life conflict also predicted both

stress and burnout, which are highly prevalent and concerning among doctors since they adversely affect both mental health and work performance. (20, 21) Therefore, enhancing work-life balance should also be a primary target to improve doctor wellbeing, performance, and commitment. While the workplace of a doctor can be inflexibly stressful and demanding, endeavouring to contain the stressors and burden inside the workplace and prevent these from spilling over into home-life is an essential challenge.

Health workforce planners and government decision-makers should be aware that doctor work commitment is a problem that is largely explained (60% of variance) by work demands, work-life conflict, burnout, and the meaningfulness and satisfaction of work. Therefore, adequate funding and resources should be allocated to minimise heavy workloads, which in turn, may go some way toward improving work-life balance, minimising burnout, and supporting doctors' intrinsic motivation.

## STRENGTHS, LIMITATIONS, AND FUTURE DIRECTIONS

The current study is strengthened by the fact that it proposes theoretically-deductive pathways constituting a broad framework that links work-demands and stressors to doctor work commitment. While there is a growing body of research focusing on doctor attrition, studies tend to focus on isolated sections of the proposed framework, which is here tested in full.

The most notable limitation is the inability of the cross-sectional data to support inferences about the causal direction of the effects. It remains plausible that the direction of influence runs counter to that depicted in the model, or in some cases, causal influences may be bidirectional or reciprocal.

A further limitation is the fact that all the measures utilised in this study rely on self-report. This may limit the results due to response biases. Another limitation is the use of self-reported commitment as the outcome variable rather than actual attrition behaviour. The current study is concerned primarily with attrition and commitment can serve only as an imperfect proxy of attrition; therefore, it is unclear if the effects found apply equally to attrition behaviour.

Finally, as with any convenience sample, no guarantee can be given regarding the degree of generalisability of the current results and therefore, they require independent corroboration before they can be taken as conclusive.

These limitations suggest several avenues for future research. Longitudinal experimental studies would provide greater confidence in drawing causal conclusions regarding the pathway proposed. However, ethical concerns likely preclude the manipulation of many of the predictors under study. Quasi-experimental studies recruiting samples of doctors experiencing varying levels of demands may be worthwhile since it is the strongest predictor among the work demands. Further studies looking at objective work outcomes, such as actual attrition from the workplace, would also be useful.

In summary, the current study supports the plausibility of the proposed pathways to doctor attrition with a large proportion of variance in work commitment and other important outcomes explained. Meaningfulness of work was the greatest independent predictor of work commitment followed by work-life conflict, job satisfaction, and burnout, while quantitative demands, the perception of too much work and not enough time, emerged as the most important work-related demand to predict stress and work-life conflict, and ultimately work commitment.

## ETHICAL APPROVAL:

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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# THE ASSOCIATION BETWEEN ORGANIZATIONAL JUSTICE AND COMMITMENT WITH WORKFORCE PRODUCTIVITY FROM CRITICAL CARE NURSES VIEWPOINT

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## ABSTRACT

**OBJECTIVE**:

Human resource productivity is one of the priorities for progress and development in any organization. Organizational commitment amongst staff members improves their positive attitude towards the organization and organizational justice is one of the requirements for any type of social participation. The present study was conducted with the aim of evaluating the relationship between organizational justice and organizational commitment and human resource productivity from the viewpoint of intensive care (ICU) nurses.

**METHODS:**

This cross-sectional study was conducted with 200 nurses working in the teaching hospitals of Mazandaran University of Medical Sciences, (five hospitals) Iran in 2018. The data were collected using the Demographic Characteristics Questionnaire, Moorman and Niehoffs Organizational Justice Questionnaire, Allen and Meyer Organizational Commitment Questionnaire and Human Resource Productivity Questionnaire. Data were analyzed using SPSS 20 software and descriptive and inferential statistical methods (Pearson correlation coefficient and linear regression analysis).

**RESULTS:**

The results of the study revealed that the mean of organizational justice, organizational commitment and human resource productivity was 52.26 ± 34.16, 96.75 ± 14.62 and 65.39 ± 18.05, respectively. The results of Pearson correlation coefficient showed a positive and significant correlation between organizational justice and human resource productivity (r = 0.615; P = 0.001) and between organizational commitment and human resource productivity (r = 0.140; P = 0.048). Accordingly, with increasing organizational justice and organizational commitment, human resource productivity also increases, and vice versa.

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**CONCLUSION:**

The results of this study showed that organizational justice and organizational commitment have a significant effect on human resources productivity. Hospital managers can consider the role of psychological interventions and strengthening justice and organizational commitment in improving human resource productivity of nurses.

## INTRODUCTION

Human resource productivity and its examination are one of the priorities of the progress and development of any organization. Productivity means feelings of effectiveness and efficiency and the ability of an individual in the organization. In other words, it involves the optimal use of workforce, power, talent and manpower skills [1]. In organizations such as hospitals, in which nurses include the largest part of the workforce [2], the importance of attracting and maintaining nursing staff is essential and the status of nurses has been recently considered by managers to increase the productivity of hospitals [1]. Nursing staff productivity is very important since the hospital is a place to care for patients who have complex and multiple needs [3]. Based on a comprehensive study by the World Bank, 50% to 80% of the health sector's resources are allocated to hospitals in developing countries. Therefore, the optimal and proper use of resources is important [4]. Report suggest that the human resource productivity indicator in Iran is very low compared to the countries of the region and East Asia [5]. Compared to member countries of Asian Productivity Organization, the mean growth rate of human resource productivity indicator in Iran was 2.03% during 2000-2006. Iran ranked 9 among 14 countries of the Asian Productivity Organization [6]. In order to achieve the goals of full progress and development, effective and efficient staffs are needed. Hence, the move towards increased equity, commitment and satisfaction among the human resources is one of the main tasks of organizations [7]. One of the important organizational issues is the commitment amongst staff. Organizational commitment amongst staff can bring beneficial results for the organization, since this variable strengthens the positive attitude of staff towards the organization [8]. Organizations with members at high levels of organizational commitment usually have a higher performance and less absenteeism for their staff. In many cases, organizations need individuals who work beyond their tasks and duties for the benefit of organization [9]. Organizational commitment is defined and measured in three dimensions. They include emotional commitment, normative commitment, and continuous commitment [10].

Another organizational component is organizational justice. Justice is one of the requirements for any type of social participation. Continuous presence of people in groups depends on their perception of observing fairness and justice. Observing justice is one of the political requirements of organizational behavior, since observing justice increases the sense of belonging, loyalty and trust of individuals to the organization and increases human and social capital of the organization [11]. The outcome of the first studies on justice is the recognition of three types of justice, including distributive justice, procedural justice, and interactive justice in organizations. Distributive justice refers to the fairness of the outcomes that staff receive [12]. Procedural justice means justice perceived of the process used to determine the distribution of rewards. In the interactive justice, organizational justice is passed on by supervisors to subordinates [7]. Various studies have been carried out on the factors affecting productivity, but there is little information available on the productivity in the ICU setting.

Based on the studies conducted and the results obtained, the importance of productivity in hospital environments becomes clearer.

The results of this research have clarified the need to pay attention to organizational commitment, organizational justice and their relationship with organizational productivity in nurses and provide a suitable intervention plan to respond to the ways of improving work productivity in hospital environments

## METHODS

The present study is a cross-sectional study with an analytical approach. The research population included

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the nurses working in ICUs of Mazandaran University of Medical Sciences in Mazandaran, Sari, and Ghaemshahr, Iran in 2018. The inclusion criteria of this study included 1) having at least 6 months of employment history in the intensive care unit, 2) having bachelor level of education and higher. The research exclusion criterion also included: 1) incomplete filling up of the questionnaire. A list of qualified individuals, against these criteria, was prepared. Then, proportional random sampling was performed. The sample size was calculated at 180 nurses using the sample size determination formula in the correlational studies and using a confidence level of 95% and considering r=0.35. The sample size increased to 200 by considering a potential 10% drop out of the subjects invited to participate [13].

$$n = \frac{[z_{1-\frac{\alpha}{2}} + z_{1-\beta}]^2}{\left(\frac{1}{2}\ln\frac{1+\rho_1}{1-\rho_1} - \frac{1}{2}\ln\frac{1+\rho_0}{1-\rho_0}\right)^2} + 3$$

Data were collected by demographic characteristics questionnaire (age, gender, level of education, employment history in ICU, work shift, number of unit beds, the unit score according to the rating the critically ill patients, type of employment, work hours per month, average overtime work hours per month), and Moorman and Niehoffs *organizational justice questionnaire*, Allen and Meyer organizational commitment questionnaire and human resource productivity questionnaire.

Moorman and Niehoffs *organizational justice questionnaire* include three subscales: distributive justice (5 questions), procedural justice (6 questions), and interactive Justice (9 questions). The score of general organizational justice is derived by summing up of scores of these three areas. The whole questionnaire includes 20 items. The questions are answered on a 5-point Likert 5 scale, ranging from 1 (I strongly disagree) to 5 (I strongly agree). The minimum score is 20 and the maximum score is 100. Scores 20-46 indicate this as lower organizational justice, scores 47 -74 indicate moderate organizational justice, and scores 75-100 indicate high organizational justice [14]. The reliability coefficient of organizational justice in previous studies has been reported as 0.74, 0.75, and 0.87 for distributive subscale, procedural subscale, and interactive, respectively, using Cronbach's alpha method [15]. The reliability of this questionnaire in this study was estimated to be 0.963 using Cronbach's alpha coefficient.

The Organizational Commitment Questionnaire was developed by Allen and Meyer in 1991 [10]. It includes 24 items used in three dimensions of emotional commitment, continuous commitment, and normative commitment. These items were designed and scored based on the five-point Likert scale, ranging from 1 (is strongly disagree) to 5 (I strongly agree). The scores are expressed as percent. Organizational commitment scores were classified into three levels of low (score 0 to 33 percent), moderate (score 34 to 66 percent) and high (67 to 100 percent). Higher scores represent higher organizational commitment. The content validity index of this tool was reported more than 89%. In the study conducted by Nabizadeh et al to examine the reliability of the questionnaire, the internal consistency method with Cronbach's alpha coefficient was used. It was found as 0.87 for the whole questionnaire (emotional commitment dimension=0.82, continuous commitment dimension= 0.89, and normative commitment=0.75 [16]. The validity of this questionnaire was estimated as 0.753 in the present study by using Cronbach's alpha coefficient. Staff productivity questionnaire includes 26 questions based on the seven dimensions of Goldsmith (ability, clarity or recognition, help, motivation, evaluation, credibility, and environment). This model is the most widely used model for assessing the productivity from the viewpoint of staff. Its questions are scored on a 5-point Likert scale ranging from 1 (I strongly disagree) to 5 (I strongly agree). The maximum score of 20 questions is 20 and the maximum is 100 [17]. The reliability of this questionnaire was assessed by Hedayati et al using Test-Retest method. The developed and final questionnaire was distributed to a group of 10 people in Hazrat-e Rasool Hospital in Tehran with time interval of 10 days in two stages, and the correlation coefficient was reported as 0.86. To examine its reliability, the researcher distributed 15 questionnaires in a population out of the study population and the Cronbach's alpha was reported 0.75 [17]. The reliability of this questionnaire was estimated to be 0.934 in the present study with Cronbach's alpha coefficient. The questionnaires were provided by the researcher to nurses of the considered units in each hospital. After taking their consent, required explanations were provided for them. After filling up of the questionnaires, each person placed the sheets in folder.

## DATA ANALYSIS

After collecting the questionnaires, the researcher classified information for analysis. For analysis of the collected data, the SPSS20 software was used. Descriptive

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statistics including mean and standard deviation to describe the research samples and inferential statistical tests including Pearson correlation coefficient and linear regression were used in this regard.

## ETHICAL CONSIDERATIONS

It should be noted that the present study was conducted after obtaining the necessary permissions and receiving the ethics code (IR.mazums.Rec.1396.10257) from the Research and Technology Deputy of Mazandaran University of Medical Sciences research and obtaining informed consent from the nurses, which included describing the research objectives and procedure for them. The researchers also ensured the nurses that their answers would be used in line with the objectives of the research and all their information would remain confidential by observing the principle of anonymity.

## RESULTS

The mean age of the respondents was 33.89 ± 6.27 years. 83% of the subjects were female, 92% had bachelor level education, 37.5% had an official employment status. The work shift of nurses in most cases (88.5%) was rotational. In terms of severity level of patients hospitalized in the special ward, most of the patients (40.5%) were at level 3 of disease severity. 36.5% of the subjects were working in the CCU unit (Table 1).

**TABLE 1- JOB-DEMOGRAPHIC CHARACTERISTICS OF NURSES WORKING IN THE INTENSIVE CARE UNITS OF TEACHING HOSPITALS IN MAZANDARAN UNIVERSITY OF MEDICAL SCIENCES IN 2018**

| Job-demographic characteristics | | f | % |
|---|---|---|---|
| gender | male | 34 | 17% |
| | female | 186 | 83% |
| Education level | associate | 2 | 1% |
| | bachelor | 184 | 92% |
| | master | 14 | 7% |
| Employment history | Official | 75 | 5.37% |
| | treaty | 56 | 28% |
| | Contractual | 31 | 5.15% |
| | project | 38 | 19% |
| Job status in unit | Head nurses | 9 | 5.4% |
| | Sub head nurse | 10 | 5% |
| | In charge of shift | 84 | 42% |
| | Normal nurse | 97 | 5.48% |
| Work shift | rotational | 177 | 5.88% |
| | fixed | 23 | 5.11% |
| Unit score (according to rating the critically ill patients) | 2 | 21 | 5.10% |
| | 3 | 81 | 5.40% |
| | 4 | 52 | 26% |
| | 5 | 44 | 22% |
| | Over 5 | 2 | 5.0% |
| Work unit | Cardiac ICU | 17 | 5.8% |
| | Surgery ICU | 1 | 5.0% |
| | General ICU | 39 | 5.19% |
| | Internal ICU | 8 | 4% |
| | Burn ICU | 15 | 7%/5 |
| | Neonates ICU | 20 | 10% |
| | Pediatric ICU | 13 | 5.6% |

| | | | |
|---|---|---|---|
| | CCU | 73 | 5.36% |
| | Dialysis | 14 | 7% |
| age | mean | 27.6±89.33 | |

The results of the study showed that the mean of organizational justice, organizational commitment, and human resource productivity were 52.26 ± 34.16, 96.75 ± 14.62 and 65.39 ± 18.05, respectively. The results of Pearson correlation coefficient showed a significant and positive correlation between organizational justice and human resource productivity (r = 0.615; P = 0.001) and between organizational commitment and human resource productivity (r = 0.140; P = 0.048), and between organizational justice and organizational commitment (r = 0.217; P = 0.001). With increasing organizational commitment, human resource productivity increases and with increasing organizational justice, organizational commitment increases, and vice versa.

The Pearson correlation test showed a significant relationship between organizational commitment and age (P = 0.007), but no significant relationship was found between organizational justice and human resource productivity and age. There was a significant correlation between organizational commitment and employment history (P = 0.011), but there was not a significant relationship between organizational justice and human resource productivity and employment history. There was a significant relationship between organizational commitment and employment history in the intensive care unit (P = 0.029). There was a significant relationship between organizational justice (P = 0.018) and human resource productivity (P = 0.008) and the number of beds in the unit, but there was no significant relationship between organizational commitment and the number of beds in the unit. There was a significant relationship between organizational justice (P = 0.005) and human resource productivity (P = 0.012) and the number of personnel, but there was not a significant relationship between organizational commitment and the number of beds in the unit. There was no significant relationship between organizational justice, organizational commitment, and human resource productivity and the work per month. There was a significant relationship between organizational justice (P = 0.033) and overtime work hours per month, but there was not a significant relationship between organizational commitment and human resource productivity and overtime work hours per month (Table 2). No significant difference was found between the mean of organizational justice, organizational commitment, and human resource productivity at the level of variables of gender, level of education, position in the unit, work shift, and work unit.

In addition, the results of the study showed that the regression model is statistically significant for nurses' human resources productivity in terms of organizational justice (P <0.001). $R^2$ value is equal to 0.378, so the model is able to explain approximately 38% of the variations in the human resource productivity (Table 3).

**TABLE 2- CORRELATION BETWEEN ORGANIZATIONAL JUSTICE, ORGANIZATIONAL COMMITMENT AND PRODUCTIVITY AND SOME MEDICAL-DEMOGRAPHIC VARIABLES OF NURSES WORKING IN THE INTENSIVE CARE UNIT OF MAZANDARAN UNIVERSITY OF MEDICAL SCIENCES IN SARI AND GHAEMSHAHR IN 2018 BASED ON THE JOB-DEMOGRAPHIC**

| Variable | Human resource productivity | Organizational commitment | Organizational justice |
|---|---|---|---|
| age | 052.0 | 192.-0 | 011.-0 |
| | 465.=0P | 007.=0P | 875.=0P |
| Employment history | 020.0 | 179.-0 | 004.0 |
| | 777.=0P | 011.=0P | 951.=0P |
| Employment history in ICU | 112.0 | 155.-0 | 024.0 |
| | 113.=0P | =029P | 736.=0P |
| Number of beds in unit | 186.0 | 010.0 | 167.0 |
| | 008.=0P | 894.=0P | 018.=0P |

| | | | | |
|---|---|---|---|---|
| Number of personnel | 176.0 P=0.012 | 061.0 P=0.391 | 197.0 P=0.005 | |
| Work hours per month | 023.0 P=0.750 | 0-.068 P=0.337 | 0-.008 P=0.906 | |
| Overtime work hours per month | 0-.069 P=0.331 | 0-.026 P=0.710 | 151.0 P=0.033 | |

**TABLE 3- PREDICTIVE POWER OF VARIANCE OF HUMAN RESOURCE PRODUCTIVITY SCORES BY ORGANIZATIONAL JUSTICE SCORES AND HUMAN RESOURCE PRODUCTIVITY AMONG NURSES WORKING IN THE INTENSIVE CARE UNITS OF MAZANDARAN UNIVERSITY OF MEDICAL SCIENCES IN SARI AND GHAEMSHAHR IN 2018**

| Independent variable | Constant (regression constant value) | B (regression non-standardized coefficient) | Beta (regression standardized coefficient) | t | P-Value (regression model statistical test) | $R^2$ (coefficient of determination) | R (Pearson coefficient of correlation_) |
|---|---|---|---|---|---|---|---|
| Organizational justice | 185.29 | 678.0 | 613.0 | 658.10 | 001.0 | 378.0 | 615.0 |
| Organizational commitment | | 008.0 | 007.0 | 116.0 | 908.0 | | |

## DISCUSSION

This study was conducted to evaluate the relationship between organizational justice and organizational commitment and human resource productivity among nurses in intensive care units. The results showed that both organizational justice and organizational commitment had a positive and significant relationship with human resource productivity. In the present study, the variables of the number of beds in the unit and the number of personnel showed relationship with human resource productivity and the variables of age, employment history, and employment history in intensive care unit showed significant relationship with organizational commitment. The variable of number of beds in the unit, the number of personnel and the overtime work hours per month were associated with organizational justice. Although some previous studies have been conducted on organizational justice, organizational commitment and human resource productivity variables separately in nurses, no domestic and foreign study has been conducted on the relationship between organizational justice and organizational commitment and human resource productivity in nurses working in teaching hospitals. We refer to a number of studies that are relatively close to the objectives of the present study below. In a study entitled organizational justice relationship with job satisfaction and organizational commitment among staff of selected hospitals of Isfahan University of Medical

Sciencesw, Yaghoubi et al showed a positive and significant relationship between organizational commitment and organizational justice [18]. In a study conducted by Olivanio to evaluate the impact of organizational justice on the health of staff in Finland, it was concluded that implementation of justice in the organization affects the health of staff and reduces absenteeism due to illness [19].

Determining the relationship between organizational justice and management commitment, Kelendaver concluded that although all dimensions of organizational justice were associated with commitment of managers, the effect of interactive justice was higher than others [20]. In a study on the relationship between organizational justice and organizational commitment among staff of Shariati and Valiasr hospitals in 2011, Ghasemiani et al concluded that there was a significant relationship between organizational commitment and organizational justice, this relationship was direct according to the correlation coefficient obtained [21]. Amirkhani et al investigated the relationship between organizational justice and organizational commitment in the staff of Isfahan University of Medical Sciences. They concluded that staff who feel injustice, show lower levels of organizational commitment and cause problems for organization archiving its goals, while high commitment of staff direct the organization

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towards its pre-specified goals [22]. In a study entitled "the impact of organizational justice, organizational commitment, and job satisfaction on the quality of working life: a case study of staff at the Public Hospital of Poursina in Rasht, Syahkal Mahalah et al found a positive and significant correlation between organizational commitment and organizational justice [11]. Safavi et al investigated the variables predicting organizational commitment in nurses and found a positive and significant correlation between job satisfaction and procedural justice and organizational commitment (P = 0.001) [23]. In a study entitled "The effect of ownership, level of staff and organizational justice on nurses' commitment, participation and satisfaction: a survey study in Finland", Heponomi et al concluded that reducing organizational justice reduces the organizational commitment [24]. In a study entitled "The relationship between emotional intelligence, job satisfaction, organizational justice and commitment with mentoring function from the viewpoint of staff of Poursina Hospital in Rasht, Syahkal Mahalah et al found a positive and significant correlation between organizational commitment and organizational justice [25].

The results of these studies are in line with those of our study. Studies have shown that justice processes play a major role in the organization and the way of dealing with individuals in organizations may affect staff's beliefs, feelings, attitudes and behavior [7]. The fair behavior of the organization with staff generally leads to their higher commitment to the organization. In addition, people who feel injustice will more likely leave the organization or show the low levels of organizational commitment and they may even show abnormal behaviors. Hence, understanding how people judge their justice in their organization and how they respond to perceived justice or injustice is one of the key issues, especially for understanding organizational behavior [7]. Organizational justice is important since if staff feel inequality, they will be the source of potential dissatisfaction in the organization, followed by irreparable consequences [26].

In a study conducted with the aim of investigating and determining the role of procedural justice in promoting decision making as a predictive variable, Mary Lemons concluded that procedural justice in decision making affects the organizational commitment of staff [27]. In a study conducted to enhance the organizational commitment of sports media staff through the mediating role of organizational justice and job satisfaction, Nazari et al found that organizational justice had an effective role in

job satisfaction and organizational commitment. In general, organizational justice had a significant impact on job satisfaction and organizational commitment of sports media staff. Thus, it can be stated that the lack of organizational justice in any organization leads to the lack of commitment in organization and lack of job satisfaction in people. Managers must be ensured of organizational justice before making any decision to avoid the problems within the organization [28]. In a study on organizational commitment and its dimensions in nurses working in hospitals of Shiraz University of Medical Sciences, Seyedghibi et al concluded that the organizational commitment of nursing staff was at the moderate level [29]. In a descriptive study entitled "evaluation of organizational commitment in clinical nurses", Nabizadeh Garguzar et al found that the level of organizational commitment was at the moderate level of 53.5% [16]. In a study entitled " the correlation between organizational commitment of nurses and the quality of hospital services at the Tehran Women Comprehensive Teaching and Health Center, Omarani et al found that organizational commitment in nurses was at a low level [30].

The results of the study conducted by Khan about organizational commitment and job satisfaction in nurses, were in line with the results of our study, so that nurses' commitment was also estimated at the moderate level in the mentioned study [31]. However, the results of a study conducted by Lee et al showed a high level of organizational commitment among nurses in Malaysia [32]. The results of a study conducted by Nyaz Azari et al on the relationship between professional ethics and organizational commitment revealed a high organizational commitment among administrative and care staffs of Amol city [33]. In a study entitled "perceiving organizational commitment among nurses, Alasri showed that emotional commitment in nurses is more perceivable than continuous commitment and normative commitment and this type of commitment (emotional) has more positive effects in an organization [34].

Rahmanzadeh et al investigated the organizational commitment of nurses in hospitals affiliated to Tehran University of Medical Sciences and showed that nurses' commitment was moderate and normative commitment had the lowest score and continuous commitment had the highest score [35]. The results of these studies were in line with those of our study. Human resources are the most important capital of organizations, and the better quality of capital will increase the probability of success, survival

and promotion of the organization. Thus, much effort should be made to improve the quality of human resources, because it is for the benefit of both organization and individuals. A loyal and satisfied workforce working with organizational goals and values, works beyond his or her duties and can play a major role in the organization effectiveness. The presence of such a force in the organization is associated with increased level of performance and reduced absenteeism and delay of staff. Such forces provide the conditions for growth and development of an organization. In contrast, a force with low level of sense of satisfaction, organizational justice and organizational commitment and with a higher willingness to leave the organization will not move in line with the organizational goals and will play major role in creating indifference to issues and problems of the organization among other coworkers [36].

In a study entitled "The relationship between perceived organizational justice and productivity in hospitals of Iran University of Medical Sciences" Sidin et al concluded that perceived organizational justice is less than moderate, and productivity is higher than the moderate among the staff. In a study entitled "The relationship between organizational justice and staff productivity in hospitals," Hedayati et al concluded that staff's understanding of the types of justice in the hospitals was moderate [17]. In the area of productivity of hospital staff, the results suggested that all of the productivity indicators were at a moderate level among the staff. The results suggest that general organizational justice has a significant positive correlation with human resource productivity [20]. In a study entitled "The relationship between organizational justice and productivity among the staff in the selected teaching hospitals of Tehran University of Medical Sciences", Ahadi Nejad et al showed a significant positive correlation between perceived organizational justice and its dimensions and productivity [13].

In a study entitled "The relationship between organizational commitment and the productivity of the rehabilitation department members: a case study of Razi Psychiatric Center, Sharifi Asl et al found a positive and significant relationship between organizational commitment and productivity [37]. Hatami et al investigated the relationship between the quality of work life and organizational commitment and productivity in the staff of Jahrom University of Medical Sciences. Results indicated a positive and significant correlation between quality of work life and organizational commitment and productivity of staffs in

Jahrom University of Medical Sciences. Pearson correlation coefficient showed a positive and significant correlation between organizational commitment and productivity [38]. In a study entitled "investigating the relationship between quality of work life and human resource productivity in health care centers (case study: Nurses of Shahid Sadoughi Hospital, Yazd), Salam Zadeh et al found that the quality of work life and the level of nurses' productivity were less than moderate level. Additionally, the results of this research revealed a positive and significant relationship between the quality of work life and the productivity of nurses [39]. The performance of staff plays a crucial role for the organization, so finding the factors that affect the performance of staff and their productivity has a high importance.

Despite the fact that the hospital system is one of the most important actors in the service sector and productivity of a nursing system is considered as the largest part of the health system, less attention is paid to their views. Using their views allows management to understand the factors affecting their productivity well and consider them in the hospital planning [40]. Nurses are the largest group of healthcare workers and they affect the productivity and progress of the organization more than any other group of hospital staff. Nurses' productivity leads to better decision-making in planning for providing the services and care [41]. Organizational commitment causes a group of skilled and qualified and high experience staffs to be gathered in their work and it is considered as the biggest treasure for the organization. In contrast, when there is no organizational commitment or loyalty, after gaining experience in the organization, staff will leave the organization as soon as they find another job. Nowadays, organizations need effective and efficient staffs to achieve their goals. In general, the effectiveness and efficiency of organizations depend on the effectiveness and efficiency of the human resources in that organization. Thus, moving towards increasing the justice, commitment and productivity of human resources are one of the core tasks of organizations.

## CONCLUSION

This study is a correlational study with an analytical approach. The results of this study revealed a positive and significant relationship between organizational justice and organizational commitment and human resource productivity.

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Nursing managers should evaluate the organizational justice, organizational commitment and human resource productivity in nurses by periodically reviewing and identify the individual, organizational and organizational factors affecting organizational justice, organizational commitment, and human resource productivity and take steps to improve each of these factors. Hence, the relevant authorities and managers are recommended to support the nursing managers with adequate allocation of resources and planning and adopting rational decisions in this regard. Organizational justice and organizational commitment are associated with human resource productivity, so paying more attention to organizational justice leads to the higher commitment of nurses and increased productivity of human resources. It will help nurses play their role effectively in providing care for patients, which is one of the main goals of the healthcare system. Given the positive relationship between organizational justice and organizational commitment and human resource productivity, it is recommended to use spiritual and financial support to enhance organizational justice and the commitment of nurses.

## DECLARATION OF INTEREST:
None.

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**11**

# THE IMPACT OF PUBLIC HEALTH INTERVENTION POLICIES ON LOCALS' MOBILITY PATTERNS DURING THE FIRST HALF OF 2020

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## ABSTRACT

### OBJECTIVE

The prevalence of coronavirus disease 2019 (COVID-19) can cause inconvenience and affect lifestyle because human movements can spread virus transmission. This study aims to investigate the impact of the government's public health intervention policies and reported COVID-19 cases on locals' mobility patterns.

### DESIGN

Secondary data on various mobility patterns of Hong Kong people against public health intervention policies and reported COVID-19 cases were collected and analyzed from publicly available sources, including government, commercial, and news sites. Data were collected from January to July 2020. Multiple regression was applied for hypothesis testing.

### RESULTS

Results showed positive and negative impacts of public health intervention policies and reported COVID-19 cases on locals' mobility patterns. The policy of wearing facial masks negatively influenced locals' mobility patterns. Then, the policy of closure of leisure and cultural service venues increases locals' mobility for retail, groceries, and transit. Moreover, the policy limiting social gatherings to 50 people enhanced locals' mobilities for retail and transit. From another aspect, the reported COVID-19 cases had a negative impact on locals' mobility for retail, parks, and transit.

### CONCLUSION

This study presents considerable effects of public health intervention policies. With the restrictions on certain activities or behaviors, locals will transfer to another behavior, which consequently enhances travel mobilities. The reported COVID-19 cases significantly reduced local mobility patterns.

### KEYWORDS

public health intervention policies, local mobility patterns, COVID-19, reported cases

## INTRODUCTION

A novel coronavirus disease, now known as COVID-19, emerged at the end of 2019 has spread globally at the beginning of 2020. Millions of people have fallen ill, and businesses have struggled to survive with strict measures, such as city lockdowns. The global tourism industry remains one of the most impacted sectors, which has suffered significantly because of travel restrictions and control. [1, 2] Restrictions on travel and mobility influence locals' behaviors and international tourist arrivals, thereby affecting the survival of businesses in the retail, tourism, and hospitality sectors.

Owing to the increase of reported COVID-19 cases globally, the governments of countries affected by the COVID-19 pandemic enact public health intervention initiatives to minimize COVID-19 transmission and people's mobility behaviors. Some rules include controlling international tourist arrivals, limiting the number of people for social gatherings, setting time for city lockdown, and seeking approval before making a business trip. These rules can prevent the disease from spreading to a certain extent. The prevention mechanism is doubted, and people are reluctant to follow the social distancing norms. Consequently, more rigid rules may be introduced, which can cause inconvenience to people psychologically and physically. Local businesses and enterprises will be affected by the constraints and limited mobility of locals.

Many researchers have used mobility data to investigate the effectiveness of government policies. [3, 4, 5, 6, 7, 8] However, a research gap still exists. Limited literature regarded the relationship between government policies and mobility data in the context of locals' behaviors and travel patterns. A case study on a densely populated city, such as Hong Kong, can provide new insight into understanding future enterprises' business recovery and new government policy initiatives. Moreover, Hong Kong's experience with the SARS outbreak in 2002–2004 implies the influence of locals' public health awareness and risk perception on mobility behaviors. Considering the different external environments, such as lack of trust in crisis response to COVID-19 in Hong Kong [9], this study explores how locals execute public health intervention initiatives with the new social distancing norms and practices initiated by the government.

This study aims to investigate the impact of the government's public health intervention policies and reported COVID-19 cases on locals' mobility patterns. The study contributes to the effectiveness of government policies and public gathering initiatives in implementing social distancing and prevention of disease transmission.

## LITERATURE REVIEW

### PUBLIC HEALTH INTERVENTION POLICIES

Public health intervention policies explain the mitigation strategies to suppress public transmission within a community. [10] During the development of a potential vaccine, non-pharmaceutical interventions (NPI) have been at the forefront to curb the spread of COVID-19. NPIs are described as "actions apart from getting vaccinated and taking medicine that people and communities can take to help slow the spread of illnesses." [11] Government policies implemented NPIs as a part of community mitigation strategies. Some examples of NPIs are travel bans, cancellations of social events, restrictions on gathering size, closure of public transport, school closures, work from home recommendations, and restriction on internal movement and international travel. [12] Restrictions on travel proved to be an effective early measure to limit the spread of the virus but were insufficient for its long-term containment. [13]

Social distancing, the act of keeping physical distance from others and limiting frequency and contact with others, has rapidly become a household term. Social distancing norms have changed locals' behaviors. Research has proven the effectiveness of social distancing as a crucial measure for controlling the spread of COVID-19. [4, 14] However, Zhang et al. argued that the effectiveness of social distancing strategies depends on other interventions to reduce transmission. [14] In Hong Kong, early quarantine that was enforced less than one day after the onset of symptoms has been identified as a crucial measure to inhibit the spread of the virus. [15] Limitations on the number of individuals gathering publicly due to public gathering policies) have been enforced to encourage social distancing. [9] Moreover, large gatherings and major public events were suspended or postponed. Dinner gathering after 6:00 pm was prohibited for a specified period.

## RELATIONSHIP BETWEEN PUBLIC HEALTH INTERVENTION POLICIES, REPORTED CASES, AND MOBILITY PATTERNS

Mobility measures the percentage change of a population's movement between spatial categories. The degree of self-restriction was consistently associated with the declines in all activities such as eat-out and leisure. [16] As the transmission of the virus occurs with close contact, reduced mobility in outdoor spaces is one way to reduce transmission and, ultimately, the reported COVID-19 cases. [8] Targeted lockdowns and closures of educational institutions have reduced mobility and virus transmission, with early closures of schools and universities resulting in a larger reduction in mobility and the reproductive number of the virus. [10]

In the literature, raw location data from commercial providers have been used to discover large reductions in mobility in the US, specifically in relation to certain government policies targeting the COVID-19 spread. [17] For instance, lockdowns were found to reduce outdoor mobility of citizens and thus virus transmission. [7, 17] Additionally, the policy of social distancing proved to be effective in restricting virus transmission owing to the reduced population mobility. [4, 6] This study aims to investigate the effectiveness of the government policies and local citizens' behaviors of mobility patterns. The following hypothesis is proposed:

*H1: Government public health intervention policies would reduce locals' mobility patterns.*

Mortality and death anxiety have been found to be positively related to outdoor mobility and negatively associated with more time spent at home. [18] With the updated number of people affected by COVID-19, people would avoid traveling in public areas, given the existing risk concerns. Thus, Hypothesis 2 is proposed as follows:

*H2: The increased number of reported COVID-19 cases would reduce locals' mobility patterns.*

## METHODOLOGY

### DATA COLLECTION AND PROCEDURE

This study focuses on Hong Kong owing to its position in the COVID-19 pandemic. The population density in Hong Kong is 6,940 persons per square kilometer of the land area. [19] Hong Kong, a densely populated city bordering Mainland China, reacted swiftly to the increasing spread of COVID-19.

Secondary data were collected and analyzed from publicly available sources, including government, commercial, and news sites. The composition of independent and dependent variables is explained below. The major independent variables are as follows: public health intervention policies—the policy timeline was constructed through individual news articles and categorized into seven main groups: (1) restaurant, (2) border, (3) quarantine, (4) face masks, (5) Leisure and Cultural Services Department (or LCSD; i.e., museums, sports, and public spaces), (6) entertainment (i.e., bars, cinemas, and karaoke venues), and (7) public gathering restrictions (e.g., 2–4, 8, and 50 people) and report COVID-19 cases. In the meantime, the dependent variable is local mobility pattern of various activities.

Policies involving restaurants included limitations on the maximum occupancy in the restaurant, hours for dining in, and restrictions on the number of people allowed per table. Border restrictions included the banning of individuals from entering Hong Kong on the basis of departure destination and residency. Quarantine policies involved the imposition of mandatory quarantine on individuals arriving from listed areas. Face mask policies required people to use face masks in stated areas. The LCSD is a governmental department, and policies under this category involve its managed facilities, including public libraries, museums, sports centers, and swimming pools. The entertainment group policies were related to the closure or restrictions of entertainment venues, such as bars, cinemas, and karaoke venues. Public gathering restrictions were coded and categorized into three groups that the government had issued in the time frame of the study. The caps of two and four people were combined into one category, with caps on 8 people and 50 people being the other two categories. The public gathering policy timeline was noted as a dummy coding (dummy code = 1, others = 0) when a certain cap on public gathering was in place.

The reported cases of COVID-19 were updated daily as public sector information by the Hong Kong government. The reported cases were logged from January 23 to July 31, 2020.

Locals' mobility patterns were sourced from the Google Community Mobility Reports (2020). [21] The dataset measured the daily percentage change of movement to various spatial categories compared with the baseline of the five weeks from January 3 to February 6, 2020. Spatial categories were grouped as follows: (1) retail and

recreation, (2) groceries and pharmacies, (3) parks, and (4) transit and stations. In particular, mobility data provided by Google were used in this study to evaluate the effectiveness of policies and locals' mobility [3, 5].

The news articles referenced were primarily from Hong Kong's public broadcasting service, Radio Television Hong Kong (RTHK) English News. [20] RTHK broadcasts with English articles were used in the creation of the policy timelines. Supplemental articles were sourced from the South China Morning Post, including international sources, such as Reuters and Al Jazeera. [22, 23, 24, 25] Policies regarding border control were also referenced through the continuously updating COVID-19 government resource website. The timeline begins on January 25, 2020 and runs until July 31, 2020. The timeline noted policy changes, including relaxation or restriction in policies, from their enforcement date. Data were coded according to the policy enforcement date rather than the announcement date.

## DATA ANALYSIS

For H1 and H2, multiple regression was employed to test the impact of various independent variables (e.g., six public health intervention policies and reported COVID-19 cases) on the dependent variable (mobility patterns to retail, groceries and pharmacies, parks, and transit). The multicollinearity testing of variance inflation factor (VIF) was performed. Most multiple regression equations met the accepted level of the multicollinearity test with the ranges between 1.02 and 1.88. [26] When running the multiple regression testing, the warnings showed that the independent variables (i.e., border, quarantine, and schools) were constants or had missing correlations.

## RESULTS

Table 1 presents the linear regression results on the influence of public health intervention policies and reported cases on locals' mobility patterns per spatial category. For retail mobility pattern, the variables of LCSD ($\beta$ = 1.84, t-value = 2.34, $p < 0.05$), public gathering restrictions of 50 people ($\beta$ = 10.75, t-value = 3.32, $p < 0.01$) as well as daily reported cases ($\beta$ = -0.13, t-value = -9.78, $p < 0.01$) were statistically significant (adjusted R2 = 0.86, F-value = 144.62, $p < 0.01$, and Durbin-Watson test = 1.15). Furthermore, the public health intervention policies in terms of facial masks ($\beta$ = -7.23, t-value = -2.31, $p < 0.05$), LCSD ($\beta$ = 5.27, t-value = 3.62, $p < 0.01$), and daily reported cases ($\beta$ = 0.09, t-value = 3.53, $p < 0.01$) had a significant effect on mobility patterns in groceries and pharmacies (adjusted R2 = 0.44, F-value = 19.84, $p < 0.01$, and Durbin-Watson test = 1.15).

Moreover, for mobility pattern to the parks, only daily reported cases ($\beta$ = -0.20, t-value = -4.51, $p < 0.01$) affected mobility patterns in parks and outdoor spaces (adjusted R2 = 0.30, F-value = 11.30, $p < 0.01$, and Durbin-Watson test = 1.12). For transit areas and stations, the variables of LCSD ($\beta$ = 4.41, t-value = 4.09, $p < 0.01$), public gathering restrictions of 50 people ($\beta$ = 10.27, t-value = 2.31, $p < 0.05$) as well as the daily reported cases ($\beta$ = -0.08, t-value = -4.45, $p < 0.01$) were statistically significant (adjusted R2 = 0.72, F-value = 62.62, $p < 0.01$, and Durbin-Watson test = 1.47). As a result, H1 and H2 were partially supported.

**TABLE 1: IMPACT OF PUBLIC HEALTH INTERVENTION POLICIES AND REPORTED CASES**

| Independent variables | RETAIL Unstandardized coefficient | | t-value | GROCERIES & PHARMACIES Unstandardized coefficient | | t-value | PARKS Unstandardized coefficient | | t-value | TRANSIT Unstandardized coefficient | | t-value |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | | B | SE | | B | SE | | B | SE | |
| (Constant) | -21.64 | 0.48 | -45.06** | -6.59 | 0.89 | -7.40** | -10.32 | 1.54 | -6.69** | -27.69 | 0.66 | -42.02** |
| Facemasks | -1.09 | 1.69 | -0.64 | -7.23 | 3.14 | -2.31* | 4.00 | 5.43 | 0.74 | 1.06 | 2.32 | 0.46 |
| LCSD | 1.84 | 0.79 | 2.34* | 5.27 | 1.46 | 3.62** | -0.46 | 2.52 | -0.18 | 4.41 | 1.08 | 4.09** |
| Entertainment | -0.91 | 3.08 | -0.30 | -3.07 | 5.71 | -0.54 | -15.17 | 9.89 | -1.53 | -4.04 | 4.22 | -0.96 |
| PG (2-4 pp) | -1.81 | 3.06 | -0.59 | 6.65 | 5.68 | 1.17 | 12.15 | 9.82 | 1.24 | -1.42 | 4.19 | -0.34 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PG (8 pp) | 5.42 | 3.16 | 1.72 | 6.71 | 5.87 | 1.14 | 5.39 | 10.16 | 0.53 | 8.23 | 4.34 | 1.90 |
| PG (50 pp) | 10.75 | 3.24 | 3.32** | 9.69 | 6.02 | 1.61 | 15.52 | 10.41 | 1.49 | 10.27 | 4.45 | 2.31* |
| Reported cases | -0.13 | 0.01 | -9.78** | 0.09 | 0.03 | 3.53** | -0.20 | 0.04 | -4.51** | -0.08 | 0.02 | -4.45** |

| | | | | |
|---|---|---|---|---|
| Adjusted $R^2$ | 0.86 | 0.44 | 0.30 | 0.72 |
| F-value | 144.62** | 19.84** | 11.30** | 62.62** |
| Durbin-Watson | 1.15 | 1.15 | 1.12 | 1.47 |

\* $p < 0.05$, \*\* $p < 0.01$

LCSD = Leisure and Cultural Services Department, PG = Public gathering, pp = people

## DISCUSSION AND CONCLUSION

This study attempts to investigate the impact of public health intervention policies and reported COVID-19 cases on locals' mobility patterns. The results indicate evident evidence of the relationship between public health intervention policies and mobility patterns. Hong Kong residents have become increasingly alert to the social distancing norm. [4, 14] Their daily activities and behaviors have been changed accordingly. For instance, wearing masks and having hand sanitizer have become a normal practice. Furthermore, the facial mask policy reduces significantly the mobility of locals to groceries and pharmacies. This event might reflect the situation by which additional drugs and dispensaries are not highly needed because locals control their safety by wearing marks in indoor and outdoor areas.

Furthermore, closures of LCSD venues, such as public libraries and museums, enhance greatly the mobility toward retails, groceries and pharmacies, and transit. As a leisure choice of Hong Kong locals, shopping activities are common for all age groups. Residents may possibly be inclined to head toward retail outlets more than before, given the sudden closure of LCSD venues as a normal leisure destination choice. Many people may not have great risk concern because wearing marks and other health protection mechanism (e.g., temperature checking) is applied in retail stores. [16] In addition, the increase of transit mobility is explained as locals need to take the means of transportation for shopping and transporting the necessary goods and supplies. Last, limiting social gatherings in a stringent manner involving 2–4 people and 8 people maximum. seemed to have no significant impacts on the mobility patterns across various areas. However, relaxation to 50 people in the gathering restriction actually positively stimulates the retail and transport mobilities. The prolonged nature of the stringent restrictions during the second wave in Hong Kong may have resulted in collective fatigue, thereby influencing increased retail and transport mobility during the easing of restrictions. [27] Many residents may thus like to hang out with a travel unit of much less than 50.

The reported cases of COVID-19 also significantly affect mobility patterns. Higher incidences of reported cases reduce mobility patterns in retail, parks, and transit but increase mobility in groceries and pharmacies and residential areas. These patterns largely reflect the reduced time spent in outdoor spaces and increased time spent at home, including stockpiling goods in response to crisis. The reported cases show the local citizens' risk perception and self-discipline, which can be an effective self-regulating factor. [28] Locals attempt to the behavior of stockpiling groceries and pharmaceutical items. [29, 30] Through these mobility and related purchase behaviors, they tend to perceive a mastery of control over their health and consumption activities to prepare for the future. In addition to individual risk perception, awareness of groups and social interaction somewhat limits outdoor mobility. [16] Individual-level behavior can outpace policy directives in some cases possibly because of increased media consumption and information networks. [4]

The battle with COVID-19 will remain until the vaccine is discovered, despite the upcoming new virus transmission. The evaluation and new initiatives of NPI strategies can be further investigated to ensure their effectiveness. The managerial implications are introduced as follows. The public health intervention policies have various effects on locals' mobility behaviors one way or another (positive and negative consequences). These policies should be developed and executed to gain optimal benefits with the

least negative impacts because they will have a direct and indirect effect on locals' daily work and lifestyle. For instance, the social distancing measures should encourage the locals' working and studying from home during the high COVID-19 infections and death rates. The duration of policy implementation can be regularly exercised to make adjustments where appropriate such as controlling the opening hours and number of visitor capacities of restaurants and public leisure and recreation facilities. Once the city small lockdowns and COVID-19 are controllable, the large-scale lockdowns can be further executed. [10] The government and organizations concerned should provide sufficient information to raise the locals' awareness and perception of COVID-19. Promoting the first, second, and third dose of COVID-19 vaccine is essential, especially for the locals who have not yet received any dose. Safeguard discipline of each individual should be reminded, and the compliance of everyone must be ensured.

## LIMITATIONS AND FUTURE RESEARCH

This study has limitations regarding the collection of secondary data. Analysis of percentage change in mobility compared with a baseline assumes the baseline as a norm and may overlook nuances in changes in seasons, public holidays, and other factors that influence human mobility. The period of data collection was until the end of July 2020. Limitations exist in the construction of the policy timeline as concurrent policies may have overlapping effects. Moreover, the nuances of mobility among extending, restricting, and relaxing a policy may have been diminished. [3] This study disregarded the interactions on human behavior in the gap between policy announcement and implementation, which can show another insight. [7] Furthermore, the inherently complex nature of human behavior in response to the pandemic involved sociodemographic factors, cultural and political contexts, and other factors that may influence the new insight. Future studies can explore a community survey to understand how mobility pattern of the population could be affected by public health policies during the pandemic. A comparison of the survey results conducted in different time points can also have important practical implications. Timely update with individuals' perceptions and attitudes as well as the effects of government policies as representing environmental factors is an important element in a longitudinal study.

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# AGGRESSION AS A PREDICTOR OF GENERAL WELL-BEING AMONG PUBLIC HEALTH WORKERS

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## ABSTRACT

Social atrocities and discrimination make sanitary workers vulnerable to aggression which in turn disrupts their well-being. The issues concerning the psychological health of sanitary workers have been addressed less by researchers. The present study aimed to assess the level of aggression and general well-being among sanitary workers.

An aggression questionnaire, consisting of four dimensions, namely physical aggression, verbal aggression, anger and hostility was used. The PGI general well-being measure and personal profile sheet consisting of socio-demographic details was given to 150 sanitary workers who were selected through purposive sampling method.

The dimensions of aggression- anger and hostility were negatively correlated with the general well-being of the participants. Amongst the four dimensions of aggression, anger is found to be the predictor of general well-being.

### KEYWORDS

aggression, general well-being, sanitary workers

## INTRODUCTION

In India, according to a report by Dalberg 2019, there were approximately 5 million sanitary workers, out of which nearly 2.5 million were exposed to a high level of occupational risks and dangers [1]. The World Bank, on its website, defines Sanitary Workers as "men and women who empty pits and septic tanks, clean toilets, sewers and manholes and operate pumping stations and treatment plants" [2]. In any civic cleaning system, sanitary workers were considered as the backbone of society. In many developing countries where the resources were limited, most of the waste handling works were done manually by them [3]. They are

also facing problems of little or inconsistent pay, no fruitful policies and laws to aid them, no facilities for their children like insurance policies, support for school education and other basic rights which were given to other employees. Many of the challenges that sanitation workers face stem from their lack of visibility in society. They are stigmatised, marginalised and their voices ignored by the people in power [4]. The sanitation workers face many social atrocities [5]. These atrocities include their poor working conditions and the non availability of the basic gear that are meant to protect them against poisonous gas and germs in the sewage. The sanitation workers do not get the basic respect that one can expect for a human being. They

are stigmatized as untouchables and were never part of the main stream society. The job undertaken by sanitary workers is often found to be a target of stigmatization. This lack of acknowledgment, adds to their health and family issues, leading to inflated levels of frustration and aggression.

Aggression is a harmful social interaction often expressed to inflict unpleasantness among others. There can be various triggers of aggression with the more important one is feeling disrespected in society [6]. Other factors such as alcohol [7], pain and discomfort [8] and frustration [9] can also trigger aggression. One of the key aspects of mental health, well-being, is affected drastically, as these sectors of people are not recognised for the kind of work they do. The WHO defines [10] well-being in terms of mental health in which how an individual perceives his or her potential, the ways of coping with the normal life stressors, the ability to work effectively and fruitfully and how can contribute to the family, society and community. Such psychological issues of sanitary workers remain unexplored and, the research studies in the above-mentioned psychological constructs were inadequate and restricted.

## METHOD

### PARTICIPANTS

From Coimbatore district, Tamilnadu, India,162 sanitary workers in the age range of 20-60 years were selected using purposive sampling technique from various working sectors viz., public, private and agency.

### MATERIALS

**A personal profile sheet** was designed by the researchers to collect the demographic details of the participants such as their name, gender, age, marital status, number of children, family type, presence of health issues and details about their health risk habits like smoking, use of alcohol, pan, betel leaves or no habits.

**The aggression questionnaire** developed by Buss and Perry(1992) [11].

**The PGI General well-being measure** developed by Verma and Verma (1989) [12].

**Adult consent form –**Before data collection, the participants were given an explanation about the research

purpose, and they were given the consent form to express their voluntary consent for participation.

### PROCEDURE

Public sanitary workers work for the government. In the present study, the data is collected from the sanitary workers working in Coimbatore Municipal Corporation. Private sanitary workers work in private institutions such as schools, colleges, hospitals and other commercial operations. Agency sanitary workers also work in private institutions but are employed by a particular organisation which provides the employment service to those private institutions.

As the study followed non-experimental research design, ethical clearance was not sought. The respective questionnaires were identified as they were found to be relevant for this study. The aggression questionnaire by Buss and Perry (1992) has all the four types of aggression elements: physical and verbal aggression, anger and hostility. The scale identified to study the general well-being was widely used in many studies, across disciplines. Hence, the researchers found reasons to choose these two questionnaires to collect the data from sanitation workers. After an expression of their consent to take part in the research study, the participants were interviewed and the data were filled by an enumerator. Although 162 participants extended their consent initially, only 150 data were found to be complete and incorporated for further statistical analysis. As the primary language of the participants was Tamil, the researcher conducted interview sessions with the participants and all the statements in the questionnaires were verbally explained to the sanitary workers in Tamil by the researcher. The research was completed under the supervision of a university professor.

### DATA ANALYSIS

The study involves analysis of the relationship between the dependent and independent variables. In the first step, the relationship between the variables was studied by subjecting the data for correlation analysis. In second step, in order to find the presence of any predictor role, regression analysis was carried out. The elaborate discussions on the outcome of these analyses are given under discussion section.

# RESULTS

## DEMOGRAPHIC DETAILS OF THE SAMPLE

The socio-demographic distribution of the 150 participants in this study were as follows: Gender - male 50%, female 50%; Marital Status - married 85%, unmarried 5%, single - 10%; Education - literates 17%, illiterates - 83%; Number of Children - No child 10%, 1 child 16%, 2 children 55%, 3 children 17% and 4 children 2%; Family Type - joint 25%, nuclear 75%; Presence of Health Issues - yes 16%, no- 84% ; Presence of Health Risk Habits - alcohol 17%, smoking 18%, pan 5%, tobacco 12%, no habits- 48%; Type of Working Sector - public 36%, private 39%, agency 25%.

**TABLE 1 MEAN AND SD OF AGGRESSION AND GENERAL WELL-BEING (N= 150)**

| Variable | | Mean (SD) |
|---|---|---|
| Aggression | Physical | 26.01 (6.54) |
| | Verbal | 12.22 (4.52) |
| | Anger | 15.52 (5.18) |
| | Hostility | 18.96 (6.75) |
| General well-being | | 16.84 (4.32) |

Table 1 displays the mean and SD of aggression and general well-being. The mean physical aggression of the sample was 26.01, verbal aggression was 12.22, anger was 15.52 and hostility was 18.96 which were interpreted as moderate. The mean general well-being was 16.84 which were interpreted as high well-being.

**TABLE- 2 SOCIO-DEMOGRAPHIC DIFFERENCES FOR AGGRESSION AND GENERAL WELL-BEING (N= 150)**

| Variables | Group | N | Mean (SD) | T | Sig |
|---|---|---|---|---|---|
| Verbal Aggression | Male | 54 | 13.22(4.68) | -2.06 | 0.05 |
| | Female | 96 | 11.66(4.35) | | |
| | Public male | 45 | 13.09(4.82) | 7.24 | <0.00 |
| | Public female | 9 | 11.67(2.18) | | |
| | Private female | 59 | 10.17(3.79) | | |
| | Agency female | 15 | 13.7(3.75) | | |
| | Agency male | 22 | 15.1 (4.59) | | |
| Anger | Male | 54 | 14.3 (4.54) | 2.20 | 0.03 |
| | Female | 96 | 16.21(5.41) | | |
| | Presence of illness | 24 | 17.38(4.18) | -2.27 | 0.03 |
| | No illness | 126 | 15.17(5.29) | | |
| | Public male | 45 | 13.8 (4.25) | 2.47 | 0.05 |
| | Public female | 9 | 14.11(3.82) | | |
| | Private female | 59 | 16.12 (5.2) | | |
| | Agency female | 15 | 17.2 (4.91) | | |
| | Agency male | 22 | 16.82(6.65) | | |
| Hostility | Presence of illness | 24 | 22.25(5.46) | -2.67 | 0.01 |
| | No illness | 126 | 18.33(6.77) | | |
| General well-being | Health compromising behaviours-Alcohol | 26 | 17 (4.62) | 2.66 | 0.04 |
| | Smoking | 27 | 18.4 (2.41) | | |
| | Pan | 8 | 19.5 (1.07) | | |

| | | | | | |
|---|---|---|---|---|---|
| Betel | 18 | 16.89(4.86) | | |
| Nil | 71 | 15.87(4.63) | | |
| Public male | 45 | 18.64(2.39) | 3.87 | 0.01 |
| Public female | 9 | 13.67(7.14) | | |
| Private female | 59 | 16.17(4.51) | | |
| Agency female | 15 | 16.53 (4.9) | | |
| Agency male | 22 | 16.46(4.01) | | |
| Male | 54 | 18.69(2.22) | 4.13 | <0.00 |
| Female | 96 | 15.8 (4.85) | | |

**TABLE 3 RELATIONSHIP BETWEEN AGE, AGGRESSION AND GENERAL WELL-BEING (N= 150)**

| Variables | Age | Physical Aggression | General Well-being |
|---|---|---|---|
| Age | 1 | -0.163* | -0.089 |
| Physical Aggression | | 1 | -0.134 |
| Verbal Aggression | | | -0.034 |
| Anger | | | -0.407** |
| Hostility | | | -0.234** |

**TABLE 4 INFLUENCE OF ANGER ON WELL-BEING (N= 150)**

| Dependent Variable | Independent Variable | $R^2$ | B | Unstandardised coefficients | | Standardised coefficients | t | Sig |
|---|---|---|---|---|---|---|---|---|
| | | | | B | Std error | Beta | | |
| General well-being | Anger | 0.20 | -3.97 | -0.31 | 0.08 | 0.08 | -3.67 | <0.00 |

## DISCUSSION

This study aimed at finding out the influence of aggression on the general well-being among sanitary workers. For this Pearson's correlation analysis and linear regression analysis were carried out and the results are displayed in Tables 3 and 4. In Step 1 to find the relationship between aggression, age and general well-being, Pearson's correlation analysis was carried out and it was found that out of four dimensions of aggression namely physical, verbal, anger and hostility, only anger and hostility were found to be negatively related to general well-being. This result is perfectly in line with the findings of Siewert et al., (2011) [13] who reported that hostile goal pursuit as such did not affect perceived social well-being. However, the reduction of social well-being subsequent to hostile thoughts was moderated by trait anger. In Step 2, to probe the accuracy of the above interpretation, regression analysis was carried out and it was found that among the dimensions of aggression, the influence of anger on general well-being was found to be significant. Work by Gilam and Hendler [14] suggests that

fundamentally anger is considered as an emotion that is helpful for our survival and it is common to all species. However, human beings possess the ability to control anger through mental flexibility by means of regulating it in a more socially acceptable form. If we fail to do so, it will be reflected in many things such as impaired well-being. In a similar vein, according to a report by the Health and Safety Authority of Dublin in 2014 [15], work-related aggression and violence is the third chief factor for injuries in health care service industries. It threatens the safety and well-being of the public and the employees should be well trained to deal with their work-related stresses. Thus, it should be noted that aggression, even in a moderate form, potentially disturbs the well-being of sanitary workers.

Concerning demographic variables, age was found to be negatively related to physical aggression. As age increases the level of physical aggression was found to be decreasing. This result can be comparable with the findings of [16] who stated that improved management of emotions with age is an important factor in maintaining well-being in old age.

A particularly serious issue was found amongst sanitary workers concerning their health risk habits. Out of 150 participants, 26 were addicted to alcohol, 27 reportedly smoking, 5 used pan and gutka (a form of tobacco consumption without smoking, especially in India), 18 were to tobacco and 71 participants were not addicted to any substances. In other words, almost 49% of participants were involved in one or more health risk habits and 51% of the participants did not report having any type of health risk habits. Current literature shows a large number of publication evidence relating to this and a particularly relevant example for this notion was the recent study by Phillips et al. [16] which exhibited that prolonged use of substances will result in poor mental health and thus their overall life expectancy is significantly reduced with an average expectancy of lesser than 50 years. Similarly, a report by Water Aid [3] stated that many sanitary workers choose to work under the influence of certain harmful substances like alcohol or drugs in an attempt to escape from the cruel work conditions of their job which advance the possibilities of mishaps. Also, a study by Bhatnagar [17] reported that sanitary workers abuse substances like tobacco 3 (15%), gutka 18 (90%) and consumption of alcohol 2 (10%). Furthermore, the findings of Patil and Kamble [18] stated that almost 50% of the sanitary workers were addicted to tobacco and due to this they suffer from serious oral problems. Surprisingly, the sanitary workers who were using the substances were found to score higher in the level of general well-being and the sanitary workers who were not using the substances were found to score low in general well-being. This finding offers a number of unique insights regarding individual well-being. In spite of the robust findings relating to the level of well-being and positive behaviours, there was still a collection of contradictory evidence regarding this idea that was found in the literature. For example, during past decades voluminous evidence documented that positive feelings and expectancies for desirable outcome were positively related with individual well-being [19–21]. However, the feeling of well-being is a highly individual construct and many times it depends on the perception of the individual. This argument derives support from the studies done by [22–24] which reported that optimism and expectancies for desirable outcomes can have harmful consequences also. A prominent, study done by Taylor et al. (1984) [22], for example, reported that positive people are less probably disengage themselves from gambling—even after suffering severe gambling losses. Rather how these traits are implicated concerning well-being depends on environmental circumstances where people function [18].

It can be concluded that although it was a proven fact that any dependence on substances will certainly impair the level of well-being among individuals in many cases, the present paper derived contradictory results. Even though the reasons behind these results were briefly discussed, further exploratory research focusing only on the above mentioned theoretical construct will be highly useful.

The socio-demographic differences for aggression and general well-being were presented in Table 2. Concerning gender, males had scored higher mean value than females in verbal aggression and general well-being whereas females scored higher in anger. The gender difference in the level of aggression and anger had been studied on a variety of domains and importantly qualitative research done by Isaacowitz and Seligman [25] advocated that there was a significant difference in the ways anger and aggression were expressed by men and women. Women, often express their anger in more expressive ways such as speaking openly about their feelings with overwhelming levels of anger and arousal and losing their self-control followed by feeling guilty of their own objectionable behaviour. But unlike women, men behave in a contrasting way. Norem [26] extended this argument by stating hyper-masculinity in men may be a risk factor for perpetrating violence and these men have a lower aggression threshold. Hence the current study is in line with the above findings regarding gender differences in the level of aggression and anger.

In relation to the working sector, difference exists for the variables verbal aggression, anger and general well-being. The efficiency of workers determined by various factors and type of working sector is one among them. Considering the presence of illness participants reported as affected with illness scored higher in hostility and anger than participants with no illness. The sanitary workers who were suffering from health issues like diabetes, somatic pains, Coronary Heart Disease (CHD) and other ailments, found to score higher than the sanitary workers who did not have any health-related problems. This finding was agreed by many research bodies which stated the list of illnesses and health hazards the sanitary workers face were almost endless [3]. The majority of the sanitary workers are exposed to dirt, pathological germs, harsh substances and human and animal wastes. Because of their low economic status, they afford poor nutrients and thus are prone to many diseases and infections [27]. A work by Rachiotis [28] suggests that the sanitary workers are exposed with a high risk of Hepatitis

B virus (HBV) infections and it is thus the potential path of transmission due to occupational injuries such as sharp objects or needles. They are also exposed to vigorous occupational situations such as extreme levels of temperatures, poor lighting and high work measures [29]. Because of these challenging and extreme working conditions, the sanitary workers who were the victims of health issues get frustrated very easily and this leads to an increased level of hostility.

## STUDY LIMITATIONS

The study has some limitations. The first was the description nature of the study design. The participants' psychological issues were only addressed but not modified through any interventions. Similarly, the assessments were based on self-reporting and hence some information bias might have occurred. The data was collected from a region of Coimbatore, India and the generalizability of the results globally is subject to further study in some other region of the globe.

## STRENGTHS OF THE STUDY

Regardless of the robust findings linking the occupational and health hazards of sanitary workers, it could be perceived that the issues concerning psychological aspects had been overlooked by many researchers. The present study has the advantage that the psychological issues were discussed in a more elaborative and multidimensional view and this will be highly helpful in designing strategic focus on the full range of possible psychological issues that arise among sanitary workers.

# CONCLUSIONS

Based on the socio-demographic variables collected from the sanitary workers, it was found that almost 83% of the sanitary workers were illiterate, 16% of them reported that they were suffering from health issues and 49% of them were found to be depended on substances. The mean well-being of sanitary workers was interpreted as high and mean scores of all other variables were found to be moderate.

Concerning the dimensions of aggression, anger and hostility are negatively correlated with the general well-being of the participants. Among the four dimensions of aggression, anger was found to be the predictor of general well-being. While considering the general well-being of sanitary workers, the value was found to be 16.84 and was interpreted as high well-being. Although the present study found that the level of well-being was high among sanitary workers, the reviews showed contradictory evidence. However, conceptualizing is a complex phenomenon. A particularly relevant example of this opinion is a study done by [18] who claimed that well-being is not determined solely by people's psychological characteristics but instead is determined jointly by the interplay between those characteristics and qualities of peoples' social environments. The independent sample t-test and ANOVA were carried out to find out the socio-demographic differences for aggression and general well-being. It was found that in verbal aggression there was a difference in gender and work sector. The mean value of male and female verbal aggression denotes that male sanitary worker scored higher than female sanitary workers.

In contrast to previous findings concerning working sectors, male sanitary workers working in agencies scored high mean value and the female sanitary workers working in private sectors scored least in verbal aggression. Similarly in anger, there exists gender difference, where female sanitary workers scored higher than male sanitary workers [30] discount the fact that private sector is usually more efficient and accountable than the public sector. The efficiency of workers determined by various factors and cannot be generalised. Also, the presence of health issues was found to be significantly different for anger. The sanitary workers who were suffering from health issues like diabetes, pains, CHD and so on, were found to score higher than the sanitary workers who did not have any health-related problems. This finding is agreed by many research bodies stated the list of illnesses and health hazards they face is almost endless [3]. The majority of sanitary workers are exposed to dirt, pathological germs, harsh substances and human and animal waste. Because of their low economic status, they can only afford poor nutrients and thus prone to many diseases and infections [29]. The female sanitary workers working in the agency had scored high and the male sanitary workers working in public i.e., the government had scored least and this found to be significant. Hence there exist differences between the employees working in public institutions and other sectors. When compared with private institutions, agency workers cannot exhibit their emotions freely as they are answerable to both (agency and workplace) the management and hence agency sanitary workers have high verbal aggression when compared with others. Also, the agency workers cannot vent their anger as freely as public sector workers do.

Concerning the hostility dimension, the presence of health issues was found to be significantly different. The sanitary workers who were suffering from health issues found to score higher in hostility than the sanitary workers who did not have any health related problems. Considering the general well-being there exists a significant difference related to health-compromising behaviours. Pearson's correlation was carried out to find out the relationship between age, aggression and general well-being. Among the dimensions of aggression, physical aggression is negatively related to age. In the similar way general well-being is negatively related with anger and hostility. It should be noted that this finding can be comparable with the findings of [12] who reported that hostile goal pursuit as such did not affect perceived social well-being. However, reduction of social well-being subsequent to hostile thoughts was moderated by trait anger. Among the dimensions of aggression, the influence of anger on general well-being is found to be significant. In a study amongst young and middle aged participants, [24] it was found that optimism was found to be associated with high level of depression particularly among older population over time. This is finding is contradictory to the positive implications of optimism. The tendency to interpret events in an optimistic way concerning undesirable experiences is found to be associated with individual characteristics [31,32]. It should be noted that many studies reported that the psychological traits and characteristics that people possess are not characteristically positive or negative. Rather how these traits are implicated concerning well-being depends on environmental circumstances where people function [18].

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# IMPACT OF EMOTIONAL INTELLIGENCE ON JOB PERFORMANCE OF NURSES WITH MEDIATING EFFECT OF JOB SATISFACTION

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## ABSTRACT

The current study investigates the effect of Emotional Intelligence (EI) on the performance of nurses with the mediating effect of job satisfaction. This study measures the concept of EI, Job Performance, and Job Satisfaction across 385 respondents from various private and government hospitals and the locale of the study was the Delhi NCR region.

PLS-SEM was used for analyzing the data. The result indicates that a relationship exists between these three variables and job satisfaction mediates the relationship between Emotional Intelligence & Job performance. The findings of the current study showed that awareness of emotions, regulation of emotions, and managing of emotions are the significant components of EI which enhances leadership, critical care, professional development, interpersonal relationships, planning and collaboration aspects of Job Performance. Further, the mediating effects support that the positive working conditions and organizations' compensation policy fetches higher level of Job Satisfaction among the professional and nursing employees who are satisfied as well as having a higher level of Emotional Quotient would be a better performer than the employees who are having a low level of emotional intelligence.

It can be recommended that while recruiting nursing employees along with their technical competence EI competence needs to be equally emphasized. Similarly, EI needs to be integrated into healthcare practice guidelines and performance evaluations as it is one of the important assets of individual persona.

### KEYWORDS

emotional intelligence, job satisfaction, job performance, nurses

## INTRODUCTION

Our evolution as a mammalian species is remarkable for the remarkable physical transformation from the four-legged ape to two-legged Home Sapiens perched on the top of the food chain, as it has been for the emotional reflexes that humans have displayed over the centuries.

From the most primal reflexes governed by the fight or flight syndrome, the human race now witnessed a full spectrum of emotional responses. Emotions are the gateway to human individuality. Emotions, put simply, are a combination of noteworthy physiological and behavioral expression to personal events. Our experiences are the sum total of our emotional reflexes [1]. Every experience has a

residual emotional aspect and managing it can impact our general and emotional health in particular. Focussing on emotional balance, its impact on human relationships, and understanding your reactions vis-à-vis others is an established academic pursuit in Emotional Intelligence. The field of study dwells on self-restraint, controlling instantaneous desires, sympathy for others, and the role of emotions in thinking and interpreting everyday situations [2]. The term and concept of emotional intelligence (EI) was coined by Peter Salovey and John Mayer and in 1990's was introduced into mainstream of psychology; before that focus of research studies into the field of social intelligence vestige the significance of emotions as intellectual function [3].

Salovey and Mayer developed a model, which considers four different factors for determining EI: recognizing and perceiving emotion, emotions based on analyses, and the capacity to manage them [4]. The theory of EI received extensive acknowledgment since a book on EI was published by Goleman in 1995. Goleman elucidates EI as a capacity of managing oneself and one's relations vis-a-via others, making team to work effectively, leading and imparting supervision to others. His observations brought to the fore the positive effects these factors had on job performance. The U.S. Bureau of Labor Statistics sets out that the nursing segment of the healthcare sector has been identified as the top occupation in the year 2020. It has been observed that the segment of employable nurses grew from 2.74 million in 2010 to 3.45 million in 2020 and involved the entrance of 712,000 new nurses in the health care field [5]. One of the widely recognized elements in the area of nursing is Emotional Labor, and in recent times it is accepted that nurses should be allowed to show their emotions which was previously restricted. Evidently, it is required that nurses should be able to manage their emotions properly to cut down their occupational stress, as they also have to manage the complex emotions of their patients [6]. Assessment of nursing performance incorporates the following factors namely, attention to the capability of nurses to accomplish their respective work goals, meeting the job expectations, the achievement of benchmarks [7]. The productivity of nursing staff' influences organizational productivity as well. In the absence of qualified, trained, and experienced nurses, the healthcare sector will be impacted adversely [8]. To enhance employee productivity environmental conditions, motivational factors, the culture of the organization, employee empowerment, styles of leadership, etc are required [9]. At the same time job satisfaction is also

among the most crucial workplace-related factors correlating with the achievement of individuals' basic needs such as physiological needs, physical and psychological safety, love and self-confidence [10]. Herzberg propounded Job Satisfaction and Job Dissatisfaction as 'hygiene factors' and 'motivators' respectively. Where Hygiene factors incorporate salary, job security, working conditions, status, organizational policies, quality supervision, leadership styles and relationships among peers and supervisors, motivators talk about employee achievement, recognition, responsibility, advancement, self-control at work, and the possibility of his/her growth [11]. EI not only provides cover to nurses against stress, arising due to the nature of occupation and but also a significant factor in promoting teamwork. Jones and Argentino, put forward that increasing the level of Emotional Intelligence can ameliorate the interpersonal relationships of nurses', alleviate their level of anxiety, and avert aggressive behaviors among them because of the stress which commonly arise due to the behavior of patients [12].

## LITERATURE REVIEW

A study was conducted by Beauvais and his colleagues to appraise the association of EI with the performance of nursing students [13]. Some academics put forward that the academic skills of nurses can be ameliorated by integrating Emotional Intelligence lectures into the nursing curriculum. The largest human resource segment of booming healthcare industry comprises of registered nurses, and yet the retention of fresh nursing graduates has always been a challenge for the healthcare sector. The exponential growth of employment opportunities in the nursing sector made it compulsory to recognize factors that correlate with high levels of performance and job retention among nurses [3]. It is quite evident via many explorations outside the nursing sector, that Emotional Intelligence correlates with the desirable performance of an employee, satisfaction with the job, and motivation for the same. Initial research pursuits in the nursing sector also manifested the correlation between the performance of nurses in clinics and hospital and their Emotional Intelligence [14]. In social and professional psychology, EI is viewed as an essential prognosticating factor for organizational outcomes and job performance in particular. For example, EI plays a significant role in the nursing profession, as it demands both technical and psychological expertise while taking care of their patients. Moreover, for any individual who thrives to

make his/her career in the nursing area, must have tom have sufficient Emotional Intelligence as they coordinate closely with doctors, other healthcare providers and patients [15]. Job satisfaction is another key element in the development of organizational functioning to come up with such managerial strategies, which could successfully enhance the number of satisfied workers, exploit creativity of workers for their development and the development of the organization as well, and in turn increase their commitment and productiveness [16]. A higher degree of job satisfaction of nursing employees has been described as one of the key determinants of job performance [17]. Very few studies have been found specifically in the nursing literature, investigating the impact of Nursing employee's emotional intelligence level on job performance as well as on job satisfaction level. For filling this gap, the present study aimed to explore the impact of Emotional Intelligence on the Job Performance of Nurses with the mediating effect of Job Satisfaction.

## OBJECTIVES

The onjectives of this research project are:

1. To examine the association among Emotional Intelligence (EI) and Job Performance.
2. To investigate the mediation effect of Job satisfaction among EI and Job Performance.

**Theoretical Construction**

FIGURE 1: RELATIONSHIPS AMONG EI, JOB SATISFACTION & JOB PERFORMANCE
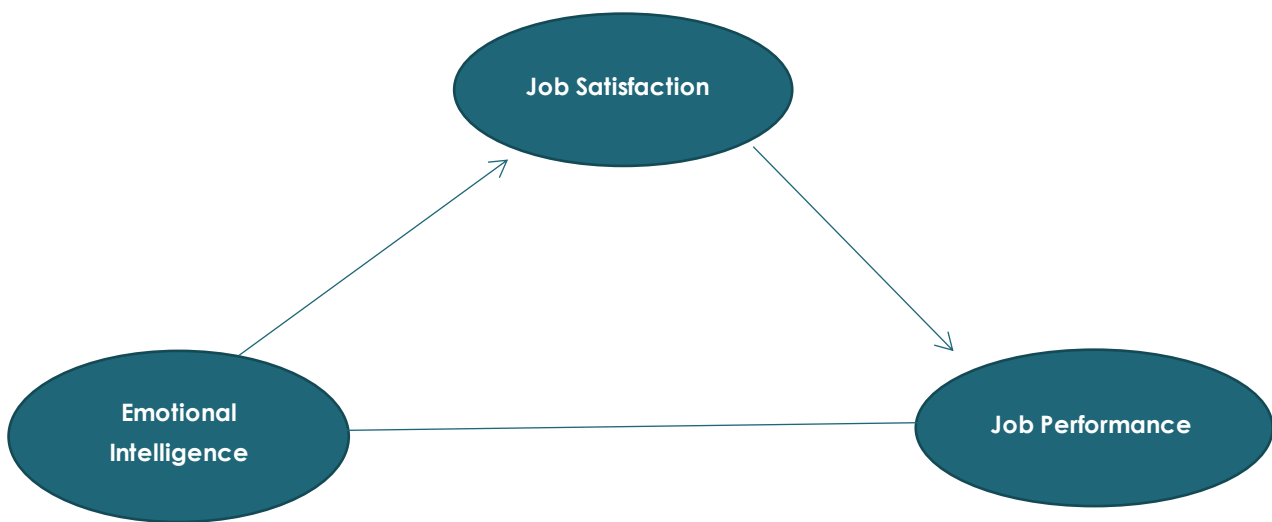


The model exhibits a number of associations which were described in the reviewed literature but specifically with respect to Job Performance, the role of EI and Job satisfaction in nursing is not tested. Consequently, two hypotheses were framed which are as follows:

**H1:** EI and Job Performance are positively correlated.
**H2:** Job Satisfaction mediates the relationship between EI & Job Performance.

## METHODOLOGY

This study was conducted to cover background information and define terms of the research problem; hence it employed exploratory research design. The sample included private and government hospitals and the locale of the study was Delhi NCR region. The sampling techniques used to target the sample involved snowball, judgmental and convenience sampling technique. On the basis of Cochran's sample size formula, the sample computed was approximately 385 respondents. Data was collected through sStandardized instruments and analysed through PLS SEM. For measuring EI a questionnaire was taken from Naseer et al. [18]. The questionnaire judged the important dimensions of emotional intelligence: self-emotion appraisal, use of emotions, emotion appraisal of others and regulation of emotions. Nurses' Job performance was measure using self-structured questionnaire based on the Schwirian Six Dimensions scale of nursing performance. Job satisfaction was evaluated through Minnesota Satisfaction Questionnaire.

### DATA ANALYSIS:
Path coefficient explains the hypnotize relationship among constructs. There values between +1 and -1 and the

Estimated levels of path coefficients are mostly close to plus one it indicates the constructive, positive associations between constructs. The significance of a coefficient is ultimately determined via the calculation of the empirical t-values obtained using bootstrapping. The objective of PLS-SEM is to classify and determine the significant path coefficients in the structural model and also to understand the essential and relevant effects. To check the level of Structural Path Significance in Bootstrapping T statistics values are generated to check the significance level of both the inner and outer model of the structural path, using a statistical procedure called bootstrapping [19].

## MEASUREMENT MODEL:

Discriminate validity, average variance extracted (AVE), composite reliability Cronbach alpha were identified and significance of factor loadings recorded to determine the reliability and validity of the model. Items that load high on their respective variables ensure convergent validity. Items loading above the cut-off value of 0.5 are acceptable [20]. Hence, items with a cut-off value of 0.5 were eliminated from the instrument after pilot study. The Cronbach alpha coefficient values (a) and composite reliability of all the variables were exceeded the acceptable cut-off limit of 0.70. The average variance extracted (AVE) also exceed the acceptable cut-off of 0.5 (refer Table 1).

**TABLE 1 MEASUREMENT MODEL TESTING RESULTS**

|  | Cronbach alpha | Composite reliability | AVE |
|---|---|---|---|
| EI | 0.805 | 0.885 | 0.720 |
| Job Satisfaction | 0.881 | 0.908 | 0.592 |
| Performance | 0.828 | 0.887 | 0.663 |

**TABLE 2 FORNELL-LARCKER CRITERIUM**

|  | EI | Job Satisfaction | Performance |
|---|---|---|---|
| EI | 0.848 |  |  |
| Job Satisfaction | 0.743 | 0.769 |  |
| Performance | 0.719 | 0.771 | 0.815 |

Discriminant validity confirms when the item loads the highest on its own variable. The Fornell-Larcker criterium satisfied the criteria for discriminant validity where the item loads highest on its own item. Hence, discriminant validity was confirmed for all the factors (refer to Table 2).

The purpose of the selection of both lies in the research objective. The primary purpose of the maximum likelihood approach was to examine the construction of the observables. The objective of the PLS-SEM was to envisage the indicators through components extension [19,20]. In view of the statement proposed that if the study is

exploratory or an expansion of some existing structural theory then applies PLS-SEM. As the study applied exploratory research design PLS-SEM was applied for the data analysis. In a structural equation model PLS-SEM evaluates the parameters of a set of equations by combining principal components analysis with regression-based path analysis' [21]. In management research, PLS is becoming popular as it is based on an iterative blend of principal components analysis and regression, and it explains the variance of the construct in the model [22].

**FIGURE 2: MEASUREMENT AND STRUCTURAL MODEL**
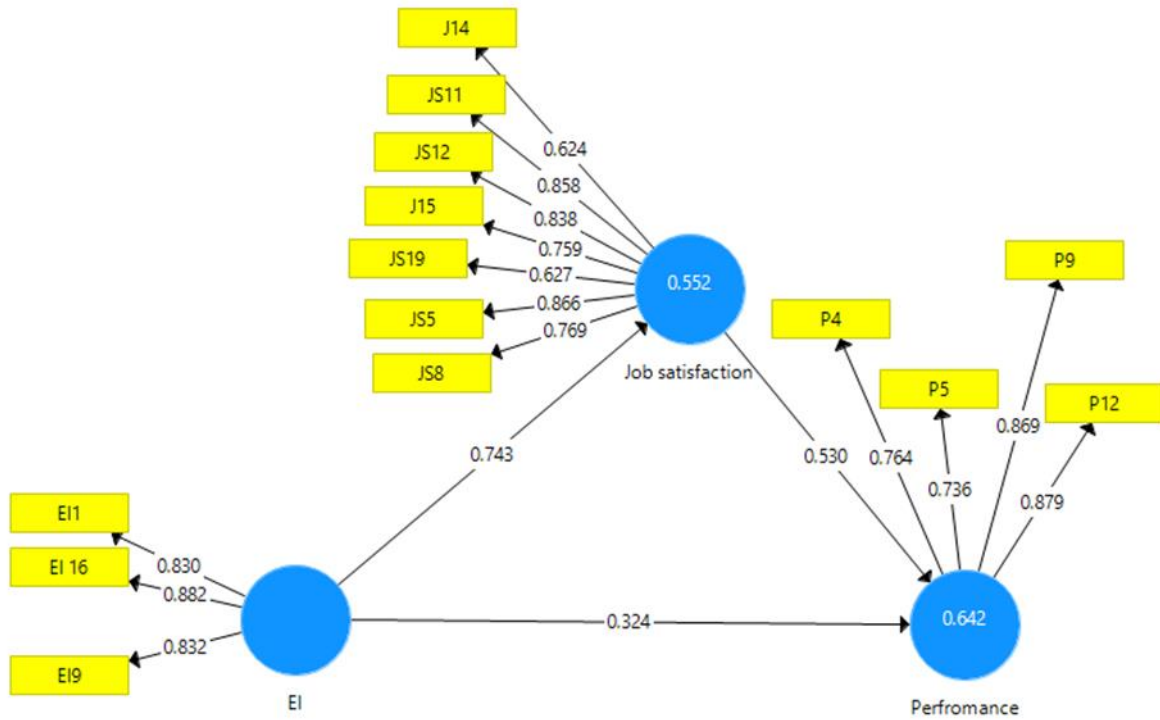


**TABLE 3 EVALUATION OF STRUCTURAL MODEL**

|  | β | F² | T Values | P Values | Result |
|---|---|---|---|---|---|
| EI ⟶ Job satisfaction | 0.743 | 1.235 | 28.848 | 0.000 | Hypothesis Supported |
| EI ⟶ Performance | 0.324 | 0.132 | 5.882 | 0.000 | Hypothesis Supported |
| Job satisfaction ⟶ Performance | 0.530 | 0.352 | 10.711 | 0.000 | Hypothesis Supported |

**TABLE 4: EFFECT OF NURSES EI ON JOB PERFORMANCE THROUGH WITH MEDIATING EFFECT OF JOB SATISFACTION**

| Path | β | P value |
|---|---|---|
| Direct effect between EI ⟶ Performance (P1) | 0.324 | 0.000 |
| Indirect effect between EI ⟶ Performance is (P2 * P3) | 0.394 | 0.000 |

In the structural model EI (β=0.743, p=0.000) has significant positive relationship with Job satisfaction and Job satisfaction (β=0.530, p=0.000) has significant positive relationship with the nurses Job Performance. The outcomes of all the hypotheses are consistent; therefore, the researchers reject the null hypothesis. Emotional intelligence items EI, EI9 and EI16 have high loadings on Job satisfaction. These items are related with awareness of emotions, regulation of emotions and managing of emotions. Individual those are emotionally balance are score high on Job satisfaction and EI act as a key antecedent for Job Satisfaction [23]. Job Satisfaction items JS5, JS8, JS11, JS12, JS14, JS15 and JS19 have high loading on Job performance. Job Performance items are related

with leadership, critical care, professional development, interpersonal relationship, planning and collaboration. Whereas Job Satisfaction items include social status, compensation, creativity, responsibility, company policies, working conditions and ability utilization. There is a significant coherent association among Job Satisfaction and Job performance [24, 25, and 26]. In the structural model, the EI ($\beta$ = 0.743, p = 0.00) has a significant positive relationship with Job Satisfaction and also having ($\beta$ = 0.324, p = 0.00) positive relationship with Performance. Also, Job Satisfaction ($\beta$ = 0.530, p = 0.00) has a positive relationship with the Performance. The results of all the hypotheses are consistent therefore researcher rejects the null hypothesis. The F2 value between 0.02–0.15 reflects a small effect size, between 0.15–0.35 reflects medium effect size and between 0.35 and above it reflects a large effect size. EI has a large effect size (F2= 1.235) on Job Satisfaction and (F2= 0.13) very small effect or no effect size on Performance. But Job satisfaction has a large effect size (F2= 0.352) on Performance (refer to Table 3).

### MEDIATION ANALYSIS:

In Figure 2 the structural and measurement model shows the resultant relationships metrics among the constructs as hypothesized. The bootstrapping was performed on the sample at the significance level of 0.05 one-tailed distribution, to identify the significance of relationship among different variables. The mediation table shows that the Direct effect between EI Performance (P1) is 0.324 (P Value- 0.047) and the Indirect effect between EI Performance is (P2 * P3) 0.394 (P Value- 0.000). As both indirect effect of P2 * P3 and direct effect of P1 are significant, we calculated the product of P2 * P3 * P1 and which is 0.128 and positive that means complementary mediation exists. Further, complementary mediation means EI does lead to Performance, but impact is not higher directly. Higher EI leads to higher Job Satisfaction which in turn enhances the chances for better Job Performance.

EI plays a role in enhancing Job performance but if employee satisfied with their employer than the chances of efficiency and effectiveness will be greater.

## DISCUSSION

Present research contributes to the literature regarding EI and nursing Employees, and simultaneously presents the positive impact of EI on their job performance, together with job satisfaction. This study reveals that emotional intelligence enhances the job performance of nurses through enriching the level of their job satisfaction. Nursing job requires a psychological and technical expertise to ensure proper care of patient. At this juncture, the emotional intelligence of nurses supports their empathetical attitude while dealing with the patients. The EI-triggered thoughtfulness and enhances the interpersonal skills of nurses which is required by them the most while handling patient [27].

## CONCLUSION

EI facilitates nurses to manage their emotions properly, especifically when they come across stressful and critical situations which are quite common in-patient care. EI supports them to respond swiftly, appropriately and with balanced approach in stressful situations which in turn enhance the job performance of nursing employees. From these insights, the following recommendations are proposed.

- As supported by the literature, EI contributes to the job performance of nurses. This finding is useful for nursing training institutes which are continuously trying to identify ways to enhance the capabilities of nursing professional.
- Understanding and usage of EI would support the nursing professionals to increase their perceptual and emotional responding capabilities which would enhance their job performance even while facing the critical situation in their job assignments.
- The findings of this study shows that the awareness, regulation, and management of emotions are the significant components of EI which enhances features such as leadership, critical care, professional development, interpersonal relationships, planning & collaboration aspects of Job Performance.
- The mediating effects support that the positive working conditions and organizations' compensation policy fetches higher level of job satisfaction among the professional and nursing employees who are satisfied as well as having a higher level of Emotional Quotient would be a better performer than the employees who are having a low level of EI [28].

### IMPLICATION OF THE STUDY:

This study recommends that by merely enriching the working conditions won't result in higher job performance, rather emotionally intelligent f employees are a prerequisite for handling job challenges. EI strengthens individual

employees Job performance by boosting their decision-making capabilities, self-esteem, and psychological health. Therefore, it can be recommended that while recruiting nursing employees, along with their technical competence, emotional intelligence competence needs to be equally emphasized. Similarly, EI needs to be integrated into healthcare practice guidelines and performance evaluations as it is one of the important assets of individual persona.

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# VALIDITY AND RELIABILITY OF A QUESTIONNAIRE TO MEASURE THE PATIENT SATISFACTION WITH NURSING CARE QUALITY-TURKISH VERSION

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## ABSTRACT

**BACKGROUND AND PURPOSE:** Patient satisfaction is an essential quality-result indicator of health services in hospital and ambulatory care settings. There has been limited use of questionnaires to measure patient satisfaction with nursing care quality in Turkey. This study aimed to assess the psychometric properties of the Turkish version of the Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQ).

**METHODS:**
This study was carried out in a bronchology unit of a state hospital in Istanbul between January and May 2021. The sample consisted of 149 participants and was recruited using convenience sampling. Data were collected using an online questionnaire.

**RESULTS:**
The Content Validity Index of the questionnaire was calculated at .95. Item-total correlations ranged from .76 to .91 for 19 items. The minimum factor load was .781, and the questionnaire items explained 79% of the total variance. Alpha coefficiency was calculated as .98 for the whole questionnaire. To test reliability analysis, the Spearman-Brown correlation value was 0.881, and the Guttman Split-Half value was 0.933. Test re-test correlation was .88. Confirmatory factor analysis confirmed the one-factor model.

**CONCLUSIONS/IMPLICATIONS FOR PRACTICE:**
The Turkish version of the PSNCQ questionnaire is a valid and reliable tool for evaluating patient satisfaction with nursing care. Valid and reliable instruments are crucial to effectively assess patient satisfaction with nursing care to improve health quality.

## KEYWORDS

nursing care, patient satisfaction, quality of care, validity, reliability. Turkey

## INTRODUCTION

In the last twenty years, fast developments worldwide have impacted both healthcare and healthcare providers. Due to the increase in health literacy and the gradual spread of news about health on the internet, the passive role of the receivers of healthcare services has started to become an active role in the health system. This change has led to an important notion called patient satisfaction, and it is seen currently as a healthcare system formed and based on patient satisfaction. [1-3]

Patient satisfaction is defined generally based on the difference between the patients' expectations and the actual care they receive. [2-4] Satisfaction from health care is the right of all patients. [5] There is a higher possibility in the patients' suggestion of the hospital, of the care they are satisfied with, to their family members and friends. [4,6] Patient satisfaction is determined by their expectations of the nursing care they should receive and the perception of the nursing service provided. [7,8] Therefore, a patient who had experienced the quality of nursing and the care given in a better manner than expected reported more satisfaction in his/her hospitalization period, and dissatisfaction emerged when his/her expectations were not met. [7-9] The American Nursing Association defined patient satisfaction with nursing care as a patients' values and attitudes toward the care they received from the nursing staff during their hospitalization. [8] Socio-demograph characteristics determine patients' satisfaction level in nursing, past experiences, motivations, health conditions, and expectations. [1,3,8] Patients who are satisfied with the nursing care conform to the instructions and recommendations of healthcare professionals more, and the probability of their recommending the hospital to others is higher; thus, nursing is essential for the hospital.[7,8,10] Patient satisfaction in nursing is the most significant determinant of the patients' general satisfaction with  hospital care services. [1,4,7] Nursing care is multidimensional, and the level of satisfaction is an individual notion. Therefore it is not easy to measure various aspects of  care. [7] Measuring patients' satisfaction, in terms of nursing, makes forming the standards for care and may be effective in improving the service quality of nursing. [6] Measuring the expectation and satisfaction of patients through nursing care quality provides critical information for healthcare managers by providing important sources for processes such as improving the service quality of nursing

planning and implementing the necessary training by determining the areas of failure.

Patient satisfaction is an essential quality-result indicator of healthcare services in a hospital environment and nursing, in relation to the satisfaction of the patient in terms of nursing is particularly significant in terms of its being the primary determinant of the general satisfaction of patients in their hospitalization. [11-13] This is measured more based on the quality of the care provided by the nurse, who is at the core of the care, and concordantly it can be said that there is a significant correlation between nursing and patient satisfaction. [1,12,14] The patients' opinions about the quality of the care are the best sources to indicate the service's critical aspect; therefore, that information can be used in health care planning and evaluation.[6,8] Patient satisfaction is a concrete and challenging measure criterion for evaluating healthcare quality. [1,3,15] Measuring patients' satisfaction in terms of nursing makes forming the standards for care and may be effective in improving the service quality of nursing. [6,13] Measuring the expectation and satisfaction of patients through nursing care quality provides critical information for healthcare managers by providing important sources for processes such as improving the service quality of nursing, planning and implementing the necessary training by determining the areas of failure. [16]

Healthcare providers can enable increasing patient satisfaction and the quality of care by improving the quality of the healthcare system if they measure patient satisfaction in terms of nursing care by factual data. Within this context, preventing malpractice is essential in increasing the reliability of healthcare professionals and developing healthcare services. The measurement of patient satisfaction with nursing care quality is essential in assessing whether the needs of patients have been met, healthcare plans have been organized, and the development of quality nursing interventions has been successful for patients. [9]  Therefore, it is essential to measure patient satisfaction with nursing care with a valid and reliable tool.

This study provides the evaluation of a valid and reliable tool for assessing patients' satisfaction with nursing care quality. Patients' satisfaction with nursing has been examined using several assessment instruments in previous research.[9,13,17] 'Newcastle Satisfaction with Nursing Care Scale' [18]  and 'Patient Perception of Hospital

Experience with Nursing Scale' [19] are widely used tools in Turkey to measure patient satisfaction with nursing care. Although satisfaction scales have been translated into Turkish, the "Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQQ)" developed by Laschinger et al. [4] differs in terms of evaluating the quality of care holistically during a hospital stay, such as ensuring the coordination of nursing care for patients in the hospital and after discharge, communication of nurses with doctors as well as patients, patient's satisfaction with nurses' teamwork, tests, and a variety of other factors. [4] The questionnaire can be used for both outpatient and inpatient patients, and it covers post-discharge satisfaction. It gives a general satisfaction rating of the service offered by the health institution from which the patients are discharged, based on the nursing care received by the patients. This measuring instrument will serve as a guide for the development of nursing care when the level of patient satisfaction is measured. The evolution of hospital services is also dependent on patient satisfaction.[8] PSNCQQ has been translated into other languages and is often referenced in the international literature. [1,7] Karaca and Durna [6] translated it into Turkish, although exploratory and confirmatory factor analyses were not carried out.[6] PSNCQQ is expected to contribute to the literature by being an easily understandable and adaptable scale that reveals the location of satisfaction with nursing services offered in the satisfaction of the entire service supplied by the health facility.

## STUDY AIMS

The primary aim of this study was to describe the translation process and assess the validity and reliability of the Turkish version of the PSNCQQ. The secondary aim was to evaluate the sociodemographic properties and patient satisfaction in a hospital in Istanbul.

# METHODS

### DESIGN

A cross-sectional and methodological study design adapted the PSNCQQ into Turkish and evaluated its psychometric properties.
SAMPLE

A convenience sampling technique was employed to recruit 149 patients who received care in a bronchology unit of a state hospital in Istanbul, Turkey. Although there

are different views in the literature about the ideal number of samplings for scale development and validity studies, the number of samplings, which is 5-10 times per item, is accepted as satisfactory. [20-22] The number of participants in this study is 149, and 7.8 samples are available per item. The criteria of inclusion in the study were determined as (i) being 18-65 years old, (ii) having bronchoscopy treatment in the Bronchology Unit, (iii) being in the second week following the treatment, (iv) having no cognitive disability, (v) being a volunteer to participate in the study. [23]

### DATA COLLECTION

This methodological study data was collected from the Bronchology Unit of a state hospital in Istanbul between January-June 2021. The potential participants having the bronchoscopy treatment were informed before the treatment about the study, and the patients who accepted to participate in the study weretelephoned in the second week of their discharge from the hospital. The online-prepared data collection form link was sent to the patients who accepted to attend the study via e-mail or Short Message Service (SMS). A personal information form and the PSNCQQ were used for collecting data.

Personal information form: This form included age, gender, education, marital status and monthly income status.

Patient Satisfaction with Nursing Care Quality Questionnaire (PSNCQQ): Was developed in 2005 by Laschinger et al. 4] The PSNCQQ, which comprises 19 items in total, includes 4 items that evaluate the perception of general satisfaction and are not included in the calculation. A 5-Point Likert type scale is scored between "(5) excellent" and "(1) poor". The PSNCQQ, where two different methods can score, was scored by adding the scores for all items and averaging each patient. The Cronbach a reliability factor in the original study of the scale was perfect (.97). Total correlations of the item were between values ranging from .61 to .89. The original scale was in the single factor structure, and the factor loads were between .753 - .89.

### PROCEDURES

Upon receiving the permission of the scale owner, the original form of the scale was translated into Turkish by a language expert who knows English and Turkish and three academics who know English well. The research team examined the translations, and a consensus was reached on a text form for the Turkish versions representing each

item best. Finally, the Turkish form was back-translated by a language expert who had not participated in the translation in the first phase, and the translation was compared to the original form by the research team.[20] This study adopted the World Health Organization's steps for translation and adapting instruments.[24] It followed the Strengthening the Reporting of Observational Studies in Epidemiology statement in reporting this study.[25] All of the study processes are shown in Figure 1.

**FIGURE 1. STUDY PROCESS**
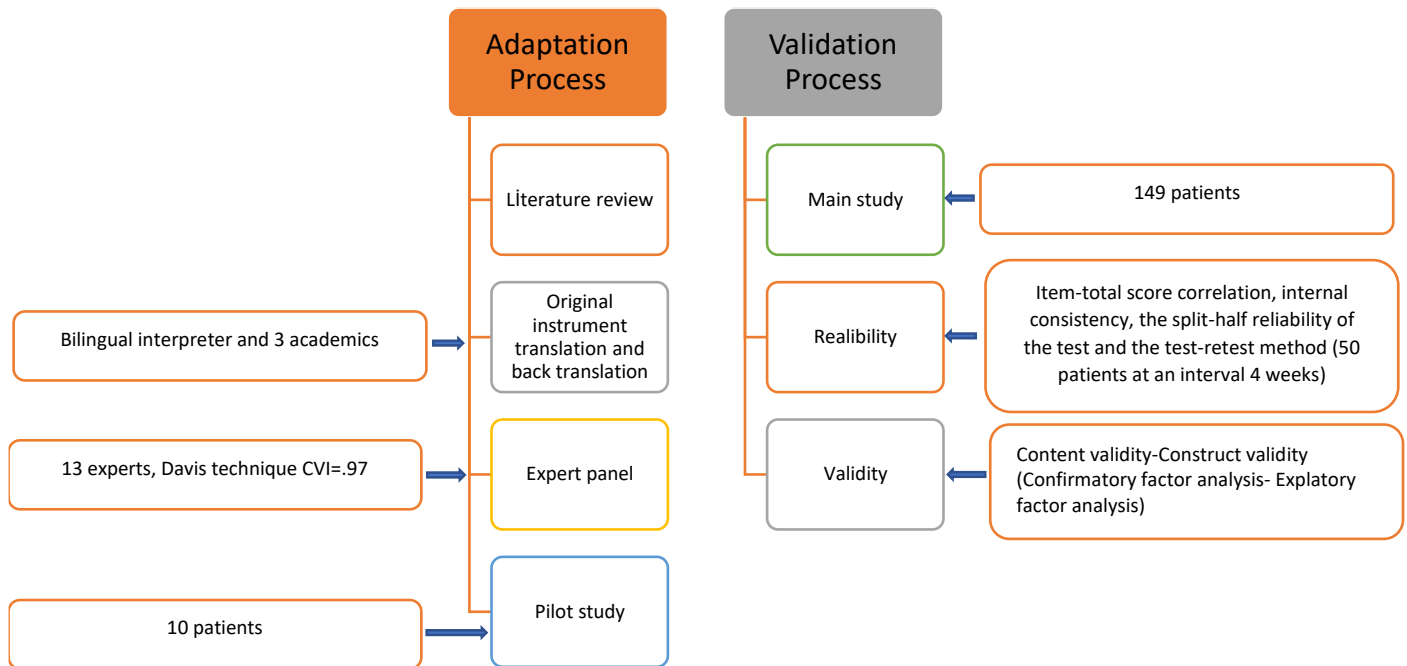


## DATA ANALYSIS

The number, percentage, average and standard deviation were calculated for descriptive statistics. Cronbach alpha-factor and Spearman-Brown and Guttman split-half factors were calculated for the reliability of the questionnaire. Furthermore, a re-test was conducted with the participation of 50 patients, and the Pearson correlation test was used to present the consistency between the two measurements.

The content analysis content validity ratio (CVR) was calculated, and the content validity index (CVI) was determined by calculating the average of CVRs. Davis technique was used for this purpose. According to this technique, it is suggested to take 3-20 expert views, and a CVI over .80 is deemed acceptable in terms of content validity.[26] Within this scope, four stages are "The item does not represent the feature (1)", "The item needs considerable correction (2)", "The item needs a little correction (3)" and "The item represents the feature (4)" were evaluated. The draft questionnaire, which was finalized based on the expert views, had been applied to 10 patients before it was applied to the study sampling group, and it was finalized based on the suggestions received.

The construct validity of the PSNCQQ was evaluated using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Kaiser-Meyer-Olkin (KMO) test and Bartlett test. Kaiser- Meyer-Olkin test (ranges from 0 to 1) greater than .50, and the result of the Bartlett test of sphericity was considered eligible to perform EFA. Bartlett's sphericity test and Kaiser–Meyer–Olkin tests were used to evaluate the sampling sufficiency.[27]

A confirmatory factor analysis (CFA) was performed using AMOS to assess how well the model gleaned from the EFA matches the observed data and whether a one-factor model fits the data better. Patient satisfaction levels were compared across different demographics using a *t*-test and one-way analysis of variance (ANOVA). Analyzes were conducted in SPSS version 25.0 (IBM, Inc., Armonk, NY, USA) with a significance level of 0.05.

## ETHICAL CONSIDERATIONS

The researchers' permission who developed the original

questionnaire was received via e-mail before starting the study. The procedures were reviewed and approved by the University of Health Sciences ethics committee with a decision no: 2021/74. The participants who agreed to participate in the study were informed before bronchology treatment, and their verbal confirmations were taken. They were asked to read the information document in the first part of the form sent to them and to mark the option "I accept to participate in the study," showing their confirmation to participate in the study byall eligible patient volunteers (*N*=149).

## RESULTS

Participants and their satisfaction regarding nursing care quality was identified.

Socio-demographical characteristics of the participants (*N*=149) are presented in Table 1. The mean age of the participants was 55.73 years old (Standart Deviation (*SD*) =14.6). The participants were primarily male (70.5%), graduated from primary school (52.3%), were married (78.5%) and had an income less than their expenses (47%). There is no statistically significant difference between the participants based on comparing their socio-demographical characteristics and nursing care satisfaction score averages (Table 1). The patients' satisfaction in terms of the quality of the care provided by the nurses is over the average score (4.11±851).

### RELIABILITY

Item-total score correlation, internal consistency, the split-half reliability of the test and the test-retest method were used to evaluate the PSNCQQ. It was determined that the item-total score correlations of the questionnaire formed of 19 items were between .762 and .913 (Table 2).

**TABLE 1. COMPARISON OF THE SOCIODEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS AND THE MEAN TOTAL SCORE ON THE SATISFACTION LEVEL OF NURSING CARE**

| Variables | Number (%) | Mean (SD) | Statistics |
|---|---|---|---|
| **Age group** | | | |
| ≤ 30 years old | 12 (8.1) | 4.39 (.666) | |
| 31-59 years old | 64 (43) | 4.09 (.815) | p=.489 |
| ≥ 60 years old | 73 (49) | 4.08 (.908) | F=.718 |
| **Age. Mean ±Standard Deviation (Min.-Max.)** | 55.73±14.6 (20-84) | | |
| **Gender** | | | |
| Female | 44 (29.5) | 4.24 (.737) | |
| Male | 105 (70.5) | 4.05 (.891) | p=.217 |
| | | | t=1.239 |
| **Educational Status** | | | |
| Illiterate | 11 (7.4) | 3.81 (1.3) | |
| Literate | 11 (7.4) | 4.3 (.74) | |
| Primary school | 78 (52.3) | 4.09 (.831) | p=.675 |
| High school | 28 (18.8) | 4.12 (.824) | F=583 |
| University and above | 21 (14.1) | 4.23 (.756) | |
| **Marital status** | | | |
| Single | 32(21.5) | 4.05(.903) | p=.153 |
| Married | 117(78.5) | 4.3(.596) | t=-1.435 |
| **Income status** | | | |
| Income less than expenses | 70 (47) | 4.01 (.887) | |
| Income equals expense | 66 (44.3) | 4.18 (.76) | p=.433 |
| Income more than expenses | 13 (8.7) | 4.23 (.1.08) | F=.841 |

**TABLE 2. ITEM TOTAL SCORE CORRELATIONS AND PRINCIPAL COMPONENT ANALYSIS AND EXPLORATORY FACTOR ANALYSIS RESULTS OF THE PATIENT SATISFACTION QUESTIONNAIRE ON NURSING CARE QUALITY**

| Original Scale Items | Item Mean | Item total correlation | Factor Loads |
|---|---|---|---|
| Item 1. Information you were given | 4.05 | .856 | .872 |
| Item 2. Instruction | 4.05 | .852 | .866 |
| Item 3. Ease of getting information | 4.11 | .836 | .853 |
| Item 4. Information given by nurses | 4.07 | .839 | .854 |
| Item 5. Informing family or friends | 3.9 | .815 | .830 |
| Item 6. Involving family or friends in your care | 3.93 | .762 | .781 |
| Item 7. Concern and caring by nurses | 4.28 | .773 | .793 |
| Item 8. The attention of nurses to your condition | 4.17 | .859 | .877 |
| Item 9. Recognition of your opinions | 4.08 | .847 | .865 |
| Item 10. Consideration of your needs | 4.11 | .883 | .898 |
| Item 11. The daily routine of the nurses | 4.06 | .913 | .926 |
| Item 12. Helpfulness | 4.23 | .896 | .913 |
| Item 13. Nursing staff response to your calls | 4.16 | .902 | .917 |
| Item 14. Skill and competence of nurses | 4.28 | .821 | .843 |
| Item 15. Coordination of care | 4.18 | .797 | .819 |
| Item 16. The restful atmosphere provided by nurses | 4.21 | .854 | .873 |
| Item 17. Privacy | 4.24 | .855 | .875 |
| Item 18. Discharge instructions | 4.07 | .789 | .809 |
| Item 19. Coordination of care after discharge | 3.97 | .823 | .842 |

**TABLE 3. DATA ON THE SPEARMAN-BROWN AND GUTTMAN SPLIT-HALF VALUES AND GOODNESS OF FIT INDICES OF THE PATIENT SATISFACTION QUESTIONNAIRE ON NURSING CARE QUALITY**

| Cronbach's Alpha | 1st Half | Value | .965 |
|---|---|---|---|
|  |  | Item total | 10a |
|  | 2nd Half | Value | .969 |
|  |  | Item total | 9b |
|  | **Total Number of Items** |  | 19 |
|  |  |  |  |
| **Inter-half Correlation** |  |  | .881 |
| **Spearman-Brown Coefficient** | Equal distance |  | .937 |
|  | Unequal distance |  | .937 |
| **Guttman Split Half Coefficient** |  |  | .933 |
| **Guttman Split-Half Coefficient** |  |  | .779 |
|  |  |  |  |
| **The goodness of Fit Indices/One factor** | Factor loadings |  | ≥ .78 |
|  | $X^2$ |  | 717.44 |

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| | |
|---|---|
| df | 152 |
| RMSEA | .097 |
| GFI | .76 |
| IFI | .784 |
| CFI | .783 |

It was detected that the Cronbach's alpha of the whole questionnaire was .98. According to the analysis of the split-half reliability of the test, the Spearman-Brown correlation value was calculated as .93, and the Gutman Split-Half value was calculated as .933 (Table 3). The test-retest method was used to assess the time durability of the questionnaire. The PSNCQQ was administered twice to 50 patients at 4 weeks. According to the findings, the correlation coefficients for the total questionnaire were .882, and all items were between .735 and .936.

## VALIDITY VERIFICATION

### Content Validity

The Turkish form (see Appendix) and the original English form were submitted for the opinion of 13 experts studying in the fields of nursing in various institutions (with five from public health nursing, two from psychiatric nursing, three from the management of nursing, three from pediatric nursing) regarding language and content validity. The experts' selection criteria were determined to have at least ten years of nursing experience, work as an academician for at least five years, and work as a manager in the working lifetime. The content validity ratio and content validity index were calculated for the whole questionnaire due to the evaluation of the expert opinions. Based on the examination of the experts, the content validity ratio (CVR=the number of experts replying properly/total number of experts/2-1) was calculated for each item based on the Davis technique. Then the content validity index (CVI) was calculated as .97, averaging these values.

### Construct validity

a. Exploratory factor analysis: Kaiser-Meyer-Olkin (KMO) value was calculated as .935 for detecting the sufficiency of the sampling, and the Bartlett test was found significant (p<0.001) which is calculated as the KMO value in the research, shows that the sampling is sufficient. According to the result of the essential components analysis and the analysis conducted using the varimax rotation, the items form 79% of the total variants, and it was seen that the whole items were gathered under a single factor. The factor loads of the questionnaire items ranged between .781 and .926 (Table 2).

b. Confirmatory factor analysis: Confirmatory factor analysis confirmed the one-factor model, with Chi-squared ($X^2$)/ degrees of freedom (df)=717.44/152, Root mean square error of approximation (RMSEA)= .097, Goodness-of-fit (GFI)= .760, Incremental Fit Index (IFI)=.784 and Comparative fit index (CFI)= .783 (Table 3).

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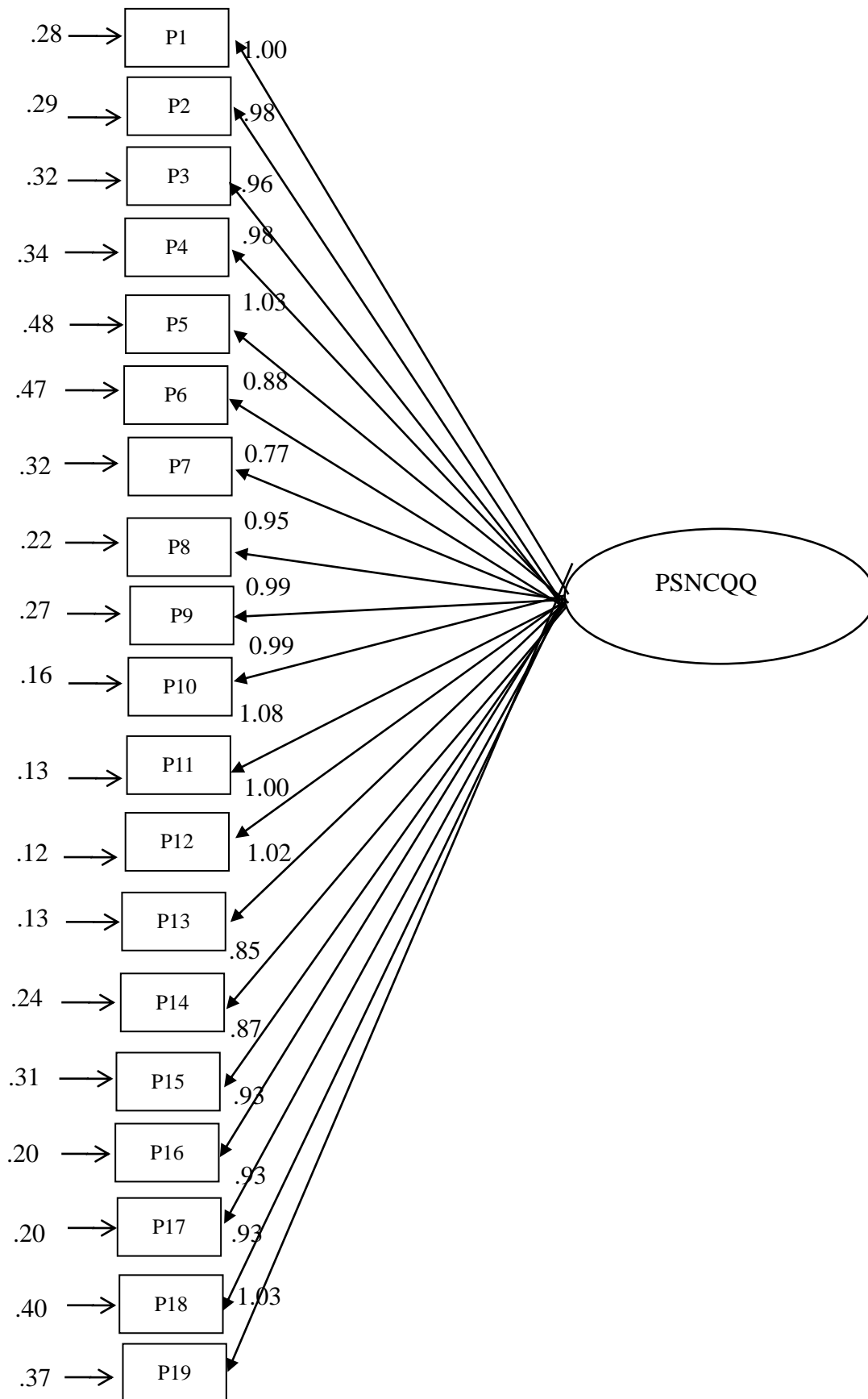
## DISCUSSION

The psychometric evaluation and adaptation of the PSNCQQ to the Turkish language were evaluated based on the sampling of bronchoscopy patients in this study. It was decided that the questionnaire was understandable and helpful in evaluating the patients' satisfaction in terms of nursing based on the study results.

When sociodemographic characteristics and patient satisfaction with nursing care quality were compared, no statistically significant difference was found. Similarly, in the study by Al-Awamreh & Suliman [12], it was found that there was no significant difference between gender and age satisfaction with nursing care quality.[12] Palese et al. [28] found that there was no difference between age and a level of satisfaction, similar to our study, but unlike our study finding, women were less satisfied with nursing than men. [28] These findings indicate that more studies are needed.

The adaptation of scale tools developed in one language to another is a complicated process requiring careful planning concerning the content, psychometric characteristics, and validity.[29-30] Cross-cultural adaptation in the scale adaptation covers both language translation and cultural adaptation for creating a form to be used in another country. [22] In this study, the "scale translation and adaptation process" suggested by WHO was followed to provide the scale's language validity.[24] The adequacy of the Turkish-language scale, which is the first of the adaptation level of the scale, was evaluated with the *CVI* and the translation and back-translation process. The number is sufficient for expert opinion. [31,32] The scales are expected to give similar results in scale development studies or scale adaptation studies in different languages when implemented under the same conditions. Many analysis methods can be used to evaluate the stability of the scales named reliability. [33] In this study, the scale's reliability was evaluated through item-total score correlation, test-retest, internal consistency, and split-half reliability of the test. Cronbach's alpha internal consistency, test-retest, and results of the split-half reliability analysis of the test reveal that the scale is a reliable measurement tool. Cronbach's alpha factor for the whole scale was calculated as .98, and item-total correlations were found between .762 and .913. It was seen that Cronbach's alpha factor was found to be .97, and total item correlations were found between .61 and .89 in the original scale, similar to our study. [4] In the study of

Milutinovic et al. (2012), Cronbach's alpha factor of the scale adapted to Serbian was found to be .94, and item-total correlations were found between .56 and .76.[7] In another study carried out in Turkey, the Cronbach's alpha factor was found to be .98, and item-total correlations were found between .80 and .89.[6] In the Albasharey et al. (2019) version, adapted to the Arabic language, the Cronbach's alpha factor was found as .96. [1] It was presented that the scale was a reliable measurement tool having internal consistency according to the Spearmen-Brown correlation factor (.937) and Guttman split-half factor (.993) results. In the study of Albasharey et al. (2019), Guttman split-half coefficients were found to be .94, similar to our study. [1] Split-half coefficients were found as .965 and .969 (1st and 2nd Part). In the study of Albasharey et al. (2019), it was seen that it was found as .91 and .95 (1st and 2nd part). [1] According to test re-test results, the correlation factor of the scale to the whole of the scale was found to be .882.

In the studies of adapting the scales to another language in the literature, it is recommended to test the current factor structure through confirmatory factor analysis).[34,35] However, in many studies, exploratory and confirmatory factor analyses were used together [34]. The CVI of the scale, which was presented to the opinion of experts for content validity, was found to be .97. It was found that CVI was between the said values.[33] Similar to our study, it was found that .94 in Albashrey et al. [1] According to the result of the exploratory factor analysis conducted upon meeting the conditions in which the *KMO* value is over .60 and the Barlett test was significant to conduct the exploratory factor analysis, it was seen that the items in the original scale gathered under a single factor and the factor loads ranged between .781 and .926. It was seen that the factor loads were between the required values. [33] It is seen that the factor loads ranged between .753 and .890 in the original study of the scale, similar to the results of our study. [4] It was seen that factor loads ranged between .60 and .95 in the study of Milutinovic et al. (2012). [7] While the total variant resulting after varimax rotation was found at 79% in our study, it was found at 59.9% in Milutinovic et al. (2012). [7] The explained variances of the scale gathered under two factors in Albashrey et al. [1] study was 46.4% and 22.9%. Unlike the result of Albashrey et al. [1]'s study, the findings of our study are congruent with the findings of the original study with the one-factor model. [4] *RMSEA* cut-off points are recommended in the range of .05 to .10 to indicate proper fit. [36] *RMSEA* value was calculated at .097 in this study, providing a mediocre fit. The *GFI*, *IFI* and *CFI*

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statistics range from 0 to 1, and recommended value is above .90. However, the closeness of these values to 1 is considered an indication of proper fit. [36,37]

## CONCLUSIONS AND SUGGESTIONS

Over the last decades, patient satisfaction with nursing care has been considered a crucial indicator of the quality of care. Measuring nursing care quality has become a priority for healthcare providers and policymakers. It is known that there is a high correlation between nursing care quality and patients' overall satisfaction with health services. Although there are questionnaires assessing nursing care quality, PSNCQQ is a practical tool to apply and assess nursing care quality in clinical and ambulatory care settings. This questionnaire may help increase the contribution and visibility of nursing care in health services. PSNCQQ in the Turkish language was evaluated based on the sampling of bronchoscopy patients in this study. This questionnaire is a valid and reliable measurement tool that evaluates patients' satisfaction at 18 years old and older in the bronchoscopy units. Therefore, the findings of this study may limit the generalizability of other settings. The PSNCQ, adapted to Turkish, is thought to be used by nurses working in the clinical and ambulatory care settings and the researchers studying in this field.

**This study has some limitations** in that conducting the study in a province and the bronchoscopy unit of a hospital is limited research. It is recommended that the conduct of further studies to measure patients' satisfaction with nursing care quality and to evaluate the effects on patients' overall satisfaction with health services is needed.

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# APPENDIX

## HEMŞİRELİK BAKIM KALİTESİNE İLİŞKİN HASTA MEMNUNİYETİ ANKETİ

| | Mükemmel | Çok İyi | İyi | Orta | Kötü |
|---|---|---|---|---|---|
| SİZE VERİLEN BİLGİ: Hemşirelerin testler, tedaviler ve beklentileriniz ile ilgili size yapmış oldukları açıklamalar ne kadar açık ve tamdı/eksiksizdi. | | | | | |
| YÖNERGE: Test ve işlem/ameliyat hazırlığı ile ilgili hemşirelerin açıklamaları ne kadar iyiydi. | | | | | |
| BİLGİ ALMA KOLAYLIĞI: Hemşirelerin sorularınızı cevaplama istekliliği. | | | | | |
| HEMŞİRELER TARAFINDAN VERİLEN BİLGİLER: Hemşireler hastalar, aileler ve doktorlar ile ne kadar iyi iletişim kuruyordu. | | | | | |
| AİLE VEYA ARKADAŞLARI BİLGİLENDİRME: Hemşireler durumunuz ve ihtiyaçlarınız/gereksinimleriniz ile ilgili ailenizi veya arkadaşlarınızı ne kadar iyi bilgilendirdi. | | | | | |
| AİLE VEYA ARKADAŞLARINIZIN BAKIMINIZA KATILIMI: Aile ve arkadaşlarınızın katılımına ne kadar izin verildi? | | | | | |
| HEMŞİRELER TARAFINDAN VERİLEN İLGİ VE BAKIM: Size gösterilen nezaket ve saygı ne kadar samimi ve kibardı. | | | | | |
| HEMŞİRELERİN DURUMUNUZLA İLGİLENMESİ veya HEMŞİRELERİN DURUMUNUZLA İLGİLİ DİKKATİ: Hemşireler sizin ve durumunuzun nasıl olduğunu ne sıklıkla kontrol etti. | | | | | |
| GÖRÜŞLERİNİZİN FARKINDA OLMASI: Hemşireler sizin görüşlerinizi ne kadar dikkate aldı ve size seçenek sundu? | | | | | |
| İHTİYAÇLARINIZI GÖZ ÖNÜNDE BULUNDURMA: Hemşireler ihtiyaçlarınızı karşılama konusunda ne kadar ilgiliydi. | | | | | |
| | | | | | |
| HEMŞİRELERİN GÜNLÜK RUTİNİ: Hemşireler programlarını sizin ihtiyaçlarınıza göre ne kadar iyi düzenlediler. | | | | | |
| YARDIMSEVERLİK: Hemşirelerin sizi rahat ve güvende hissettirme becerisi nasıldı. | | | | | |
| HEMŞİRELERİN ÇAĞRILARINIZA KARŞILIK VERMESİ: Hemşireler size yardım etmede ne kadar hızlıydılar. | | | | | |
| HEMŞİRELERİN BECERİ VE YETKİNLİĞİ: Hemşireler ilaç uygulama, damar yolu tedavisini yapma gibi işlemlerde ne kadar iyiydiler. | | | | | |
| BAKIM KOORDİNASYONU: Hemşireler ile size bakım veren diğer hastane personeli arasındaki ekip çalışması. | | | | | |
| HEMŞİRELER TARAFINDAN SAĞLANAN HUZUR ORTAMI: Huzur ve sessizliğin miktarı/süresi. | | | | | |
| MAHREMİYET: Hemşireler tarafından mahremiyetiniz için sağlanan koşullar. | | | | | |
| TABURCULUK TALİMATLARI: Hastaneden taburcu olduktan sonra ne yapmanız gerektiği ve nelerin beklediğine ilişkin anlattıkları ne kadar açık ve tamdı. | | | | | |
| TABURCULUK SONRASI BAKIM KOORDİNASYONU: Hemşirelerin siz hastaneden taburcu olduktan sonraki ihtiyaçlarınızı karşılama konusundaki çabaları. | | | | | |
| **GENEL ALGI** | Mükemmel | Çok İyi | İyi | Orta | Kötü |
| Genel olarak hastanede kaldığınız süre boyunca aldığınız bakım ve hizmetlerin kalitesi. | | | | | |
| Genel olarak hastanede kaldığınız süre boyunca aldığınız hemşirelik bakım kalitesi. | | | | | |
| Genel olarak sağlığınız ile ilgili ne söylersiniz? | | | | | |
| Aldığım hemşirelik bakımına dayanarak bu hastaneyi aileme ve arkadaşlarıma tavsiye ederim. | | | | | |

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# VALUE-BASED PRICING IN MALAYSIA'S HEALTHCARE: A STAKEHOLDER ANALYSIS

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## ABSTRACT

### BACKGROUND:

High pharmaceutical price is a dilemma. Value-based pricing (VBP) is suggested to be the potential solution to this problem. However, in Malaysia, VBP does not receive favorable response from the industry players. Therefore, in this study we would like to examine the position of various stakeholders on this issue.

### METHODS:

The PolicyMaker tool is used to evaluate the position and interest of the various stakeholders. Next, we assess the factors that might contribute to the policy success or failure using Kingdon's multiple stream approach.

### RESULTS:

We found that VBP received positive response from the stakeholders with some request for amendments. There was unanimity among the stakeholdersabout introducing medications that do not improve patient outcomes is counterproductive, therefore the problem has been articulated adequately. The policy was sufficiently explained with the publication of the guidelines. Continuous engagement between the government and the private sector plays a major role. Strong political will also contributed to the success.

### CONCLUSION:

Our findings showed that VBP implementation is successful due to strategic engagement and strong support from the government and the private sectors.

### KEYWORDS

value based pricing, pharmaceutical policy, price regulation, stakeholder analysis

## INTRODUCTION

Globally, high pharmaceutical prices has become a dilemma. This conundrum arises from the tension between the need to encourage novel treatments through high product pricing while also protecting consumers and taxpayers from the financial burden of paying for such high costs. In recent years, this topic has become more widespread among the public and the medical fraternities.

One of the potential solutions for this is value-based pricing (VBP). VBP utilized the cost-effectiveness analysis in order to decide which drug and treatment to incorporate into daily practice. VBP ensures that the price of the drug is aligned with the benefits received [1]. Several countries had adopted this strategy namely, Italy, Spain and France. In United States, The Centers for Medicare and Medicaid Services had proposed incorporation of value-based purchasing strategy in 2016, but the plan was cancelled late [2]. However, VBP remains a topic for debate between the stakeholders.

There are two important entities in the Malaysian Ministry of Health (MOH) which are involved in the implementation of VBP in Malaysia, namely the Malaysia Health Technology Assessment Section (MaHTAS) and Formulary Management Branch of the Pharmacy Practice & Development Division (PPDD).

MaHTAS is a vital structure in the MOH. Founded in August 1995 and funded by the federal government, MaHTAS is established under the Medical Development Division, MOH, which also makes it as the first formal health technology assessment (HTA) program in Asia. The primary role of MaHTAS is to assess programs, technologies, procedures, drugs, medical devices and treatments, on issues of safety, cost and effectiveness. It incorporates research evidences, collaborates with local and international stakeholders as well as producing transparent and relevant reports [3].

The second organization is the Formulary Management Branch of Pharmacy Practice & Development Division (PPDD). PPDD is vital as they oversee new drug incorporation into the Ministry of Health Medicine Formulary (MOHMF), modify existing drug specifications or remove existing drugs from the list. Thus, the PPDD role is crucial as they determine what treatments Malaysians will get. Through an extensive literature research and appraisal, PPDD assess about 60 drugs annually with half of them as as full assessments (mini-HTA), evaluating their safety, cost and cost-effectiveness [4].

These two organizations reflect the rising disposition towards the incorporation of economic consideration when devising a new health policy. MOH has also published two guidelines in 2012 and 2019 on pharmacoeconomic analysis studies.

However, VBP does not receive favourable response from the pharmaceutical industry. The Pharmaceutical Association of Malaysia (PhAMA) has argued that cost-effectiveness analysis (CEA) should not be the sole metric to decide which drug to incorporate into the Malaysia Drug formulary. Instead, they suggested that Multi Criteria Decision analysis should be used in order to give a better picture on the overall effectiveness of a drug [5].

In this study, we conducted a stakeholder analysis to assess the position and interests of various stakeholders on the issue. We also used Kingdon's multiple stream approach [6][cite] to contextualize the factors that might affect the success or failure of VBP.

## METHODOLOGY

### DATA
Data were collected from peer-reviewed documents and grey literature from 2000 to 2020 spanning two decades through general web-based searches. Grey literatures consist of reports, working papers, white papers and research outside conventional academic publishing and distribution channels.

### DOCUMENTS
Most of the data was gathered through extensive desk review. Keywords used include, "value-based pricing", "pharmaceutical pricing", "cost-effectiveness analysis", the name of specific stakeholders and related queries. Online search also includes newspaper articles, speeches, conference presentation and so forth. We also included social media sites such as Facebook and YouTube in our study.

### ANALYSIS
Our analysis was conducted in three steps. First, was to identify stakeholders affected by VBP. Second, was to evaluate the stakeholders' resources, interests and relationships. Third, was to assess the stance and roles taken by the stakeholders.

The data collected was then entered into Reich's PolicyMaker software and the software guided the user through each steps [7]. PolicyMaker includes questionnaires to assess stakeholder position (support, oppose, non-mobilized), power (resource available) and the intensity of position (disposition to use available resource). The stakeholders (players) were displayed based on the spectrum from high support, non-mobilized, and

high opposition. A feasibility graph was produced based on three criteria: power, intensity of position and number of mobilized groups. Kingdon's multiple stream analysis [6][ [cite] was used to analyse the data and identify the barriers formed by the stakeholders that might influence the policy implementation.

## RESULT

In general, the key stakeholders are supportive of the implementation of VBP in Malaysia's healthcare system. We created the Position Map based on the result (Figure 1).

**FIGURE 1: BLACK BOXES INDICATE HIGH POWER OF THE STAKEHOLDERS TO INTERVENE, GREY BOXES FOR MEDIUM POWER AND WHITE BOXES FOR LOW POWER**
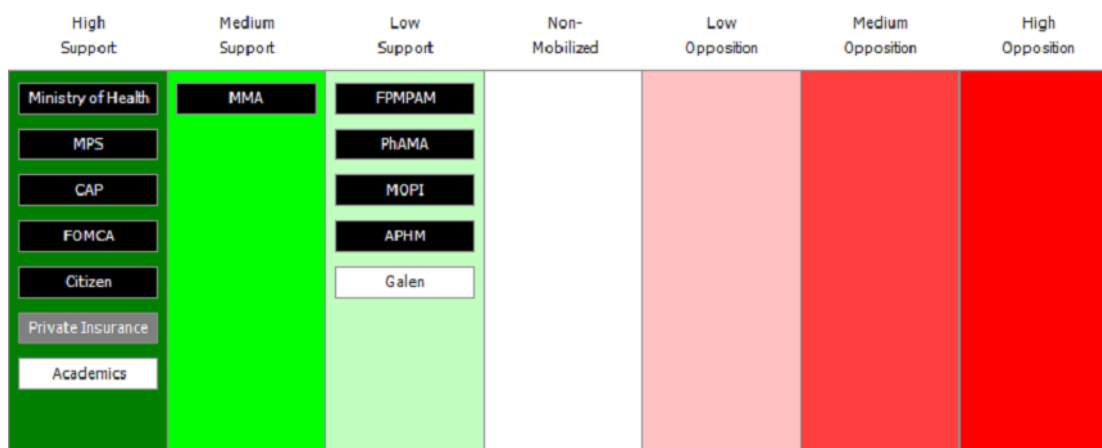


In the PolicyMaker tool, interest is divided into several categories such as financial, ideological, religious and humanitarian. Here we included some of the most prevalent interests.

### FINANCIAL INTEREST

#### Public sector

Stakeholders with financial interest in the public sector aim to optimize their budget utilization by applying VBP in the healthcare system. For example, the MOH have specific divisions to conduct various studies to determine the costs of an intervention or program. Public sector receives limited budget annually and they need to allocate this resource wisely. They also collaborate with local partners such as universities and think tanks, as well as international partners, in order to evaluate the best program for money. Several universities such as Universiti Kebangsaan Malaysia, Universiti Sains Malaysia and Universiti Malaya have integrated casemix system based on Diagnosis Related Group into the hospital setting. Universiti Kebangsaan Malaysia Medical Centre is the first hospital to have fully integrate casemix analysis since July 2002 [8].

#### Private sectors

This is in contrast with the private sector. Stakeholders with financial interest in the private sector seek to maintain or increase their profits in the market. Generally, the private

sectors always stated their support for the application of VBP saying that patient interest is of their utmost importance however, whenever the interest coincide with their profits, they backpedaled. For example, PhAMA initially voiced their full support for VBP and then asked for a few amendments afterward on the methodology of determining cost-effectiveness threshold.

The Association of Private Hospitals Malaysia (APHM) support the application of VBP, and later on added that, the expectation of the public to receive cheap quality healthcare within their vicinity is impossible with the small profits accrued by private hospitals [9]. Some parties do not agree with this claiming that the CEO of a private hospital received RM34 million in remuneration for a particular year [10]. They also reprove this statement arguing that the continuous expansion of the private hospitals both locally and internationally is a proof that the profit is 'exorbitant'.

PhAMA which initially supported the application of VBP withdrew as they were concerned that the sole practice of CEA will restrict the entrance of new innovative drugs into the formulary and therefore, reduced their profits. For example, in the United Kingdom (UK), the willingness-to-pay was set between £GBP 20,000 and 30,000 per Quality Adjusted Life Years (QALYS) [11]. However, many cancer treatments have higher QALYS and therefore were not

reimbursed. PhAMA asserts that using incremental cost-effectiveness ratio (ICER) threshold as the sole criteria for selecting drugs is parochial as it does not account for other factors such as disease severity, unmet needs, target population size and societal cost for CEA. PhAMA instead, suggested that a Multi Decision Criteria Analysis model should be used as it sets weightage to different factors and therefore will be more comprehensive in the decision making [5].

The private insurance industry is generally supportive of any cost containment measure [12]. In 2019, the private insurance sector and Bank Negara Malaysia (BNM) established Medical Cost Containment Task Force (MCCTF) to study the reasons for rising medical insurance premiums. High medical cost will lead to high premiums, which will deter the public from taking private insurance. More co-insurance plans were also suggested to make medical insurance more affordable [13].

## IDEOLOGICAL INTEREST

Ideological interest relates to government's role in providing quality healthcare and the population access to better healthcare.

The MOH aims to "assist an individual in achieving and sustaining as well as maintaining a certain level of health status to further facilitate them in leading a productive lifestyle, economically and socially" [14$^{p?}$]. MOH strong advocavy for VBP is ingrained in its vision to provide the people a quality healthcare that is affordable, efficient and innovative. However, due to budget constraint, this encourages the MOH to explore other avenues which lead to the establishment of National Health Financing Unit in 2009. However, since then, the MOH still has not made a significant move from the general taxation funding system. It has always been to reduce the cost, instead of increasing the income. Besides, the emerging importance of the HTA division in the MOH has shown MOH commitment towards VBP although this effort has been mainly restricted by the lack of data and electronic medical records.

Other stakeholders such as academics have also fully supported the implementation of VBP shown by the growing numbers of CEA studies over the years, increasing from only 2 studies in 2004 to 15 studies in 2017 [15]. Academics have always conducted various seminars and conferences to discuss the importance and application of VBP. One of the foremost universities in this area is Monash University, Australia. Headed by Professor Kenneth Lee, who

is widely recognized as one of the pioneers in pharmacoeconomic research in Asia, and also a founding member of the Hong Kong Chapter of the International Society for Pharmacoeconomics and Outcomes Research. Monash University has invited various well-known experts in the pharmacoeconomic area to present as well as organizing health economics workshops and collaborating with the MOH and international universities [16].

The Malaysia Pharmaceutical Society (MPS) has organized several forums on VBP. For example, MPS worked with the MOH to organize the 10th National Pharmacy Conference in 2018 to discuss VBP related issues and recent advances in pharmacoeconomic research [17]. MPS encourage patients to obtain prescriptions from their doctors using chemical names instead of brand names as this would allow the patient to choose the medication based on affordability. In 2015, MPS support a petition to classify controlled medication as zero-rated GST [18]. Fundamentally, the Malaysian Organisation of Pharmaceutical Industries (MOPI) is committed to VBP. One of the MOPI's objective is to "ensure that all patients have access to affordable quality medicines" [19][cite p?]. MOPI is committed to promote cost-effective and high-quality pharmaceutical products. The first general principles of MOPI, out of six principles mentioned, was to do all it can to benefit the patients [19]

## HUMANITARIAN INTEREST

Stakeholders with humanitarian interest such as the Federation of Malaysian Consumers Associations (FOMCA) seeks to study consumer issues, educate on consumer's rights and advocate for better consumer protection. Established in 1973 in Alor Setar, Kedah, FOMCA has been in the forefront when it comes to consumerism issues. FOMCA works in three phases. In the first phase, FOMCA will organize forums and meetings with the government agencies. In the second phase, FOMCA will write to the press and politicians to assert pressure. The third phase is by collecting petitions from the public [20]. FOMCA seeks to ensure that Malaysian will have the access to affordable and high-quality healthcare. FOMCA suggested that healthcare expenditure should be increased to 7% of GDP, in line with WHO recommendations [21]. Known as the staunch critic for private healthcare sector, FOMCA advocate for better regulation and lower insurance premium to cater for low and middle income consumers [22].

## STAKEHOLDER MAPPING: POWER AND POSITION

PolicyMaker tool categorize power into: low, medium and high. Power is characterized by the resource that the stakeholder has, both tangible and intangible. Power is measured by the possession of fiscal, organizational and symbolic resource in order to guide the policy, along with their relationship to the policymaker and media. We showed the power and position of the stakeholders in Table 1.

**TABLE 1 1: STAKEHOLDERS' POSITION, INTEREST AND POWER**

| Stakeholder | Interest | Position | Power |
|---|---|---|---|
| Academics | Professional | High Support | Low |
| Association of Private Hospitals Malaysia (APHM) | Financial | Low Support | High |
| Citizen | Financial Ideological | High Support | High |
| Consumer Association of Penang (CAP) | Humanitarian Ideological | High Support | High |
| Federation of Private Medical Practitioners' Associations, Malaysia(FPMPAM) | Financial | Low Support | High |
| Federation of Malaysian Consumers Associations (FOMCA) | Humanitarian Ideological | High Support | High |
| The Galen Centre for Health and Social Policy | Professional | Low Support | Low |
| Malaysia Medical Association (MMA) | Financial | Medium Support | High |
| Malaysian Organisation of Pharmaceutical Industry (MOPI) | Financial | Low Support | High |
| Malaysian Pharmaceutical Society (MPS) | Financial | High Support | High |
| Ministry of Health (MOH) | Financial Ideological | High Support | High |
| Pharmaceutical Association of Malaysia (PhAMA) | Financial | Low Support | High |
| Private Insurance | Financial | High Support | Medium |

The MOH is considered to have high power as they have considerable resources and access to the 'high table'. Their support for VBP enabled them to initiate various VBP programmes and cooperate with numerous institutions. They also provide research grants and funding for health economics studies through National Institute of Health (NIH) and Medical Review and Ethics Committee (MREC). All studies involving MOH facilities must be registered under the National Committee for Clinical Research (NMRR). MOH is responsible for administering several important Acts such as the*Medical Act 1971, Poisons Act 1952 and Mental Health Act 2001*. Conforming to the current technology trend, the MOH is active through social media such as Facebook, Twitter and Telegram, devoted to provide timely, truthful and transparent sources of information.

Other stakeholders such as PhAMA and APHM use media and forums to state their position. Social media such as Facebook and Youtube are also used.

## KINGDON'S MULTIPLE STREAM APPROACH

It is necessary to understand what factors lead to the virtually successful implementation of VBP in Malaysia's healthcare system. One of the ways to do this is by applying Kingdon's multiple stream framework. This framework analyses the component or the stream of policy setting process which are the problem, policy and the political stream. This analysis attempt to discover the window of opportunity so that, VBP can be maintained and strengthened as the national agenda.

## THE PROBLEM STREAM

To ensure that the problem is solved, the problem needs to be addressed first. The stakeholders agreed that incorporating drugs that do not improve a patient's outcomes is detrimental and a waste of money. There is a consensus amongst stakeholders that integrating VBP into the pharmaceutical pricing is essential. This can be seen through numerous seminars and conferences organized on the issue. Therefore, a proper problem framing has been established on the importance of implementing VBP in the drugs listing and pricing.

Stakeholders with financial interest such as MOH plays vital role in pushing forward the VBP agenda through its divisions and programmes. Academics had been increasing their studies and discussion on this topic, making it a primary issue in the health economics area [15].

Private sectors with financial interest, such as PhAMA and APHM, also generally agreed with the notion although they called for several modifications. The public sector viewed VBP as their responsibility to provide a high-quality healthcare at affordable price to the public, whereas the private sector viewed VBP as their way of conveying their commitment toward patient's care and ultimately, customer's interest.

As a result of the unanimity among public sector, private stakeholders, academics and the NGOs, the implementation of VBP received a favourable response.

## THE POLICY STREAM

Policymaking is a complex process, intertwined with various concepts, players and solutions, presented at different stage of the policy cycle [23]. However, the problem must first be identified and then, the solution (policy) can come into play.

The implementation of VBP in the country is still not widespread, yet it is moving in the right direction. The strong agreement among the stakeholders helps this policy to come into light.

The HTA division under the MOH, widely regarded as one of the most important divisions, continuously engaged with stakeholders through seminars, forums and workshops. This continuous engagement is crucial to strengthen the understanding between the stakeholders and improve transparency. The MOH conduct various VBP studies and published several guidelines to help improve the state of

VBP in the country. These guidelines help the private sectors and the academics to comprehend the approach that MOH is taking.

Although the MOH does not publish official CEA threshold, the MOH generally agreed to follow WHO recommendations. A study in 2017 found that the CEA threshold estimated for Malaysia is lower than the WHO recommendation [24]. The simple and straightforward nature of the guideline supports unambiguity and helps to frame the solution as acceptable to many [25].

The continuous interests from the academics involving several local universities helps to provide factual evidence on VBP, shown by the increasing number of studies on VBP over the years.

Stakeholders with humanitarian interests like FOMCA, welcome the solution as they had been asking for years that the problem of expensive healthcare, be addressed and thus, VBP implementation is seen as a way to help reduce the cost of healthcare for low- and middle-income groups, especially in the private sector.

The private sector generally agreed with the solution although they asked for a few modifications. PhAMA is concerned that VBP might hinder the entrance of new innovative drugs whereas the private hospital group is concerned that VBP might compromise patients' welfare. Although they have financial interest at stake, the private sector managed to frame the modifications as a way to protect the public's interest.

Coming together, the stakeholders managed to push forward the VBP agenda. The strong policy stream coupled with well-framed problems, helps the implementation of VBP to be successful.

## THE POLITICAL STREAM

The establishment of MaHTAS in the 1990s signified the importance of HTA in the country. Progressing towards evidence-based medicine and later on, VBP, the changes of administration continuously uphold the concept of VBP and put it in the centre. Perhaps helped by the previous Prime Minister, Tun Dr. Mahathir bin Mohamad, who was a medical doctor by training, also spearheaded the reform of HTA in the MOH. Political groups, whether they are in the government or in opposition, both support VBP. This can be seen after the fall of Barisan Nasional in 2018 and

subsequently the takeover from the Pakatan Harapan, that the VBP agenda has become more important. This is also encouraged by the commitment from the government to establish Malaysia as an educational hub and therefore invited several reputable universities to get a foothold in Malaysia. Among them is Monash University which is seen at the forefront of VBP implementation.

## DISCUSSION

The implementation of VBP is considered as successful. Our analysis used a double pronged approach to study VBP, first with Reich's methodology to understand the stakeholders position and then merged that with the Kingdon's multiple stream framework to evaluate the factors involved in VBP success.

We found that both approaches point to the significant role of the MOH in ensuring that VBP remains a priority. The stakeholder analysis revealed that the MOH have significant power and resources, are highly supportive and continuously engaged with stakeholders to implement VBP. The Kingdon's multiple stream approach demonstrates how cost becomes a major problem resulting in the strong endorsement by the MOH in the policy stream.

### WINDOW OF OPPORTUNITY

VBP implementation is still progressing. There are several things that can be improved. First, the inclusion of CEA studies should be made mandatory when submitting dossier for new drug listing. All the drugs in the formulary should continuously be evaluated. Government should invest in digitalising the healthcare system. Electronic medical records need to be used in hospitals and clinics, both in public and private sectors. Hospitals should move from paper-based systems to fully computerized systems. This data then needs to be integrated. Malaysia should emulate the Taiwan Health Care Smart Card system which uses a microcontroller-based card that has various information such as the number of admissions, accumulated medical expenditure, drug allergy history and immunization information [26]. A centralised patient registry should also be set up. The availability of the data will help catapult the integration of VBP into the healthcare system. The presence of real-time data, coupled with longitudinal pharmaco-surveillance, will help to reduce the uncertainties regarding the true safety and effectiveness of the drug while at the same time providing leverage in the pricing negotiation process.

## FUNDAMENTAL CAUSE OF VBP SUCCESS

This research seeks to understand the interplay between the stakeholders in VBP implementation. We believe that the MOH plays a big role in ensuring VBP success. The MOH utilised its resource efficiently in applying and presenting VBP as the top priority. Conversely, if the MOH is not adamant in putting VBP forward, VBP might succumb to the pressure from the private sectors.

Private sectors also play a major role in VBP implementation. Continuous engagements and clear commitment on the VBP implementation from private sectors contributed to the wide acceptance of the policy by the stakeholders.

VBP was perceived as the way to ensure sustainable healthcare cost in light of increasing spending and budget constraint. VBP is vital in ensuring the benefits received is align with the cost and therefore, optimize the budget provided to the fullest while protecting patients' welfare.

In regard to about budget constraint however, there is still a need for more fiscal allocation for health. The total healthcare expenditure in 2019 is at 4.26% of GDP [27]. This needs to be increased to 7% of GDP as recommended by the WHO. Healthcare in Malaysia is virtually seen as a burden to the government rather than a booster to the economy. This perception needs to be changed as a good healthcare system will provide a healthy generation and a high quality workforce.

Economic concerns, corruption, unemployment, political instability and kleptocracy have always become the priorities, something that are always seen in the news, social media and in daily conversation. Healthcare cost should also have topped this list. More discussion and awareness on the importance of affordable excellent healthcare is needed.

### LIMITATIONS

This study has several limitations. We attempt to analyse the problem using Reich's stakeholder analysis and Kingdon's multiple stream approach, which are both recognized scientific methods. However, it is difficult to externalize this study to policy in other countries as this study is a single case study with various unique stakeholders.

There are a lot of stakeholders that might be involved in the current study. However, we only focused on the big and powerful organizations which in itself might be a bias.

This study also only involved publicly available data. This study does not take into account what might happen during private negotiations.

As for public documents, these documents might be available in English, Malay, Mandarin or Tamil. However, our sources of information were only from English and Malay.

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# ASSOCIATION BETWEEN SECURE ATTACHMENT STYLE AND SUBJECTIVE WELL-BEING: EXAMINING THE SEQUENTIAL MEDIATION EFFECTS

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## ABSTRACT

Attachments are an integral element of the human experience from birth to death. Early experiences with caregiver and adult attachments are crucial for human emotional and cognitive development and it is a strong basis for mental health and psychological adjustment. Despite this, little research on the relationship of these attachments has been undertaken on subjective well-being.

This study intended to investigate the relation of secure attachment style with subjective well-being through serial mediation effect of self-esteem and emotional intelligence. Process macro version 3.4 in SPSS 23 and AMOS 21.0 were used to evaluate survey data of 266 respondents.

The findings of the study revealed that secure attachment style play a significant role in enhancing the subjective well-being of people and a positive significant relation was found between them. Also, this relationship was mediated by both self-esteem and emotional intelligence which supports the serial mediation model. Hence, the results exhibit that secure attachment style predicts self-esteem and emotional intelligence, which in turn influences the subjective well-being of persons. Furthermore, both direct and indirect effects were statistically significant.

Theoretical and practical implications are discussed based on the findings of the study.

### KEYWORDS

attachment styles, emotional intelligence, self-esteem, subjective well-being

## INTRODUCTION

Subjective well-being (SWB) is a relatively emerging psychological construct in the field of positive psychology which was firstly explored by Edward Diener in 1984. Ed Diener and his colleagues defined subjective well-being as composed of three components - life satisfaction, pleasant emotions, and unpleasant emotions [1]. They defined subjective well-being as an individual's cognitive and affective self-evaluation [2]. The cognitive component is defined as the way people might think about their life satisfaction as a whole, while the affective element will be defined as people's emotions, feelings, or moods, such as

when a person feels happiness [3,4]. Therefore, SWB can be defined as a cognitive evaluation of life that is filled with pleasant emotions without unpleasant emotions. Similarly, other previous research on the correlates of subjective well-being also supported affective components of subjective well-being and life satisfaction as extremely important [2]. Further, after determining that demographic characteristics such as income only explain a small portion of happiness variation, then research focused on psychological determinants of subjective well-being [1,2]. Among the psychological determinants, social relationships were found to be significantly more strongly linked to satisfaction than objective measurements like income [5], and relatedness was one of the key determinants to influence happiness [6,7]. Similarly, relationship-enhancing attributes and personality traits were also found to be highly associated variables with subjective well-being among other traits [8]. Given the complexity of the topic of relationships, studies have focused on various components of relationships that contribute to subjective well-being. Attachment, as a feature of close relationships, has been identified as one of the important relationship characteristics that may be highly related to subjective well-being [6] or satisfaction of life [9]. However, the relationship between attachment in close relationships and subjective well-being is less well understood.

On the other hand, attachment refers to a feeling of trust in others to respond and assist people in times of need, and it is a strong basis for mental health and psychological adjustment [10]. Attachment is an emotional bond formed with another person who is regarded as a security source and provides a safe foundation for exploration of the surroundings [9]. Internal cognitive-affective working models, which are mental representations of self and others, and connections derived through child-parent interactions, are thought to impact a child's attachment behaviour and have long-term effects on subsequent relationships [11]. Thus, adult emotional relationships are seen as extensions of child-parent attachments. Different attachment categories, such as secure, dismissive, preoccupied, and fearful are described based on perceived trustworthiness and availability of others and perceived worth of self [12].

The term secure attachment style (SAS) refers to a person's ability to openly express their feelings with their family, friends and partners and adults who have a secure attachment style may rely on their partners and, in turn, let their partners rely on them. In the dismissive style, people believe that being in a relationship is not necessary to feel complete. They don't want to rely on others to seek support and approval and don't let others rely on them. People with a preoccupied attachment style place a high value on their relationships, but they are often concerned that their partners are not as invested in the relationship as they are and fearful people seek intimacy and closeness, yet they have problems trusting and relying on others. They have trouble regulating their emotions and avoid significant emotional attachments because they are afraid of being hurt. Later, two dimensions were discovered beneath these categories or styles: Anxiety and avoidance [13]. So, the avoidance dimension refers to how much people want restricted intimacy and prefer to be mentally and emotionally independent, whereas the anxiety dimension refers to how much people worry that their relationship partners would not be around or abandon them.

Although there are few studies, research focusing on the relationship between attachment styles and subjective well-being found that securely attached people had a less negative affect and more positive affect [14], and that attachment dimensions were linked to everyday subjective emotional experiences [15]. In another study [16], found a link between attachment and subjective well-being, demonstrating a link between people's general attachment security and their well-being. Overall, these research findings seem to point to a link between attachment and subjective well-being. Furthermore, self-esteem (SE) described as a person's positive or negative attitude toward oneself, and emotional intelligence (EI) is a cognitive phenomenon about reasoning or solving problems in the emotion domain and understanding one's emotional tendencies and dispositions, has recently emerged as a significant construct with strong linkages to psychological flourishing and mental health as well as the stable attachment. So, the goal of this study was to look into the role of attachment in subjective well-being, as well as the significance of self-esteem and emotional intelligence as a mediating factor.

This present study explores the mediating role of self-esteem and emotional intelligence between the association of secure attachment style and subjective well-being among the people of Punjab and Chandigarh Tricity. This research's use of self-esteem and emotional intelligence as a mediator is consistent with previous studies [17-20]. Aside from individual mediation, the study will focus on serial

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mediation of self-esteem and emotional intelligence, which will be a significant contribution. These two mediating variables are important in improving subjective well-being [21-24]. Now the question arises "How do secure attachment style enhances subjective well-being through self-esteem and emotional intelligence?" To answer this question, a serial mediation conceptual framework was developed and studied.

The current study is worthwhile for several reasons. The study's originality is that it has used objectives and models that had not previously been studied. Furthermore, existing research has not looked into the relationship between the variables indicated above, particularly on the adults of Punjab and Chandigarh Tricity, where respondents may have different characteristics and work settings than in previous studies. As a result, the current study will fill in gaps in the existing literature.

## THEORETICAL FRAMEWORK AND HYPOTHESES FORMULATION

### ATTACHMENT THEORY
Early experiences with caregivers, are crucial for human emotional and cognitive development [9]. Although attachment behaviours are especially obvious in early childhood, attachment is an integral element of the human experience from birth to death [25]. Hazan and Shaver extended this attachment theory to adult relationships, defining friendships, romantic love, or pair bonding, as an attachment process [11]. Therefore, the theory is considered a suitable theoretical base for studying the relationship between attachment style and subjective well-being. Supporting this, a research study [26] stated that people would have high subjective well-being if they have good relationships. Similarly, this theory is applied to comprehend the relationship between the other constructs of the study.

### SECURE ATTACHMENT STYLE AND SUBJECTIVE WELL-BEING
Attachment theory is a valid framework for understanding individual variations in happiness and many studies have provided empirical evidence to support the idea that good family relationships can contribute to a sense of well-being [27]. So, the social environment in which individuals live has an important role in individual behaviour. Moreover, according to [28], secure attachments are favourably connected with happiness, but attachment anxiety and attachment avoidance have both been shown to be

adversely correlated with life satisfaction and wellbeing [29]. Secure attachment is linked to positive emotions through social interactions [30], as well as happiness, reduced negative affect, and fewer psychiatric symptoms [31]. But attachment anxiety and avoidance have been linked to more pain and lower well-being [32], as well as negatively associated with global happiness [33] as an anxious attachment can result in the development of maladaptive affect regulation strategies, which can lead to negative mood and interpersonal issues [34], low romantic relationship satisfaction [35], and less positive emotions [36]. Also, the outcomes are more complicated for avoidance deactivation approaches. Thus, it can be implied that secure attachments with friends and family enhance the subjective well-being of people. So, this study proposed the following hypothesis:

H1: Secure attachment style positively affects subjective well-being.

### MEDIATION OF SELF-ESTEEM
Self-esteem is a person's positive or negative attitude toward oneself as well as a person's favourable or unfavourable view of himself or herself. Self-esteem is a feeling of a person that he considers himself worthy or unworthy [37].

It has been claimed that attachment experiences are significant in shaping people's self-images and, as a result, their ability to control emotions [17]. Also, there are many existing links between insecure attachment and poor self-esteem [38]. Furthermore, in the opinion of [39], self-esteem and spiritual belief affect dependent and anxious attachment in females only and not in males which contradicts the findings of [40], who claimed that both genders have reduced self-esteem as a result of attachment experiences. In addition, past research has linked secure attachment to self-worth in the context of family support. Similarly, researchers have emphasized the role of self-esteem in determining happiness in recent decades and consider self-esteem to be one of the greatest predictors of wellbeing [41]. According to social identity theory, the relational self is an important part of one's selfhood, and one's assessment of the relational self is linked to subjective well-being [42]. Further, relational self-esteem was found to be connected with many indices of well-being (positive affect, purpose in life, depression) in one of the few studies that explicitly assessed self-esteem. It means individuals who felt more connected and related to significant persons such as family and friends were more

likely to demonstrate optimal functioning [43,44]. Numerous studies have also found that those who have a strong bond with their parents have greater levels of psychological well-being [21,22]. So, after finding the relationship of self-esteem with attachments and subjective well-being, existing literature recommends self-esteem may mediate the relationship between secure attachment style and subjective well-being. Hence, this study is using self-esteem as a mediator between secure attachment style and subjective well-being.

H2: Self-esteem positively mediates the relationship between secure attachment style and subjective well-being.

### MEDIATION OF EMOTIONAL INTELLIGENCE

Emotional intelligence (EI) has progressed in two directions, each based on a different conceptualization [45,46]. As a result of this evolution, two types of EI have emerged: ability EI and trait EI [46,47]. Ability EI is defined by [48] as a set of three adaptive abilities: emotion perception and expression, emotion management, and emotion used in problem-solving. Trait EI is conceptualized as a set of emotion-related self-perceptions and dispositions, i.e., self-efficacy in the emotion domain [24,49]. This view assumes that emotions are subjective, and thus anything emotion-related (including emotional intelligence) is equally subjective, and hence cannot be objectively quantified. As a result, self-report questionnaires are used in this study. It appears that the two conceptualizations differ not on whether EI is a cognitive phenomenon, but on what the cognitive phenomenon is about-if it is about reasoning or solving problems in the emotion domain, it is an ability [45], if it is about understanding one's emotional tendencies and dispositions, it is a trait [24,45].

Attachment theory is also a paradigm of emotional regulation [18,50]. According to [50], Internal working models of attachment could be seen as the complete process that orients an individual's emotional reactions to stressful situations. Internal working models are full character methods for controlling emotions and directing behaviours. When it comes to attachment styles, research shows that secure people can cope better with negative emotions in social interactions than insecure people [50] and have more positive feelings within interactions [14], and pleasant emotional skills [51]. Hence, secure attachment style has a significant impact on EI [19], and EI, as a set of abilities to process and comprehend emotions, has a significant impact on an individual's wellbeing [20].

As subjective well-being, anxiety and stress are linked to both ability EI and trait EI. In the opinion of [23,46,52], ability EI has been linked to increased life satisfaction, improved affective well-being (increased positive affect and decreased negative affect and reduced stress. Above and beyond, trait EI also indicated enhanced life satisfaction [24]. Kong and Zhao discovered that this association was mediated by affect, with higher trait EI related with enhanced positive affect and decreased negative affect, both of which contributed to increased life satisfaction [53]. Hence, the literature shows that secure attachment style has a positive significant relation with emotional intelligence and further, emotional intelligence has a significant effect on subjective well-being. So, based on these prior studies, this study is using emotional intelligence as a mediator between secure attachment style and subjective well-being.

H3: Emotional intelligence positively mediates the relationship between secure attachment style and subjective well-being.

### SERIAL MEDIATION

The current study examines the serial mediation effect. Taking all hypotheses proposed above, the present study foresees that the relationship between secure attachment style and subjective well-being can be mediated by SE and EI (a serial mediation). Former studies provide empirical evidence to confirm the positive association between attachment orientations and self-esteem [43,44]. Individuals who felt more connected and related to important people in their lives, such as family and friends, were more likely to perform at their best. People with high self-esteem have a high level of emotional processing and control power, which leads to high emotional intelligence [17]. Furthermore, Higher EI can enhance life satisfaction, improve affective wellbeing [23,46,52,53]. Hence, it can be seen that self-esteem developed by secured attachments will positively influence emotional intelligence and it will ultimately lead to influencing SWB. As a result, it is feasible that SE and EI not only play an individual mediating role in the link between secure attachment style and subjective well-being but also relate with each other and play a serial mediation role in the relationship at the same time. Thus, the following hypothesis has been proposed when taken together.

H4: Self-esteem and emotional intelligence serially mediates the relationship between secure attachment style and subjective well-being.

## CONCEPTUAL FRAMEWORK:

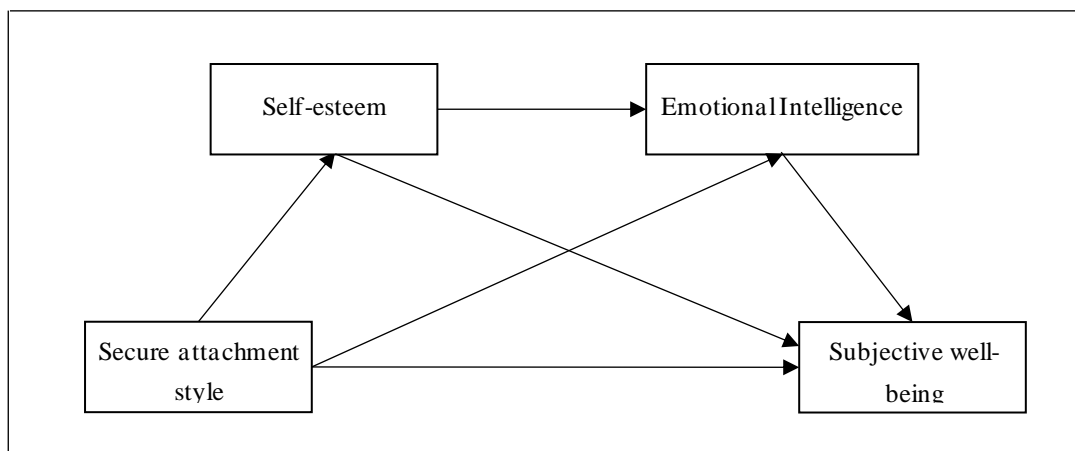Based on the above literature and hypotheses, the following conceptual framework has been framed:

**FIGURE 1: CONCEPTUAL FRAMEWORK**



## METHODOLOGY

### SAMPLING AND DATA COLLECTION

The study investigates the association between secure attachment style and subjective well-being of adults of North India by using a quantitative cross-section research design. Convenience sampling was used to collect the data from the adults of Punjab and Chandigarh Tricity in north India and data was collected from different age groups. To make the sample more representative, it included respondents from urban, rural, and semi-urban areas, as well as married/unmarried men and women from nuclear and joint families. A structured questionnaire was distributed to collect the responses in November-December 2021

A closed-ended questionnaire was distributed to 300 people, and 282 responses were received, yielding a response rate of 94 per cent. Due to incomplete and invalid responses, 16 of the submitted questionnaires were discarded. Data for the study were collected at two points in time, separated by three weeks, to eliminate common method biases. Closed-ended questions were chosen because respondents would find it easier to complete the questionnaire, and the study would take less time and expense to complete. Before proceeding on to analysis, the primary conditions of sample size and data accuracy were met. A minimum sample size of 100-150 is deemed appropriate for analyzing a model [54]. As a result, the

current study's effective sample size of 266 is adequate for analyzing the proposed model.

### MEASUREMENT DEVELOPMENT

The variables in the present study were measured using existing scales extracted from previous literature. The secure attachment style was measured by nine items adapted from the revised adult attachment scale of Collins and Read [55]. These nine items were developed based on the 'depend' and 'close' dimensions of scale. The sample item is "I find it relatively easy to get close to people.'' For subjective well-being, a five-item life satisfaction scale developed by Diener, Emmons, Larsen & Griffen was used [3]. The sample item is "I am satisfied with my life" and for self-esteem, a five-item scale has been constructed based on a scale developed by Rosenberg with modifications as per the requirement of the study [37]. The sample item is "I feel that I have a number of good qualities." A five-item scale was constructed to measure emotional intelligence from the self-reported emotional intelligence test (SSEIT) [20]. The sample item is "I am aware of my emotions as I experience them." All the scales except adult attachment scale items used five-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree) and for adult attachment scale items used five-point Likert scales ranging from 1 (not at all characteristics) to 5 (very characteristic).

## SAMPLING ADEQUACY AND FACTOR ANALYSIS

Table 1 shows Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity is used to determine sampling adequacy. KMO value of more than .8 indicates that the sample is adequate for the analysis. According to Barlett's test, p-value<.001 make up the constructs are significantly satisfying.

All the scales were validated and standardized. However, factor analysis with varimax rotation was used to re-evaluate the scales' applicability for the current study. Cronbach's alpha, with a minimum threshold of 0.6, was used to assess the constructs' internal reliability [56]. Table 2 shows the factor loadings and Cronbach's alpha results.

**TABLE 1: KMO AND BARTLETT'S TEST**

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | | .889 |
|---|---|---|
| Bartlett's Test of Sphericity | Approx. Chi-Square | 5747.014 |
| | Df | 176 |
| | Sig. | .000 |

Source: Primary Data

**TABLE 2: ROTATED COMPONENT MATRIX**

| Variables | Items | Factor Loading | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| Secure Attachment Style (Cronbach's alpha = .912) | SAS1 | .787 | | | |
| | SAS2 | .828 | | | |
| | SAS3 | .724 | | | |
| | SAS4 | .681 | | | |
| | SAS5 | .793 | | | |
| | SAS6 | .757 | | | |
| | SAS7 | .767 | | | |
| | SAS8 | .723 | | | |
| | SAS9 | .656 | | | |
| Self-Esteem (Cronbach's alpha = .845) | SE1 | | .771 | | |
| | SE2 | | .774 | | |
| | SE3 | | .607 | | |
| | SE4 | | .687 | | |

| | | | | |
|---|---|---|---|---|
| | SE5 | | .782 | | |
| Emotional Intelligence (Cronbach's alpha = .878) | EI1 | | | .684 | |
| | EI2 | | | .772 | |
| | EI3 | | | .787 | |
| | EI4 | | | .775 | |
| | EI5 | | | .663 | |
| Subjective well-being (Cronbach's alpha = .897) | SWB1 | | | | .767 |
| | SWB2 | | | | .678 |
| | SWB3 | | | | .833 |
| | SWB4 | | | | .784 |
| | SWB5 | | | | .832 |

Source: Primary Data

Note: 1) SAS=Secure Attachment Style, SE=Self-Esteem, EI=Emotional Intelligence, SWB=Subjective well-being

## TESTING COMMON METHOD BIAS

Although the current study controls for common method bias by using self-reported data acquired through a survey questionnaire at two points in time. However, each participant responds to a survey, there is a risk of common method bias. The study used Harman's Single Factor Tool, which is the most extensively used test for assessing common method bias, to determine biasness. The variation explained in the study was determined at 35.07% which is less than Harman's stated criteria of 50% [57]. As a result, statistical data suggest that common technique bias does not pose a threat to the interpretation of the current study's findings.

## DATA ANALYSIS

The data was analyzed using SPSS 23 with Process macro version 3.4 and AMOS version 21.0 [58]. The constructs' reliability, correlation, and factor analysis were examined using SPSS 23. The validity of the scale was investigated through CFA in AMOS 21.0 and validity master [59]. Serial mediation was also examined using SPSS with PROCESS Macro (Model 6) and 5000 bootstrapping with a 95% confidence level [60].

## DEMOGRAPHIC PROFILE

Table 3 shows the demographic profile of respondents following gender, age, marital status, family structure, and region.

## TABLE 3: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

| Demographic Variables | Categories | Percentage |
|---|---|---|
| Gender | Male<br>Female | 54.7<br>45.3 |

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| Age | 18-24 | 29 |
| | 25-35 | 47 |
| | 36-45 | 17 |
| | Above 45 | 7 |
| Marital Status | Unmarried | 36.7 |
| | Married | 63.3 |
| Family Structure | Nuclear Family | 52.8 |
| | Joint Family | 47.2 |
| Region | Rural | 42.4 |
| | Semi-urban | 28.4 |
| | Urban | 29.2 |

Source: Primary Data

## RESULTS:

The findings of descriptive statistics analysis and the correlation amongst variables are reported in Table 4 and all of the variables were found to be statistically significant and correlated.

## MODEL FIT AND VALIDITY

The research model was examined using confirmatory factor analysis (CFA) with AMOS 21 to examine the overall model fit [61]. The goodness of fit measurement indices model value, GFI, PGFI, CFI, TLI, and RMSEA were investigated [59]. All of these values were found to be within acceptable ranges. Table 5 summarises the findings.

**TABLE 4: DESCRIPTIVE STATISTICS AND INTER-CORRELATIONS AMONG VARIABLES**

| S. No. | | Variables | M | SD | SAS | SE | EI | SWB |
|--------|---|-----------|---|----|----|----|----|-----|
| 1. | | Secure Attachment Style | 3.55 | .57 | 1 | | | |
| 2. | | Self-Esteem | 3.58 | .56 | .420** | | | |
| 3. | | Emotional Intelligence | 3.84 | .48 | .365** | .525** | | |
| 4. | | Subjective well-being | 3.77 | .57 | .363** | .451** | .563** | 1 |

Source: Primary Data

Note: 1) SAS=Secure attachment Style, SE=Self-Esteem, EI=Emotional Intelligence, SWB=Subjective well-being
 2) N=266, **p<.01

**TABLE 5: FIT STATISTICS OF THE MODEL**

| Model Fit | Model Statistics | Cut-off Criteria |
|-----------|------------------|------------------|
| CMIN | 673.11 | |
| DF | 243 | |
| CMIN/Df | 2.77 | ≤3 (Hair et al., 2010), |
| GFI | .815 | ≥.8 (Homburg & Baumgartner, 1995) |
| PGFI | .72 | ≥.5 (Wu, 2009) |
| CFI | .97 | ≥.9 (Hair et al., 2010) |
| TLI | .96 | ≥ 0.90 (Byrne, 2013 |
| RMSEA | .077 | ≤.08 (Steiger, 1990) |

Source: Primary Data

The convergent and discriminant validity of the scale constructs were investigated. The validity master was used to examine the validity that had already been established. All of the data were found to be within permissible ranges, such as CR>0.6 and AVE>0.5 [62] which confirms the internal consistency and convergent validity. Furthermore, the results in Table 6 show that discriminant validity is satisfactory as the square root of AVEs for each construct exceeded its correlation coefficients with other constructs [62].

**TABLE 6: CONVERGENT AND DISCRIMINANT VALIDITY STATISTIC OF VARIABLES**

| | CR | AVE | MSV | MaxR(H) | SE | SAS | SWB | EI |
|-----|-----|-----|-----|---------|-----|-----|-----|-----|
| **SE** | 0.890 | 0.619 | 0.360 | 0.899 | **0.787** | | | |
| **SAS** | 0.917 | 0.552 | 0.214 | 0.920 | 0.463 | **0.743** | | |
| **SWB** | 0.899 | 0.642 | 0.401 | 0.910 | 0.502 | 0.395 | **0.801** | |
| **EI** | 0.879 | 0.593 | 0.401 | 0.882 | 0.600 | 0.418 | 0.633 | **0.770** |

Note: 1) SAS=Secure attachment Style, SWB=Subjective well-being, SE=Self-Esteem, EI= Emotional Intelligence
2) CR= Composite reliability, AVE= Average variance extracted MSV= maximum shared variance

## RESULTS OF DIRECT EFFECTS :

The direct effect of all four constructs is shown in Table 7. Attachment style has a positive direct effect on subjective well-being (β=.1359, p<0.004), self-esteem (β=.410, p<0.000), and emotional intelligence (β=.1475, p<0.000). Similarly, a positive significant impact of self-esteem on SWB (β=.1751, p<0.001), and EI (β=.3867, p<0.000) is observed. Further, EI was also found to be positively impacting SWB (β=.5016, p<0.000).

**TABLE 7: RESULTS OF DIRECT EFFECT**

| Relationships | β | se | t | P | boot LLCI | boot ULCI |
|---------------|------|------|------|------|-----------|-----------|
| SAS -> SWB | .1359 | .047 | 2.88 | .004 | .0433 | .2284 |
| SAS->SE | .4105 | .046 | 8.77 | .000 | .3186 | .5025 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAS-> EI | .1475 | .040 | 3.61 | .000 | .0673 | .2277 |
| SE -> SWB | .1751 | .052 | 3.32 | .001 | .0716 | .2786 |
| SE -> EI | .3867 | .041 | 9.27 | .000 | .3047 | .4687 |
| EI->SWB | .5016 | .059 | 8.38 | .000 | .3840 | .6193 |

Source: Primary Data

Notes: 1. *** $p$-value < 0.01; ** $p$-value < 0.05

2. SAS=Secure attachment Style, SWB= Subjective well-being, SE= Self-Esteem, EI= Emotional Intelligence

## RESULTS OF INDIRECT EFFECTS

The direct and indirect effects of self-esteem and emotional intelligence were examined. It was observed that after mediation analysis, the direct effect of SAS on SWB is positively significant (β=.1359, 95% CL: .4333, .2284), leading to acceptance of hypothesis H1. The total size of the indirect effect is (β=.2255, 95% CL: .1508, .3056), and was found to be statistically significant as there are no zeroes between LLCI and ULCI in the confidence interval. Mediation effect of SE, H2 (β=.0719, 95% CL: .0244, .1286) and EI H3 (β=.0740, 95% CL: .0285, .1239) were found to be statistically significant. Simple mediation analyses predicted in hypotheses 2 and 3 are supported by the results. Further, examining the serial mediating effect H4 (β=.0796, 95% CL: .0480, .1178), is also found to be statistically significant. Through this, the serial mediation effect of SE and EI is confirmed in the relationship between SAS and SWB. As proposed, all the results were found to be statistically significant, supporting all hypotheses.

**TABLE 8: SPECIFIC INDIRECT EFFECTS**

| Relationships | H | Effect | boot SE | boot LLCI | boot ULCI | Decision |
|---|---|---|---|---|---|---|
| Direct effect after mediation (SAS->SWB) | H1 | .1359 | .0470 | .0433 | .2284 | Accepted |
| Total Indirect effect | | .2255 | .0394 | .1508 | .3056 | |
| SAS -> SE -> SWB | H2 | .0719 | .0266 | .0244 | .1286 | Accepted |
| SAS -> EI -> SWB | H3 | .0740 | .0245 | .0285 | .1239 | Accepted |
| SAS->SE -> EI -> SWB | H4 | .0796 | .0178 | .0480 | .1178 | Accepted |

Source: Primary Data

Notes: 1. SAS=Secure attachment Style, SWB= Subjective well-being, SE= Self-Esteem, EI= Emotional Intelligence

2. Number of bootstrap samples for bias-corrected bootstrap confidence intervals: 5000.

Level of confidence for all confidence intervals: 95%

## DISCUSSION

The purpose of this article was to better understand how secure attachments are related to the subjective well-being of respondents. The study presented and investigated a serial mediation model of secure attachment style impacting subjective well-being through self-esteem and emotional intelligence. The study's empirical findings indicate some significant conclusions.

Firstly, the study examined the direct and indirect effects of secure attachment style on subjective well-being (SWB). The study found that attachments are an essential element influencing SWB. From hypothesis one, results exhibit a positive significant association between SAS and SWB, which explains that a person who has good family/friends' relationships can contribute to a healthy sense of well-being. These findings are consistent with previous studies [27,28,30] which also found a positive significant relationship between SAS and SWB. Both direct and indirect effects were found to be statistically significant. It explains that attachment received from the family and friends helps in enhancing the subjective well-being of respondents. From the perspective of attachment theory, when person experiences love and bonding from the parents, partner,

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or friends, it will help in their emotional and cognitive development.

Further, the study examined the mediating role of self-esteem (SI) and emotional intelligence (EI). As forecasted, the results were found to be positively significant. The study adds pieces of evidence to the existing literature [17,19,28,43,44] that examined the association of SE and EI with SAS and SWB. Firstly, the study forecasted the mediation effect of SE and found significant empirical results. The result exhibits similar findings with previous research [17] that examined the mediating role of SE between SAS and SWB. It explains that attachments are an important element to enhance self-esteem for increasing subjective well-being. Thus, persons should have better relationships with their family and friends to keep their self-esteem and subjective well-being high. Further, this study examined EI as a mediator between SAS and SWB. The results revealed the positive mediating role of EI between the relationship of SAS and SWB, similar to existing studies [19,20]. Its emphasis is that persons with secured attachments are more likely to be able to process and comprehend emotions and have high well-being. Therefore, attachments with family and friends help in enhancing emotional strength in persons, and then these positive emotions are responsible for high subjective well-being among them. Finally, this study analyzed the proposed serial mediation of SE and EI. The results revealed that both variables were statistically significant in influencing SAS on SWB. This is a key finding as this is the first study to analyze serial mediation in this relationship. The serial mediation effect describes that the higher the attachments among persons, the higher will be the level of self-esteem which will strengthen emotions and will ultimately lead to high subjective well-being of people. Hence, findings illuminate that self-esteem and emotional intelligence are significant factors to strengthen the positive association between attachment styles and subjective well-being.

## IMPLICATIONS

### THEORETICAL IMPLICATIONS:

The current study adds to the literature by incorporating numerous forms of evidence. To begin, the researchers focused on an important part of the wellbeing of people, namely secure attachment style to affect subjective well-being in the northern cities of India. However, previous studies majorly focus on anxious attachment style and avoidance attachment style [26,63] but this study focused on the secure attachment style because according to the attachment theory adult relationships, friendships, romantic love, or pair bonding affects subjective well-being [9]. So, based on this theory, the variables secure attachment style and subjective well-being are employed in the study. Moreover, this study was also look into relationship between secure attachment style and subjective well-being through self-esteem and emotional intelligence. Hence, this is the first study to look at the relationship between SAS, SE, EI, and SWB and it makes a significant contribution by validating the serial mediation of SE and EI between secure attachment style and subjective well-being. Indeed, past research in India has looked at these variables separately, but not together. Furthermore, no previous study, to our knowledge, has looked at the underlying process mechanisms of SAS's influence from the perspectives of SE and EI. Moreover, the research model used in this study adds to the existing literature that SAS [27,28,30], SE [17,43,44] and EI [23,46,52,53] are the influencing variables that affect subjective well-being of people. As a result, this study illuminated a new HR research field for researchers, demonstrating that secure attachment style is critical to subjective well-being.

### PRACTICAL IMPLICATIONS:

The current study has practical implications in addition to its theoretical contribution. The previous study has not taken into account the potential role of SE and EI of people to shed light on the influence of SAS on SWB. As a result, the current study appears to be one of the first attempts to capture a holistic view of the asserted relationships among the people of India. From a practical viewpoint, the study findings can help in understanding the importance of attachments among persons to enhance their subjective well-being. Furthermore, this study appears to imply that, in addition to the attachments which define healthy relationships with friends and family, self-esteem and emotional intelligence can also be significant predictors for well-being. So, the findings of the study suggested that psychological counseling and guidance programs should be implemented focusing on secure attachments, subjective well-being, self-esteem and emotional intelligence so that people must have positive relationships with their family and friends to enhance their self-esteem and balance their emotions which will lead to high subjective well-being. Furthermore, it is crucial for the psychologists to encourage emotional education programmes that help adults to acquire emotional competences. The authors believe that these measures,

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would be effective in improving attachments, self-esteem and emotional intelligence and developing subjective well-being of adults.

## LIMITATIONS AND FUTURE RESEARCH SCOPE:

While the findings of the study highlighted the relevance of secure attachment style, self-esteem, and emotional intelligence on subjective well-being, however, there are significant limitations.

Firstly, even though the current study used a two-wave survey separated by a three-week interval data collection, the study is unable to draw firm causal conclusions about the relationship between attachment styles, self-esteem, and emotional intelligence on subjective well-being due to the short interval of data collection. A longitudinal or quasi-experimental study approach is encouraged for future research to better represent variances in the relationship of variables across time. Second, the study used a small data set of adults from northern cities of India, raising concerns about the study's generalizability. In future studies, the same model can be repeated with a larger sample size and diverse participant groups in other areas and countries to see if there is a cultural impact on the association under study. Third, the study mainly investigated attachment style as a factor impacting other factors. In future studies, scholars should also investigate the other variables (like employee performance, organization citizenship behavior, turnover intentions). Finally, this study just focused on mediators and did not look at any moderating variables (like education, gender), future studies might explore this.

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# SERVICE QUALITY AND SERVICE SATISFACTION IN THE INPATIENT SETTING: MODERATING ROLE OF INSURANCE STATUS

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## ABSTRACT

### BACKGROUND:

The purpose of this study is to propose and test for the moderating role of insurance status on the relationship between service quality (SQ) and service satisfaction (SS) in a hospital setting. The study focuses on the state-run health insurance (SHI) provided to economically deprived families in India.

### METHODOLOGY:

Using a reliable and validated structured questionnaire adapted from Dagger's hierarchical model of health service quality, exit interviews were conducted with 279 respondents. 310 study participants were randomly recruited (response rate = 90%) from the discharge list of general surgery ward of a private hospital in the Thane district of Maharashtra, India. Multi-group Structural Equation Modelling (SEM) in AMOS v.22 was used to test for the hypothesized model.

### FINDINGS:

The study finds that patients' perceptions of different service quality dimensions, including inter-personal, administrative and technical are affected by the insurance status. The analysis identified technical quality as the key determinant of overall perceived service quality for patients insured under SHI. Results support our proposed moderating effect of insurance status on the relationship between service quality and service satisfaction.

### CONCLUSION:

The study findings indicate that patients receiving free treatment under SHIs may not have higher expectations of inter-personal and/or administrative quality but are concerned about technical quality. For paid patients all the dimensions of service quality determine overall perceived service quality and service satisfaction. The study findings have implications for market segmentation strategies based on the insurance status. The study provides insights to SHI implementers for improving the program in the long run and also help hospital administrators identify the quality dimensions to focus upon and ensure patient satisfaction and loyalty.

### KEYWORDS

service quality; patients' satisfaction; state health insurance; moderation; multi-group SEM; technical quality

## INTRODUCTION

State health insurance schemes (SHIs) have been launched across developing countries to achieve Universal Health Coverage (UHC). Under the UHC framework, just providing services is not enough, as we need quality services for the coverage to be effective in terms of health gains for the population [1]. Most of the low-middle income countries, including India, rely on private providers to provide quality care to their poor population through SHIs [2–4].

The Indian studies focusing on the service provisioning of private providers in India raises concerns regarding the quality of care due to the profit motives of the private sector [5–7]. The quality issues that have been highlighted in the private sector includes; Length of Stay (LOS) being affected by non-clinical factors [8]; insurance status affecting the likelihood of undergoing procedures [9]; over-prescription, over-diagnosis and use of branded drugs [6, 10, 11]. These quality issues affect the overall satisfaction of the patient and thus treatment outcome.

The patients' perception of service quality is a key determinant of patient satisfaction which has implications for the success and profitability of health care organizations [12, 13]. In the Indian context, the majority of the studies exploring the quality aspects of health service delivery have focused on assessing structural quality through facility surveys [14]. Though the role of socio-economic factors affecting the perceptions of service quality from the users' perspective has been studied to some extent [15, 16], however, the role of insurance status, specifically government provided, remains understudied.

The existing literature on the impact of health insurance schemes [17, 18] raises concerns about the quality of care received under health insurance schemes in low resource settings. The studies specific to the Indian context also highlights the issues of quality under State Health Insurance schemes or community based health insurance schemes [6, 19, 20]. The most commonly reported issue with the quality of care under SHIs is the denial of treatment or delay in providing treatment by private providers empanelled under these schemes. A recent study by Khetrapal et al. (2019) reports that service satisfaction is higher among SHI beneficiaries when compared with non-SHI beneficiaries in private hospitals in two Northern states of India. The study also highlights that though SHI beneficiaries had higher levels of service satisfaction the service quality was doubted. This indicates that there is no conclusive evidence regarding differences in service quality or satisfaction among insured and uninsured patients. With this background, we propose and test for a moderating role of insurance status.

This study contributes to the literature on health care service quality in Indian context by focusing on multiple dimensions of health care quality, including, inter-personal, administrative, and technical quality. Further, the role of insurance status in affecting the perceptions of service quality and thereby service satisfaction is largely understudied. Our study fills this research gap by proposing and testing for a differential effect of insurance status (moderating effect) on the relationship between service quality and service satisfaction in a hospital setting.

### STATE HEALTH INSURANCE SCHEME

Mahatama Jyotiba Phule Jan Aarogya Yojana (MJPJAY) is a State run health insurance scheme (SHI) in the state of Maharashtra, earlier known as "Rajiv Gandhi Jeevandaayi Aarogya Yojana". This scheme was launched in the year 2012 in a phased manner, covering eight districts in its first phase. The eight districts included, Gadchiroli, Amravati, Nanded, Sholapur, Dhule, Raigad, Mumbai city, and Mumbai Suburban. Later in November 2013, the scheme was extended to the whole state. Currently, it empanels 973 health facilities with 677 private and remaining in public sector. It covers below poverty line families and marginal above poverty line (those with annual income less than 100000 rupees [about $USD1,360]). It provides a financial coverage of $USD2,039 to all eligible households.

## THEORETICAL BACKGROUND

### SERVICE QUALITY

Service Quality is broadly defined as an assessment procedure, whereby customers compare their expectations about a service with their perceptions of the way that service was performed [21, 22]. Some of the early conceptualizations of service quality in the goods marketing literature are based on the disconfirmation paradigm [21, 22]; which suggests that the comparison of perceived and expected performance of a product or service defines quality perception.

The conceptualization of service quality perception follows either the "Nordic" perspective [21] or the "American" perspective [22]. The Nordic perspective defines service

quality in terms of functional and technical quality while the American perspective defines service quality in terms of service encounter characteristics. In the service sector the most widely used measure of service quality is "SERVQUAL" proposed by Parasuraman, Zeithaml, and Berry in the year 1985 [22]. SERVQUAL is based on an "American" perspective and records consumers' expectations and perceptions of a service along these five dimensions, namely, "reliability", "empathy", "tangibles", "responsiveness", and "assurance". The service quality is then recorded by the difference between expectations and perceptions. SERVQUAL is a generic quality measurement tool applicable across service sectors however, it is critiqued for theoretical as well as psychometric concerns [23–26].

The reliability of the SERVQUAL scale in measuring perceived service quality in the healthcare setting has mixed results. Some researchers regard SERVQUAL as a valid measure of perceived service quality in a healthcare setting [27] others consider it inappropriate in the healthcare context [25, 28]. As per Koerner (2000), the SERVQUAL is ineffective in capturing the service quality dimensions of inpatient care.

Dagger et al. (2007) developed a hierarchical model of service quality measure based on the "Nordic perspective". They identified four primary dimensions from the marketing literature that reflect service quality dimensions, including inter-personal quality, administrative quality, environment, and technical quality. As the focus of this research is on comparing the process dimension of quality, we measure inter-personal (IPQ), administrative (AQ), and technical (TQ) quality along with overall service quality (SQ) and service satisfaction.

## SERVICE SATISFACTION

Consumer satisfaction is fundamental in the services marketing research and is believed to be largely affected by service quality perceptions [29–31]. The expectancy-disconfirmation is the major theoretical framework used to explain customer satisfaction in the services marketing literature. The disconfirmations can be positive, negative, or nil. When a product or service performs below customer's expectations then there exists negative disconfirmation resulting in dissatisfaction [29, 32, 33].

The recent transformation of the patient as a consumer of healthcare has given impetus to satisfaction evaluations and market research in the health sector [34]. Presently,

managing patients' satisfaction is the most crucial task for hospital managers and thus, there is a growing body of literature exploring patient's satisfaction and factors affecting it [35, 36]. However, there is no consensus on the factors and there exists contradicting results across studies [36].

Service quality is considered as an antecedent to service satisfaction [25, 37, 38]. Researchers' posit that higher level of satisfaction is an indicator of higher perceived service quality. Further, in a healthcare setting overall perception of service quality (SQ) is affected by various dimensions of healthcare quality, including, inter-personal (IPQ), administrative quality (AQ), and technical quality (TQ) [25, 30]. Existing studies in healthcare setting have found that service quality is a determinant of service satisfaction [39–41]. With this theoretical background, our first set of hypotheses are:

H1a: Inter-personal quality (IPQ) will have a significant positive association with Overall Perceived Service Quality (SQ)

H1b: Administrative quality (AQ) will have a significant positive association with Overall Perceived Service Quality (SQ)

H1c: Technical quality (TQ) will have a significant positive association with Overall Perceived Service Quality (SQ)

H2: The overall service quality (SQ) will have positive association with service satisfaction (SS).

## PERCEIVED SERVICE QUALITY AND SERVICE SATISFACTION: EFFECT OF INSURANCE STATUS

With increasing coverage of health insurance in developing countries, the study of the effect of insurance status on service delivery components including access and quality is gaining attention among researchers. There are limited studies, especially in the context of Low-Middle Income Countries, that have looked at the effect of insurance status on quality, its dimensions and on service satisfaction. Further, the limited existing evidence remains inconclusive as some studies report positive effect of insurance status on service quality while others report negative effect, A study conducted in the United States among Latinos concludes that insured patients give higher ratings on perceived service quality and service satisfaction [42]. Few studies from Low-Middle Income Countries (LMICs) report negative perceptions of quality among insured wherein insured patients experienced longer waiting times, verbal abuse, and discrimination from health providers [43, 44] while other researchers from similar

study setting report no significant differences in the perceived quality and satisfaction between insured and uninsured [45]. Similarly, the findings related to the relationship between service quality and service satisfaction are inconsistent. Few studies have found that customers report higher levels of satisfaction even with lower perceived service quality [30, 46, 47]. We posit that these inconsistencies in the relationship between service quality and service satisfaction could be explained by moderating role of insurance status.

We propose and test for the moderating role of the insurance status on the relationship between the dimensions of service quality and perceived service quality and on the relationship between service quality and service satisfaction. Based on this, our next set of hypotheses are:

H3a: Insurance status will have differential effect (moderating effect) on the relationship between IPQ and SQ

H3b: Insurance status will have differential effect (moderating effect) on the relationship between AQ and SQ

H3c: Insurance status will have differential effect (moderating effect) on the relationship between TQ and SQ

H3d: Insurance status will have differential effect (moderating effect) on the relationship between SQ and SS.

**FIGURE 1: THEORETICAL MODEL FOR THE STUDY**
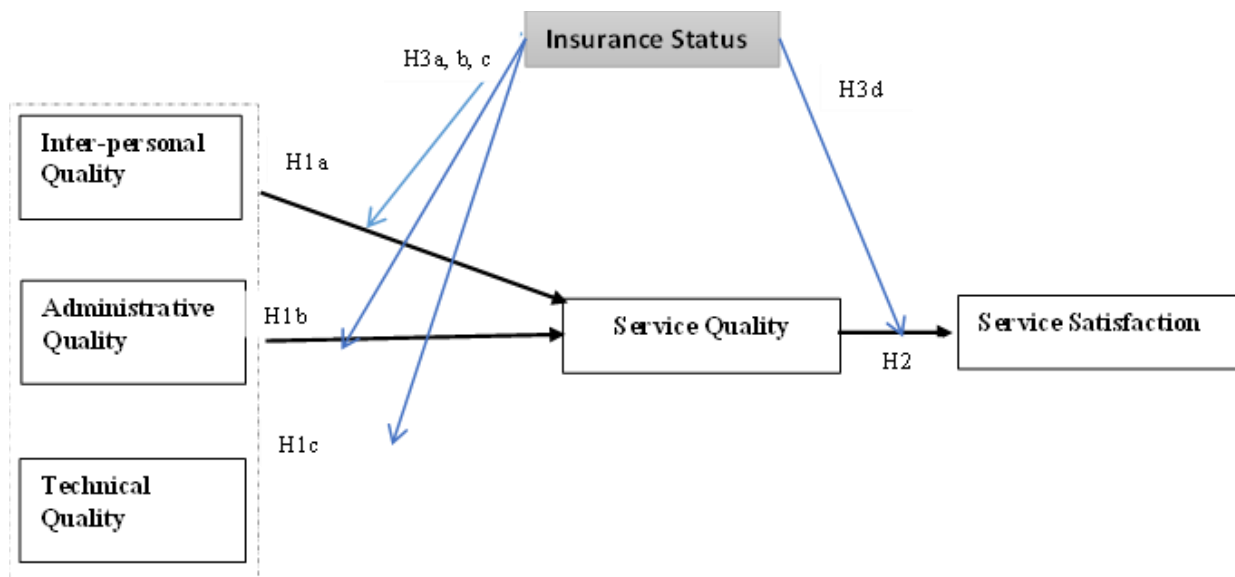


## METHODOLOGY

### STUDY DESIGN

The study used a cross-sectional design to collect data on patients' perception of service quality and service satisfaction. Our interest variables included: Inter-personal Quality (IPQ), Administrative quality (AQ), Technical Quality (TQ), Overall service quality (SQ) and patients' satisfaction (SS). We have measured these variables using existing validated scales adapted from Dagger et al. (2007). The reliability of the scales was pre-tested through a pilot study (N = 40) in the same study setting. Based on the results of pilot study few items were reworded and few items were deleted. The item-wise details of the latent constructs are provided in the measurement section under methodology.

### STUDY SETTING

The study was done in the general ward of a tertiary level private teaching hospital in Thane district, Maharashtra. The study site was purposely selected as our focus was private hospital empanelled under state run PFHI, Mahatama Jyotiba Phule Jan Aarogya Yojana (MJPJAY). The selected hospital is a 1400 bedded private hospital empanelled with MJPJAY and is among the top private hospitals in terms of the number of patients served under MJPJAY. We selected general ward to get a matching sample (comparison group) in terms of socio-economic characteristics as MJPJAY beneficiaries receive treatment in the general ward under this scheme. Within the general ward top six departments, Cardiology, Cardio-Vascular and Thoracic Surgery, Gastro-intestinal surgery,

Genitourinary, General Surgery, Onco-surgery, in terms of the volume of patients served under MJPJAY were selected.

## SAMPLE SIZE

The required sample size for this study was calculated using (33):

α = 0.05 (the false positive rate)

power = 0.80 or β = 0.20

and effect size (the standardized difference) of 0.5

$N = 2(Z_{\alpha/2} + Z_{1-\beta})^2 / (\mu_1 - \mu_2)$

Based on this, the required sample size was 64 for each group. We tried to accomplish as large sample as possible and collected data from 119 respondents from the insured group and 160 respondents in the uninsured group.

## DATA COLLECTION

The data was collected from February – March 2020 using a pre-designed survey instrument. Our sampling frame was the discharge list of the six selected departments. The random sampling approach was used to recruit patients from the discharge list of the general surgery ward under 6 departments: Gastrointestinal; Oncology; Genito-urinary; Cardiology and Cardiothoracic Surgery and General Surgery.

On daily basis, from the discharge list of each of the department 2-3 patients were randomly selected and approached for being a part of the study. The selected patients were explained the purpose and objective of the study. If the patient gave his/her consent to take part in the study, the responses were recorded using a pre-defined survey instrument.

## MEASURES
### Latent Variables:

The survey questionnaire included five validated constructs; inter-personal quality (IPQ), administrative quality (AQ), technical quality (TQ), overall service quality (SQ) and service satisfaction. All these constructs were adapted from previous studies [30, 48] and tailored to the context of inpatient services. All the items of the construct were measured on a five-point Likert Scale ranging from 1-5 (5-strongly agree to 1: strongly disagree). The negative worded items were reverse coded while entering the data. All the measures exhibited high reliability in our study sample, measured using Cronbach's alpha.

Inter-personal Quality (IPQ): We measure IPQ along three core themes as identified by Dagger et al. (2007), namely, manner of interaction, nature of the communication process (whether interactive), and mutuality of relationship.

Technical Quality (TQ): We measure TQ based on the perception about providers' skills and competence and satisfaction with the treatment outcome.

The details of the quality and satisfaction constructs are given in table 1. The construct validity and reliability testing of the adapted latent variables in provided in results section under measurement model testing.

TABLE 1: DETAILS OF LATENT CONSTRUCTS USED IN THE STUDY

| **Construct: Inter-personal Quality (IPQ)** |
| --- |
| IPQ1: I feel the staff at the hospital are not open to queries |
| IPQ2: I always get personalized attention from the staff |
| IPQ3: I do not find it easy to discuss things with the staff at the hospital |
| IPQ4: I feel the staff understand my needs |
| **Construct: Administrative Quality (AQ)** |
| AQ1: The admission process was not smooth and hassle-free |
| AQ2: There exists good coordination between various departments of the hospital |
| AQ3: The discharge procedures at the hospital are not efficient |
| AQ4: The administration system at the hospital is excellent |
| **Construct: Technical Quality (TQ)** |
| TQ1: I am impressed with the care provided at the hospital |
| TQ2: The care provided by the hospital is not of a high standard |
| TQ3: You can rely on the staff at the hospital to be well trained and qualified |

TQ4: I believe the staff at the hospital are not highly skilled and competent

| **Construct: Service Satisfaction (SS)** |
| --- |
| SS1: My feelings towards the hospital are very positive. |
| SS2: I do not feel good about coming to this hospital for my treatment. |
| SS3: Overall, I am satisfied with the hospital and the service it provides. |
| SS4: I feel satisfied that the results of my treatment are the best that can be achieved. |
| SS5: The extent to which my treatment has produced the best possible outcome is not satisfying |
| **Construct: Overall Service Quality (SQ)** |
| SQ1: The overall quality of the service provided by the hospital is excellent. |
| SQ2: The quality of the service provided at the hospital is not impressive |
| SQ3: The services provided by the hospital are not of high standard. |
| SQ4: I believe the hospital offers service that is superior in every way. |

## Control Variables:

Socio-demographic variables that have been found to affect service satisfaction were included as covariates in the overall model fit. These include:

*Age:* Respondents were asked about their completed age in years and recorded as a continuous variable;

*Gender* was dichotomous variable with Males coded as 1 and Females coded as 2;

*Residence* was dichotomous with Urban coded as 1 and Rural coded as 2;

*Monthly Household Income*: Respondents were asked about their monthly family income from all sources combined which was then recorded as continuous variable.

*Education level*: Respondents were asked about their completed years of schooling and recorded as a continuous variable.

*Admitting department*: This information was recorded from the discharge list provided by the hospital. The admitting departments were coded as: 1- Cardiology; 2- Gastroenterology surgery; 3- Oncology surgery; 4- Genitourinary surgery; 5- General surgery; 6- Cardiovascular Thoracic surgery.

*Length of stay in the hospital (LOS):* LOS was recorded from the discharge list provided by the hospital.

*Perceived health status at admission:* Patients were asked to rate their perceived health status at the time of admission on a Likert scale of 1-5 (1: Very Poor; 5: Excellent).

*Perceived health status at discharge*: Patients were asked to rate their perceived health status at the time of discharge on a Likert scale of 1-5 (1: Very Poor; 5: Excellent).

## ANALYTIC STRATEGIES

As our variables of interest were latent constructs so we use factor analysis in AMOS v.22 to estimate the dimensions of service quality, overall perceived service quality and patients' satisfaction. The data was collected in a cross-sectional manner, thus, we use common latent factor method to address the risk of common method variance bias (CMB) [49]. The values for the latent variables were obtained through data imputation (by regression) on the measurement model using AMOS [50].

In order to test our hypothesis 1a, 1b, 1c and hypothesis 2, which relates to testing the base model, we did SEM path analysis. For testing hypothesis 3, which involves testing for the moderation effect, we use Multi-group SEM. Multi-group SEM helps to answer the question, "does group membership moderate the relations specified in the model?" [51]. Multi-group SEM uses covariance SEM approach for between group analysis and first involves establishing measurement model invariance [52, 53]. Once the measurement model equivalence is established then structural equation model is tested for between-group differences.

## RESULTS

### SAMPLE CHARACTERISTICS

Table 2 presents the sample characteristics. 42% of our study sample were covered under PFHI. The average age was 45 years and in the range of 18-70 years. 29% of our respondents were female. The average years of completed education was 8.2 years. 23% of our sample belonged to minority religion (other than Hindus). There were 9% migrants in our sample who reported not having ration card and thus not being entitled to receive health scheme benefits. 26% of our study sample were from rural areas. The average length of stay of our study sample was 11.4 days and ranged from 2 days to 90 days. Our study sample reported spending 25545 rupees on an average in the general ward of a private hospital.

### EXAMINING THE OVERALL MEASUREMENT MODEL

The measurement model was tested using AMOS version 22. The hypothesized twenty-one factor model, where each factor loads onto their corresponding latent factor, provided a good fit to the data ($\chi2$= 302, df = 166; RMSEA = .054, CFI = .97, TLI = .97) [51]. The confirmatory factor analysis showed that the latent constructs IPQ, AQ, TQ, SQ and SS have adequate convergent validity, i.e., Average Variance Explained (AVE) is greater than 0.5 (Malhotra & Dash, 2011). The composite reliabilities for IPQ, AQ, TQ, SQ and SS were 0.92, 0.87, 0.90, 0.87 and 0.93 respectively.

### EXAMINING THE OVERALL STRUCTURAL MODEL

The overall structural model fit was good as evident with mode fit indices $\chi2$= 450, df = 249; RMSEA = .0.05, CFI = .96, TLI = .95). With a well-fitting overall structural model, we tested our proposed hypothesis (H1a, H1b and H1c). Our results support our hypothesis 1c, significant positive relationship between TQ and SQ (coefficient: .630; p-value: <.00) but not hypothesis 1a and 1b as though the relations are positive bit statistically insignificant. Hypothesis 2 is supported with significant positive association between service quality and service satisfaction (coefficient: 0.515; p-value:<.00).

**TABLE 2: SAMPLE CHARACTERISTICS**

| Variables | Mean/Proportion | S.d. | Min. | Max. |
|---|---|---|---|---|
| Treatment covered under PFHI | 0.42 | 0.49 | 0 | 1 |
| Age (in years) | 45.26 | 13.46 | 18 | 70 |
| Sex=Female | 0.29 | 0.45 | 0 | 1 |
| Education (in years) | 8.27 | 4.37 | 0 | 15 |
| Religion = Minority | 0.23 | 0.42 | 0 | 1 |
| Migrant without Ration Card | 0.09 | 0.28 | 0 | 1 |
| Annual Family Income (in Rs.) | 193060 | 102764 | 25000 | 600000 |
| Rural residence | 0.26 | 0.44 | 0 | 1 |
| Perceived HS at admission | 2.31 | 0.96 | 1 | 4 |
| Perceived HS at discharge | 4.2 | 0.81 | 1 | 5 |
| Average level of SS | 3.7 | 0.82 | 1 | 5 |
| Avg. length of stay (los) in days | 11.36 | 10.12 | 2 | 90 |
| Avg. Medical Expend. (in rupees) | 21244 | 37972 | 0 | 320000 |

**FIGURE 2: RELATIONSHIP BETWEEN DIMENSIONS OF SERVICE QUALITY AND SERVICE SATISFACTION (BASE MODEL)**
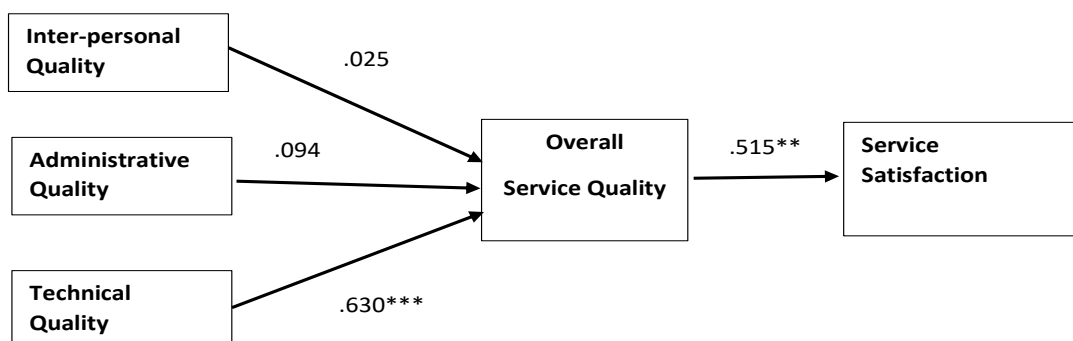
## MULTI-GROUP SEM RESULTS

Our Hypothesis 3 suggests that the relationships posited in our base model will be moderated by the insurance status. We test for the moderating role of insurance status on the relations posited in the base model using Multi-group SEM. As suggested in the methodology section, first we establish measurement invariance before testing for structural invariance [54].

### TESTING FOR MEASUREMENT INVARIANCE:

Measurement invariance tests whether the equations used to create the latent factor scores are equal across the groups which in turn ensures that the constructs are operationalized similarly across the two groups (38). We test for the invariance related to factor loadings. Goodness of fit results from this test of invariant factor loadings provided evidence of a well-fitting model with $\chi^2 = 840$; df= 340; CFI = .93, RMSEA: .07. We use the CFI difference test [52] for testing measurement invariance across our two groups. Based on our results of measurement invariance test (delta CFI = 0.001), we contend that our measurement model is completely invariant across insured and uninsured patients.

### BETWEEN-GROUP DIFFERENCES IN PATH COEFFICIENTS

Table 3 presents the standardized estimates for the path coefficients and for the control variables affecting service satisfaction. The standardized estimates of TQ->SQ are positive and significant across both the groups (Insured: coeff. = .836 and p-value = .00; Uninsured: coeff. = .402 and p-value = .00) while the path from IPQ to SQ and AQ to SQ is positive and significant only for the uninsured group (IPQ->SQ: 0.125, p-value: .087; AQ->SQ: 0.191, p-value:.067). The path from SQ to SS is insignificant for the insured group (-.144, p-value = .419) while it is positive and significant for the uninsured group (coeff.= .327, p-value = .00). The path from TQ to SS is positive and significant for both insured (coeff.=.550, p-value=.00) and uninsured (coeff. =.391, p-value=.00).

Among the control variables affecting our final outcome variable (Service Satisfaction -SS), perceived health status at discharge is positive and significant for both the groups (Insured: coeff. =.187, p-value =.00; Uninsured: coeff. .174, p-value = .00). Respondents from lower age category, higher education status, females and with higher length of stay are less satisfied in our study sample, however, these estimates are statistically not significant (see table 3 for details). In the next section we test for structural invariance between the two groups to conclude if the estimates observed are significantly different between the two groups.

### TESTING FOR STRUCTURAL INVARIANCE:

The unconstrained model provided a $\chi^2$ value of 886 with 592 degrees of freedom. The chi-square difference test for the fully constrained model of structural weights indicated a deterioration of the model (delta $\chi^2$=111; delta degrees of freedom= 29; p=0.00) which is statistically significant. The chi-square difference value is statistically significant at a probability of less than .01 which suggests that one or more of the paths are not invariant across the two groups. Further, we identify the specific path coefficients that were different for the two groups. For this, we constrain only the specific path to be tested and using CFI difference test we assess for the structural invariance. The CFI difference between unconstrained model (CFI = .94) and structural weights model (CFI = .92) is 0.02, which is greater than the threshold for establishing structural invariance suggesting that the structural coefficients are significantly different across the two groups. On further testing for the specific path coefficients the CFI difference test results show (table 4) that the path coefficients for SS<-SQ, SQ<-TQ, SQ<-AQ and SQ<-IPQ are significantly different between the two groups. This provides evidence in support of our hypothesis 3a, 3b,3c, and 3d.

## TABLE 3: RESULTS OF MULTI-GROUP SEM

| | *Unstandardized Estimates* | |
| --- | --- | --- |
| *Paths* | *Insured* | Uninsured |
| IPQ → SQ | -0.081 | 0.125* |
| AQ → SQ | -0.006 | 0.191** |
| TQ → SQ | 0.836*** | 0.402*** |
| SQ → SS | -0.144 | 0.327*** |
| IPQ → SS | -0.172 | .167* |
| AQ → SS | 0.228 | 0.183 |

| | | |
|---|---|---|
| TQ → SS | .550*** | .391*** |
| | | |
| ***Control Variables: Effect on SS*** | | |
| Age (in years) | *0.178** | *-0.029* |
| Education (in completed years) | *-0.081* | *-0.021* |
| Gender (Male=1; Female=2) | *-0.022* | *-0.083* |
| Residence (Urban=1; Rural=2) | *0.062* | *-0.017* |
| Perceived HS^ [1: Very Poor to 5: Excellent] | *.187*** | *.174*** |
| Length of Stay (LOS) [in days] | *-0.04* | *-0.006* |

^: HS – Perceived Health Status at discharge

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01

**TABLE 4: RESULTS OF MULTI-GROUP STRUCTURAL INVARIANCE TEST**

| Model | Δ Chi-square | p-value | CFI |
|---|---|---|---|
| Structural Weights | 112.28 | 0.00 | 0.92 |
| Structural Covariances | 150.62 | 0.00 | 0.92 |
| SQ->SS | 144.40 | 0.00 | 0.92 |
| IPQ->SQ | 135.63 | 0.00 | 0.92 |
| AQ->SQ | 137.32 | 0.00 | 0.92 |
| TQ->SQ | 142.70 | 0.00 | 0.93 |
| TQ->SS | 135.42 | 0.00 | 0.93 |
| AQ->SS | 135.21 | 0.00 | 0.93 |
| IPQ->SS | 137.81 | 0.00 | 0.93 |

*\*Unconstrained Model: Chi-square = 885;D.f.=592;p-value=.00; CFI=0.94*

## DISCUSSION

We tested first the structural model for the overall fit with the data and then to test our proposed hypothesis of moderation by insurance status we did multi-group structural invariance test. The fit indices including Chi-square, CFI, TLI exhibited good fit with our sample data validating Dagger's hierarchical model for service quality in Indian healthcare (inpatient) setting.

Our tests of hypothesis 1a,1b and 1c suggest positive relationship between different dimensions of quality (Inter-personal, Technical, and Administrative) and overall service quality (SQ). Further, technical quality (TQ) has the largest effect on the overall perceived service quality (SQ). This finding resonates well with the existing evidence of the preference for technical quality over inter-personal quality (39). The multi-group analysis suggests that for the uninsured (self-paid) patients all the dimensions, including inter-personal, administrative and technical are significant predictors of overall perceived service quality while for those insured (receiving free treatment under State health insurance scheme) only technical quality significantly determines overall service quality.

The results show that the base model (combined sample) is closer to uninsured model. The existing studies report inter-personal, administrative and technical all having significant effect on overall service quality [30, 32, 46, 55]. The results of regression analysis showed that age, gender and education have no significant association with satisfaction. Similar findings have been reported by other studies as well [35, 56].

The multi-group analysis highlighted the moderating role of insurance status on the relationship between dimensions of service quality and overall service quality and service quality and patient satisfaction. The insured patients are mainly concerned about technical quality while for the

uninsured all the dimensions, inter-personal, technical and administrative, are significant predictor of overall perceived service quality. Further, the service quality is not a significant predictor for satisfaction among insured patients while it remains significant for uninsured patients. The literature on consumer research [37, 57, 58] suggests that consumers use price as a cue to quality and the service quality expectations are formed accordingly. Perhaps, the insured sample in this study expect lower quality as they receive free services under SHI. The lower service quality expectations result in higher satisfaction for insured sample in our group.

## CONCLUSION

This study highlighted the moderating role of insurance status on the relationship between service quality and patients' satisfaction. The technical quality plays a major role in setting up overall service quality expectations. Accordingly, hospitals need to ensure technical quality for ensuring higher satisfaction and customer loyalty in turn. The study findings have significant managerial implications for health care organizations deciding to serve beneficiary of State-run health insurance programs in India. The organizations may benefit from effective segmentation strategies. For insured patients, organizations must focus on technical quality while for uninsured patients inter-personal, technical and administrative dimensions are equally important. The effective resource utilization can be achieved by focusing on technical quality and thus ensuring satisfied and loyal patient base for business expansions. By ensuring satisfied and loyal patients organizations empaneled under SHIs have a chance to increase their customer base for services not covered under these schemes.

### LIMITATIONS

The study sample was small and represents only a section of population. Future work may consider replicating study with a large sample at multiple sites and study the effect of hospital type (public/private/trust) on the proposed relationships.

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# CLINICAL PATHWAY FOR INFLUENZA IN THE ELDERLY: A COMPREHENSIVE MANAGEMENT PROTOCOL OF MALAYSIA

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## ABSTRACT

**INTRODUCTION:**

The clinical pathway (CP) is one of the most recommended tools for ensuring the best quality of care and has been proven to reduce the cost and time spent in hospital. The development of a CP for influenza is crucial, especially for the elderly, as they are vulnerable to influenza-related complications. The main aim of this study was to provide a comprehensive protocol for each component of influenza management among the elderly in Malaysia.

**METHOD:**

An expert group meeting was conducted involving family medicine specialists, public health specialists, geriatricians, respiratory physicians and infectious disease physicians. The CP was designed following a 6-step protocol: 1) Selection of expert panel, 2) discussion and information gathering, 3) development of CP draft, 4) refinement of CP draft, 5) implementation of CP, and 6) finalisation of CP. The CP for influenza was designed based on service type and disease severity.

**RESULTS:**

The panel described both outpatient and inpatient CPs for managing elderly patients with influenza. The outpatient CP covered mild and moderate influenza cases, while the inpatient CP addressed the management of moderate and severe

influenza. The estimated length of hospital stay for moderate and severe influenza cases with pneumonia was 6 and 14 days, respectively.

## CONCLUSION:

The CP for influenza supports existing treatment according to illness severity leveraged on current clinical practice guidelines and the best-care practices in primary and tertiary care settings. Continuous use of the CP is required to assess its effectiveness, thereby enabling optimisation of the healthcare process in influenza treatment.

## KEYWORDS

Clinical Pathway, Influenza, Elderly, Malaysia

## INTRODUCTION

Influenza is a febrile illness mainly affecting the respiratory tract; it is highly infectious and is associated with excess hospitalisation [1]. Worldwide, influenza results in an estimated 3–5 million severe cases and about 290,000–650,000 respiratory deaths annually, with an estimated 90% of the deaths occurring among senior citizens [1,2]. Influenza is characterised by symptoms that include the sudden onset of fever (38–40°C), cough (usually dry), headaches, myalgia, sore throat and respiratory tract inflammation. Most patients recover from fever and other symptoms within a week without requiring medical attention. However, people at high risk, particularly the elderly, are susceptible to more serious life-threatening complications such as pneumonia, chronic heart and lung diseases [3]. Furthermore, the cell-mediated immune response needed to clear the influenza virus from the lungs declines with age, causing influenza to last longer in elderly patients [4]. In general, such patients are more likely to experience hospitalisation, intensive care admission or death compared to other age groups [5]. As influenza-related hospitalisations are more frequent and prolonged among the elderly, influenza is likely to contribute to significant costs to healthcare providers and patients.

Malaysia is expected to become an ageing nation by 2030, with the elderly population estimated to comprise 15% of the total population [6]. The majority of older people in this country are retired, have no established income and are entirely dependent on the public healthcare system. Hence, this population group is vulnerable to the clinical and economic burden of influenza due to the costly treatment of influenza, especially those with comorbid diseases. Apart from improving patient care efficiency to an optimum and more comprehensive level, the development of evidence-based treatment guidelines is crucial for reducing treatment costs.

Clinical pathways (CPs) are one of the most recommended tools for minimising the variations in each clinical process for improving medical treatment. The main aim of a CP is to enhance the quality of care across the continuum by improving risk-adjusted patient outcomes, promoting patient safety, increasing patient satisfaction and optimising the use of resources [7]. The European Pathway Association defines a CP as a complex intervention that involves a mutual decision-making process for a group of patients based on the principles of evidence, best practice and patient expectations [8]. It also involves coordinating the activities between physicians, case managers, nurses, pharmacists, physiotherapists and other health professionals [7,9]. Following that, CPs ensure that the best quality of care is delivered and have reduced the cost and time spent in hospital [10–14]. Historically, CPs were designed mainly for inpatient care to assist health care providers in delivering more effective and efficient care, which subsequently contributes to a shorter length of hospital stay. In recent years, CPs have also been developed for outpatients to support disease management in the primary care setting, such as periodontitis and primary care-based longer-term stroke care [15,16]. CPs have been widely established and used in hospitals mainly in the developed countries such as the United Kingdom, Australia, New Zealand, the United States, Canada, Japan, Germany and Belgium [7,17]. In Southeast Asia, the use of CPs in Indonesia and Singapore has been rising rapidly in the last decade [12,18].

Health expenditure in Malaysia has shown an upward trend throughout the years. Moreover, it is difficult to acquire information on the estimated cost of treatment of

particular diseases, as most of the existing studies were not performed in detail. The procedures and activities used for treatment CPs will help healthcare managers estimate the cost of each illness, thereby aiding their prevention of financial mismanagement. When minimising healthcare finances, healthcare policymakers face considerable challenges in controlling costs without compromising quality. In addition, this concern has become the rationale for the need for CP usage to provide cost-effective healthcare. To date, there are limited evidence on available guideline use in the clinical management of influenza in Malaysia healthcare system. Furthermore, there are considerable variations in the management of influenza patients, especially patients with severe influenza with pneumonia [19]. The main aim of the present study was to identify a comprehensive CP for each component of influenza management specifically among the elderly in Malaysia. The development of a CP for influenza in Malaysia will support existing treatments and be consistent with the available influenza management guidelines for both outpatient and inpatient care.

## METHODS

We developed a CP for influenza with cooperation and collaboration between various disciplines (interdisciplinary and multidisciplinary) involved in treating the disease. Active involvement is needed to construct a comprehensive and reliable CP. Developing the CP for influenza among the elderly involved six steps: 1) formation of the team, 2) discussion and information gathering, 3) development of the CP draft, 4) refinement of the CP draft, 5) implementation and evaluation of the CP, and 6) finalisation of the CP [7,20].

### 1. Formation of the Team
The team was selected based on their direct involvement in influenza treatment and management. The research team identified family medicine specialists, public health specialists, geriatricians, respiratory physicians and infectious disease physicians as the core discipline experts actively involved in managing influenza patients at primary care clinics and hospitals. The experts were selected based on their clinical expertise, experience and knowledge on the latest clinical practice guidelines and evidence-based recommendations. These experts were also able to share the best practice recommendations for conditions where healthcare services were lacking or inadequate.

### 2. Information Gathering
The healthcare procedures required in influenza treatment of elderly patients were discussed in several meetings. During the brainstorming session, each expert had the opportunity to describe the appropriate goals for meeting the patients' multidimensional needs, and all of the information to be documented was agreed upon. The activities were listed from the point of the patient attending primary care for mild to moderate influenza to their admission for inpatient treatment for moderate to severe influenza until discharge. The key objectives were to specify the criteria and symptoms differentiating each severity level and to outline all activities involved in relation to managing influenza patients at the hospital and clinic.

### 3. Development of the CP Draft
The assessment outcomes were interpreted into the basics of care, which were detailed in local protocols, including the sequence of procedures and expected patient progress over the period, by implementing the general format of the CP template [21]. Based on the discussion, the CP for influenza was divided into outpatient and inpatient care based on severity (mild, moderate or severe). The main CP components were time, activities or intervention and final treatment outcome. The care activities included the assessment by the consultant, medical officer or other health personnel, and the type of investigation or treatment arranged for the patient. The medications, diet plans, education or medical advice, referral and discharge plans provided to the patient each day were also obtained.

### 4. Refinement of the CP Draft
The developed CP draft was disseminated to all team members for review. Feedback from each discipline was obtained to ensure that each activity in the pathway depicted current and comprehensive practice and were agreed upon by all disciplines. The experts' response and additional information on the activities in the CP draft were evaluated for improvement of the final draft. The initial draft was presented to the team to obtain consensus on the completed draft before the CP for influenza among elderly patients was implemented in clinical practice.

### 5. Implementation and Evaluation of the CP
The implementation of a CP is the most crucial and challenging phase. Cooperation and teamwork from the healthcare managers and supporting staff handling the CP are indispensable. During the pilot phase, the case manager was required to document any variances that

had occurred in the CP. The researchers and experts involved in the CP reviewed the details and variance gathered to continue evaluating and improving the activities in the CP for influenza.

## 6. Finalisation of the CP

The final CP draft, outlined in Gantt chart format, was accomplished by translating the detailed protocol involved in managing influenza treatment from the collected feedback and evaluation from the pilot implementation. Finally, the complete CP could be utilised continuously and its effectiveness in controlling the medical cost could be assessed and to improve the quality of care.

## RESULTS

We established a CP for influenza via multidisciplinary clinician specialists, including family medicine specialists, public health specialists, geriatricians, respiratory physicians and infectious disease physicians. The development of the CP began with segregating the clinical characteristics and criteria for each influenza severity (mild, moderate, severe) and by the type of service care (inpatient and outpatient). The outpatient care CP was separated into mild and moderate cases whilst that for inpatient care was separated into moderate and severe influenza with pneumonia cases.

For mild cases, one visit is necessary for outpatient care services and the patient receives symptomatic treatment (Table 1). However, the infection may progress if the symptoms persist or worsen. In that circumstance, the patient requires further treatment and investigation following the CP for moderate cases (Table 2). Generally, elderly patients with moderate influenza require two visits at outpatient primary care services. They typically present with complicated illness and atypical signs, including diarrhoea, myalgia and fatigue with respiratory symptoms. Additional investigation and the use of antibiotics or antiviral agents, particularly Tamiflu®, or Oseltamivir, are recommended if the indications for use are fulfilled. Investigations and laboratory tests performed during the first visit have to be repeated in one week, especially if the initial results are abnormal. Also, as a safety net, the patient or their caregiver should be educated on the warning signs of deterioration or requiring admission. Home assessment tools are advised, apart from advocating soft diet and adequate fluid intake to prevent dehydration.

In this study, we developed a CP for hospitalised elderly patients with moderate influenza, considering the high risk of developing serious flu-related complications if they were infected with the virus (Table 3). The inpatient care CP begins with an assessment by the consultant or medical officer, where the patient undergoes a Comprehensive Geriatric Assessment (CGA). Subsequently, a thorough physical examination, including that for mental status, is performed, and medical history is taken before the patient is offered any treatment. Furthermore, monitoring investigations during admission such as full blood count, renal profile, liver function test, chest x-ray and C-Reactive Protein (CRP) test are repeated on day 2 and 5. Diagnostic tests, involving sputum culture and sensitivity testing, and blood cultures, are conducted twice during the entire hospitalisation duration. At the same time, antiviral agents and antibiotics Azithromycin and Augmentin® (Amoxycillin-Clavulanic Acid) are to be administered intravenously initially, then orally for total of six days. The patient will also have to be referred to the clinical pharmacist for medication reconciliation and review and to the physiotherapist for chest and mobility physiotherapy.

The experts in the team concurred that the average length of hospital stay for severe influenza with pneumonia was 14 days (Table 4). Above all, the daily consultant and medical officer assessments for examining the patient's oxygen saturation, blood pressure, pulse rate and mental status are maintained. Following that, procedural investigations are conducted based on the patient's clinical progress and requirements. Progress review and assessment carried out by nurses to monitor the patient's illness during the entire care episode. They also play an important role in increasing patient knowledge about preventing and managing medical conditions. Further, health education and the role of clinical pharmacists, physiotherapists, occupational therapists, dietitians and speech therapists in managing elderly patients with severe influenza are crucial for these health care providers to understand the disease and educate the patient on the various aspects of their condition to avoid other complications and reduce mortality. In the course of discharge, the patient is assigned a summary note to undergo rehabilitation to review their health status. Moreover, a 1-month influenza vaccination plan is recommended after discharge or as suggested by the clinician to provide better protection against the influenza virus.

**TABLE 1: CLINICAL PATHWAY OF INFLUENZA FOR OUTPATIENT (MILD)**

| Activities | Visit 1<br>Date: |
|---|---|
| **Assessment** | 5 to10 minutes by Medical Assistant/Medical Officer |
| **Investigations** | Assess clinically |
| **Medications** | Symptomatic treatment:<br>antihistamine<br>antitussive<br>antipyretic<br>antiemetic |
| **Diet** | Lots of fluids/food<br>Soft diet |
| **Teaching** | Warning sign<br>Patient education |
| **Referral** | - |
| **Outcome** | May progress or get well |
| **Discharge Plan** | No follow up unless symptoms persist or worsen |

**TABLE 2: CLINICAL PATHWAY OF INFLUENZA FOR OUTPATIENT (MODERATE)**

| Activities | Visit 1<br>Date: | Visit 2<br>Date: After 1 week from Visit 1 |
|---|---|---|
| **Assessment** | 15-30 minutes (SOB & Respiratory distress)<br>(MA/MO/FMS) | 15 - 60 minutes<br>(MA/MO/FMS) |
| **Investigations** | FBC<br>Chest x ray<br>Urine Creatinine (BUSE)<br>Renal Profile (RP)<br>Urine Ketone/Blood Ketone if RP not available<br>Random blood sugar test (Dextrostix) | FBC<br>Chest x ray<br>Urine Creatinine (BUSE)<br>Renal Profile (RP)<br>Urine Ketone/Blood Ketone if RP not available<br>Random blood sugar test (Dextrostix) |
| **Medications** | TamiFlu® (high risk/comorbid)<br>Antibiotic | TamiFlu® (high risk/comorbid)<br>Antibiotic |
| **Diet** | Lots of fluids/food<br>Soft diet | Lots of fluids/food<br>Soft diet |
| **Teaching** | Warning sign<br>Patient education | Warning sign<br>Patient education<br>Home assessment tools |
| **Referral** | EM Specialist:<br>30 minutes | EM Specialist:<br>30 minutes |
| **Outcome** | - | Admission to hospital |
| **Discharge Plan** | Follow-up after 1 week | Discharge. Admission to hospital if conditions become severe. |

Abbreviations: SOB, shortness of breath; MA, Medical Assistant; MO, Medical Officer; FMS, Family Medicine Specialist; BUSE, blood urea and serum electrolyte; EM, Emergency Medicine

## DISCUSSION

In the present study, we created a CP that could be used for guiding the management of influenza in elderly patients. CPs are a common component in the healthcare setting for sustaining and supporting quality improvement aimed at organizing and standardising care processes [22]. The team members involved in developing the CP were mainly responsible for supervising influenza patients. They were expected to comprehend their responsibilities and roles to successfully produce an effective CP. The lack of involvement of physicians in patient management has been identified as the main obstacle to the success of a CP [23]. The expert panel agreed on separating the CP into four pathways mainly for outpatient and inpatient influenza cases according to severity. The influenza-related symptoms in each classification of the CP were discussed. This is a shift from the majority of available guidelines on the management of influenza patients, which focus more on severe or progressive clinical illness [24,25]. Our study provides more information on treatment procedures according to severity to aid decision-making by health managers beginning at the early stage of the disease. Additionally, early initiation of influenza treatment and timely medical treatment reduce the length of hospital stay, especially among those with severe influenza [26].

The design of the CP covers a full course of influenza management from screening, disease investigation, treatment and supportive care to discharge plans and preventive measures. These procedures can be planned and executed such that they are most advantageous for the organisation and its patients. Furthermore, desirable outcomes can be established and monitored, and capacity and resources can be provided to help improve both quality and efficiency. Elderly patients with influenza require careful attention and immediate treatment, as they are vulnerable to developing influenza-related complications. In the present study, we suggest that antivirals or antibiotics be started for elderly patients with moderate and severe influenza with pneumonia. Moreover, it is also recommended that this high-risk group be treated with Oseltamivir or Zanamivir as soon as possible whenever they have uncomplicated illness due to confirmed or strongly suspected with virus infection [27]. Furthermore, there is evidence that antiviral therapy successfully reduces the burden in an influenza pandemics in high risk group aged 5 to 65 years and healthcare workers [28].

In hospitals, patients with influenza-related pneumonia and severe influenza-related complications are at high risk of death and should be managed as having severe pneumonia [24]. Needless to say, the elderly population are at increased risk for contracting pneumonia, especially those with comorbid risk factors such as hypertension, heart disease, other cardiovascular diseases and diabetes [29]. The other serious complications triggered by influenza include myocarditis, encephalitis, multiorgan failure, severe dehydration and exacerbation of underlying chronic disease (such as asthma, chronic obstructive pulmonary disease (COPD), renal insufficiency). It can also lead to the development of the life-threatening illness known as sepsis [30]. For these reasons, elderly patients are likely to stay longer in hospital due to complications and comorbid conditions-related problems. Primarily in the geriatric ward, most patients exhibit a slow recovery rate and also experience mobility difficulty. Further investigation and repeated testing are important and should be conducted to obtain useful diagnostic and prognostic information on other related complications. Therefore, investigations such as chest radiography and laboratory tests, i.e. full blood count, serum creatinine, blood urea nitrogen, glucose, electrolytes and liver function testing, should be determined for influenza patients thought to have pneumonia.

Globally, many CP treatments have been implemented to evaluate the impact of a CP on the average length of hospital stay associated with the illness. The majority of the outcomes has shown a positive impact, with decreases in days with using CP treatment [10,12,14]. A comprehensive action plan would allow better continuity of the implementation process. Certainly, further studies should be conducted to determine the impact of influenza CP treatment on the length of hospital stay to strengthen the evidence on the effectiveness and sustainability of healthcare quality. In addition, CP implementation would facilitate healthcare processes across different clinical departments by presenting best practice principles and a safety culture in healthcare settings [31]. Besides, the application of a CP would aid standardisation in healthcare services management. Health care standardisation is greatly beneficial because it not only promotes services implementation, but also aids assessment of the disease course and treatment results [32]. As the elderly are a vaccine priority group, first-line prevention measures are strongly recommended. In Malaysia, influenza vaccines are currently only subsidised for healthcare workers, but vaccination is strongly

recommended for pilgrims and the elderly with ≥1 chronic illnesses who are travelling to Saudi Arabia [33]. Therefore, economic evaluation of influenza vaccines is crucial for providing evidence-based information to policymakers and stakeholders on the cost–benefits of implementing a national influenza immunisation program for the elderly. Using this CP would enable estimation of the cost of influenza treatment, and further research can be conducted to determine the economic impact of the illness and strengthen the evidence on the economic evaluation of influenza, especially among the elderly.

The CP management usage scope is not universal, and the various patient and physician needs as well as resources availability in healthcare facilities, be it the public or private sector, will affect compliance. In addition, continuous use of the CP in healthcare settings should be implemented to provide feedback based on the issues and challenges encountered. Further, analysis of the variances in practice will yield further recommendations and improvements to the existing CPs in each healthcare setting, allowing for long-term sustainability of the CPs and simultaneously enhancing the healthcare system.

# CONCLUSION

The CP for influenza is a detailed protocol for managing influenza in elderly patients in Malaysia, spanning primary care to tertiary care and being based on illness severity and presentation at the healthcare facility. Early detection of influenza may help lessen the symptoms of the flu by initiate necessary treatment and avoid unhelpful medications. Furthermore, influenza screening in elderly may help inform decisions on infection prevention and control practices such as vaccination program among the elderly. The CP also provides a basis for further economic evaluation of the effectiveness of influenza management and prevention. Further study on the implementation of influenza CP is recommended to evaluate the impact in length of stays and resource use in healthcare setting.

## ETHICS STATEMENT

This research was approved by the Universiti Kebangsaan Malaysia (UKM) Research Committee (UKM PPI/111/8/JEP-2021-603) and the Medical Research Committee, Faculty of Medicine, UKM (FF-2021-353).

## CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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## TABLE 3: CLINICAL PATHWAY OF INFLUENZA FOR INPATIENT (MODERATE)

| Activities | Day 1 Date: | Day 2 Date: | Day 3 Date: | Day 4 Date: | Day 5 Date: | Day 6 Date: |
|---|---|---|---|---|---|---|
| **Assessment** | Consultants: 5 -10 minutes. MO/HO: 20-30 minutes Comprehensive Geriatric Assessment (CGA) in Geriatric facility. MO/HO: 60 minutes. History taking and full physical examinations. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Daily ward rounds by HO and MO: 5-10 minutes. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Consultants: 3-5 minutes. Daily ward rounds by HO and MO: 5-10 minutes. Nurse : Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Daily ward rounds by HO and MO: 5-10 minutes. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Consultants: 3-5 minutes Daily ward rounds by HO and MO: 5-10 minutes Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Daily ward rounds by HO and MO: 5-10 minutes Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). |
| **Investigations** | FBC Renal Profile Liver Function Test Chest X-ray CRP Sputum culture & sensitivity Blood culture Arterial blood gas | FBC Renal Profile Liver Function Test Chest X-ray CRP Arterial blood gas | - | - | FBC Renal Profile Liver Function Test Chest X-ray CRP Sputum culture & sensitivity Blood culture Arterial blood gas | - |
| **Treatment & Medications** | TamiFlu® 75 mg (bd) Antibiotic *Azithromycin 500 mg (od) (oral)* *Augmentin 1.2 gram (tds) (IV)* IV Drip | TamiFlu® 75 mg (bd) Antibiotic *Azithromycin 500 mg (od) (oral)* | TamiFlu® 75 mg (bd) Antibiotic *Azithromycin 500 mg (od) (oral)* | TamiFlu® 75 mg (bd) Antibiotic *Augmentin 1.2 gram (tds) (IV)* IV Drip | TamiFlu® 75 mg (bd) Antibiotic *Augmentin 1.2 gram (tds) (IV)* | Antibiotic (oral) *Augmentin 1.2 gram (tds) (Oral)* |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Paracetamol<br>Oxygen | *Augmentin 1.2 gram (tds) (IV)*<br>IV Drip<br>Paracetamol<br>Oxygen | *Augmentin 1.2 gram (tds) (IV)*<br>IV Drip<br>Paracetamol<br>Oxygen | Oxygen | | |
| **Diet** | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding |
| **Teaching** | Health Education | - | - | - | - | - |
| **Referral** | Clinical Pharmacist<br>Physiotherapist<br>*Chest and mobility physio* | - | - | - | - | - |
| **Discharge Plan** | - | - | - | - | - | Rehabilitation (Outpatient visit)<br>Review at Health Clinic if required e.g.: for blood pressure control and medication continuation or follow up for comorbidities. (Discharge summary notes will be given to patient upon discharge). Plan for vaccination (after 1 month from discharged) |

Abbreviations: MO, Medical Officer; HO, House Officer; IV, intravenous; FBC, full blood count; CRP, C-Reactive Protein

**TABLE 4: CLINICAL PATHWAY OF INFLUENZA FOR INPATIENT (SEVERE WITH PNEUMONIA)**

| Activities | Day 1 Date: | Day 2 Date: | Day 3 Date: | Day 4 Date: | Day 5 Date: | Day 6 – 8 Date: | Day 9 – 11 Date: | Day 12 – 14 Date: |
|---|---|---|---|---|---|---|---|---|
| **Assessment** | Consultants: 10 -20 minutes. MO/HO: 20-30 minutes. Comprehensive Geriatric Assessment (CGA) (Geriatric facility). MO/HO: 60 minutes. History taking and full physical examinations (additional information may be added up during the hospital stay). Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | MO/HO: 20-30 minutes. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Consultants: 3-5 minutes. MO/HO: 20-30 minutes. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | MO/HO: 20-30 minutes. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/ person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Consultants: 3-5 minutes. MO/HO: 20-30 minutes. Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly. Mental status: orientation to time/place/ person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | MO/HO: 20-30 minutes Nurse: Oxygen saturations/ blood pressure/pulse rate every 4 hourly Mental status: orientation to time/place/ person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Consultants: 3-5 minutes. MO/HO: 20-30 minutes. Nurse:Oxygen saturations/ blood pressure/pulse rate every 4 hourly Mental status: orientation to time/place/ person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). | Consultants: 3-5 minutes. MO/HO: 20-30 minutes. Nurse:Oxygen saturations/ blood pressure/pulse rate every 4 hourly Mental status: orientation to time/place/person (if Glasgow Coma Scale <15, to start GCS charting 4 hourly). |
| **Investigations** | FBC Renal Profile Liver Function Test (LFT) Chest X-ray CRP Sputum culture & sensitivity Blood culture Arterial blood gas (ABG) Rapid antigen test (Influenza A&B) | FBC Renal Profile Liver Function Test (LFT) Chest X-ray CRP Arterial blood gas (ABG) | FBC Renal Profile Sputum culture & sensitivity Chest X-ray CRP Arterial blood gas (ABG) | FBC Renal Profile Chest X-ray CRP Arterial blood gas (ABG) | FBC Renal Profile Chest X-ray CRP Arterial blood gas (ABG) | FBC Renal Profile Chest X-ray CRP Arterial blood gas (ABG) Liver Function Test (LFT) Blood culture | FBC Renal Profile Chest X-ray CRP Arterial blood gas (ABG) | FBC Renal Profile Chest X-ray CRP Arterial blood gas (ABG) |

ESR
Urine FEME
Blood Glucose
ECG

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Medications** | TamiFlu® 75 mg (bd) Antibiotic *Ceftriaxone 2gm (od) Azithromycin 500 mg (od) (oral) Augmentin 1.2 gram (tds) (IV)* IV Drip Paracetamol Oxygen | TamiFlu® 75 mg (bd) Antibiotic *Ceftriaxone 2gm (od) Azithromycin 500 mg (od) (oral) Augmentin 1.2 gram (tds) (IV)* IV Drip Paracetamol Oxygen | TamiFlu® 75 mg (bd) Antibiotic *Ceftriaxone 2gm (od) Azithromycin 500 mg (od) (oral) Augmentin 1.2 gram (tds) (IV)* IV Drip Paracetamol Oxygen | TamiFlu® 75 mg (bd) Antibiotic *Ceftriaxone 2gm (od) Augmentin 1.2 gram (tds) (IV)* IV Drip Paracetamol Oxygen | TamiFlu® 75 mg (bd) Antibiotic *Ceftriaxone 2gm (od) Augmentin 1.2 gram (tds) (IV)* IV Drip Paracetamol Oxygen | Antibiotic *Ceftriaxone 2gm (od) Augmentin 1.2 gram (tds) (IV)* IV Drip Paracetamol Oxygen | Paracetamol Oxygen KIV Antibiotic | Paracetamol Oxygen KIV Antibiotic |
| **Diet** | Soft diet / parenteral feeding | Soft diet/ parenteral feeding | Soft diet/ parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding | Soft diet/parenteral feeding |
| **Teaching Referral** | Health Education Clinical Pharmacist Physiotherapist *Chest and mobility physio* Dietitian Speech therapist OT | - Physiotherapist *Chest and mobility physio* | - Physiotherapist *Chest and mobility physio* | - Physiotherapist *Chest and mobility physio* | - Physiotherapist *Chest and mobility physio* Dietitian Speech therapist | - Physiotherapist *Chest and mobility physio* Dietitian Speech therapist | - Physiotherapist *Chest and mobility physio* Dietitian Speech therapist | - Physiotherapist *Chest and mobility physio* Dietitian Speech therapist |
| **Discharge Plan** | - | - | - | - | - | - | - | Rehabilitation (Outpatient visit). Review at Health Clinic if required e.g.: |

for blood pressure control and medication continuation or follow up for comorbidities. (Discharge summary notes will be given to patient upon discharge). Plan for vaccination (after 1 month from discharged).

Abbreviations: MO, Medical Officer; HO, House Officer; IV, intravenous; FBC, full blood count; FEME, full examination microscopic examination; OT, occupational therapist; CRP, C-Reactive Protein

# AN OVERVIEW OF JOB SATISFACTION OF EMERGENCY HEALTHCARE PROVIDERS IN NORTHERN CYPRUS

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## ABSTRACT

**INTRODUCTION:**

Emergency calls are a challenging triangle that requires quick assessment, immediate action, and correct decision-making. The appropriate work environment and conditions of emergency healthcare workers result in this triangle's flawless functioning. This study aims to evaluate and overview the job satisfaction of the personnel working in emergency healthcare in Northern Cyprus.

**METHODS:**

This descriptive study was conducted to evaluate the job satisfaction of the personnel working in emergency healthcare in Northern Cyprus. This research involved nurses, paramedics, and EMTs, who intervene in an emergency call. The participants' job satisfaction was evaluated by the scale developed by Güneri (2011). The scale score range was 47-235. A high score was considered as increased job satisfaction.

**RESULTS:**

132 personnel who work in emergency healthcare in Northern Cyprus participated in this study. 31.82% were aged between 36 and 49 years, 81.6% were women, and 42.42% were undergraduates. 31.6% had worked for more than ten years. 39.39% (52) declared that they had occupational disease/accidents. 43.18% said they had received training more than two years ago. The participants' mean job satisfaction score was moderate ($143.59 \pm 26.86$). Job satisfaction was higher in emergency call center personnel, high school graduates, and head nurses, working 40-50 hours a week, with seniority 1-4 years, and had integration training ($p<0.05$).

**CONCLUSION:**

Emergency healthcare personnel in Northern Cyprus are primarily nurses. Most of them have not received updated training recently. Studies in which most participants are paramedics will reflect the current situation more objectively. Therefore, structuring emergency health services as a separate unit within the Ministry of Health and the necessary regulations can increase job satisfaction even more.

**KEYWORDS**

Emergency healthcare, EMT, job satisfaction, nurse, paramedic

## INTRODUCTION

The job or the employee's characteristics alone are not enough for individual success in the workplace. Success is a definition that is affected by external factors and is accepted in continuity. Many factors affect personal success, including the employee's environment, wages, working hours, and relationships with colleagues. All of these factors are cornerstones for job satisfaction. High job satisfaction means high job quality. [1-3]

In the last 20 years, authors have examined job satisfaction and its scientific definition.[4] Price reviewed the studies from 1972, and job satisfaction was defined for the first time on a scale in 2001. According to this scale, staff can be connected and affected emotionally by their job.[5] Among the factors that will cause low job satisfaction in healthcare are increased workload, caring for patients with a fatal disease, over shift work. [6,7] Being at work at frequent intervals limits the social life of the personnel and causes both physical and mental fatigue. In addition, excessive working hours may increase the possibility of making mistakes, and legal problems may arise. Workload should not be thought of only as working hours per employee. Suppose the workload per employee in a shift is higher than usual; in that case, even if the working hours are suitable, the personnel's job satisfaction decreases due to physical and mental fatigue and increased responsibility. Even if the personnel are satisfied with the payment due to the increased working hours, the probability of malpractices may arise. In addition, making rapid and correct decisions in succession is the most significant stress factor, especially in emergency health services. If the working environment and other conditions are inconvenient, job satisfaction may decrease considerably.[8,9] Health institution managers can achieve high job satisfaction by removing the differences between working hours, job definition, and emergency healthcare personnel conditions, especially paramedics. [10-12]

In Northern Cyprus, five centers and 17 ambulance service networks provide emergency health services connected to the central station. Most of the personnel are nurses. Two of these units are linked to the hospital emergency services. In other words, the health personnel goes to intervene in the case directed by the dispatch center by ambulance and then returns to the place of duty. The primary responsibility of the health personnel

working in this group is the hospital emergency service, and they only go to emergency health service by ambulance when needed. In health centers, emergency health services are provided only at certain hours. On the other hand, a group of personnel works directly under the dispatch center, and their only duty is to respond to incoming emergency calls. In 2005, the first paramedic started at the Ministry of Hhealth. Paramedics and EMTs participating in this study declared working as nursing staff. Since 2018, the Ministry of Health defined a paramedic profession for the first time in its recruitment.[13]

## METHODS

This descriptive study was conducted to evaluate the job satisfaction of the personnel working in emergency healthcare in Northern Cyprus. At the time of the study, there was one head nurse, 123 nurses, 12 paramedics, and 3 EMTs providing emergency health services in Northern Cyprus.

After obtaining permission, research data were collected between October 20, 2016, and November 10, 2016 (Near East University Ethics Committee, 2016/40). This research involved nurses, paramedics, and EMTs, who intervene in an emergency call.

In the first part of the questionnaire used, there were 20 questions directed to determine the participants' sociodemographic characteristics, such as age, gender, marital status, seniority in emergency health care, and vocational training. In the second part of the questionnaire, the participants' job satisfaction was evaluated by the scale developed by Güneri. [14] The questionnaire consisted of 7 sub-dimensions.

The section about the nature of work investigated subjects such as workload, training related to the job, and providing the necessary environments for the participant to express and develop themselves. The Relations with Co-workers and Supervisors section were evaluated by sharing information, respect, and positive behaviors in the working environment. Vocational training and the content of the workouts were assessed in the updated training part. In addition, for the capacity of consumables, researchers evaluated equipment, safety, and environmental conditions at the workplace. Finally, in the job's social, cultural, and economic dimensions, the participants' opinions were considered on issues such as the opportunity

to be promoted in the workplace, satisfaction with salaries, and social solidarity.

The scale is a 5-point Likert type, and a score of 1-5 was used. The scale score range was 47-235. A high score was considered as increased job satisfaction. After evaluating the research data, the Cronbach alpha coefficient was 0.94 on the whole scale and between 0.75-0.95 in the sub-dimensions. In a similar study by Güneri, Cronbach's alpha coefficient for the overall scale was found to be 0.81.

In this study, the researchers used the SPSS 21.0 statistics program for analysis and checked the data set for errors from the data set entry. Frequency analysis was used to analyze the participants' sociodemographic characteristics. Researchers used descriptive statistics such as minimum and maximum value, the mean, and standard deviation to evaluate the scale's score and sub-dimensions. The participants' scores from the scale were analyzed according to independent variables. In this study, researchers used the Kolmogorov-Smirnov test and the QQ plot graph for the data analysis. According to the results obtained, the data set distribution was expected. The scale scores were then evaluated according to independent variables.

In comparing job satisfaction scores according to the participants' characteristics, such as gender and marital status, a t-test was used since the independent variable consists of two categories. ANOVA test was used to compare the participants' scores if the independent variable such as age group and professional seniority consisted of more than two categories. The Tukey test determined which groups the dispute originated if there was a difference between the independent variable types due to ANOVA.

## RESULTS

In this study, 132 of 138 personnel working in emergency health services Northern Cyprus were reached. Four remaining personnel were on long-term leave and two did not accept.

Table 1 shows the sociodemographic characteristics of respondents. Of the participants, 31.82% were in the 36-49 age range, 81.06% were women, 75% were married, 82.5% had children, and 42.42% had undergraduate degrees. Most participants were nurses, had worked for more than ten years, and worked 40-50 hours per week. Also, only 16 (12%) participants worked in the dispatch center. The rest worked in hospital emergency services (59, 44.7%) and healthcare centers (57, 43%).

**TABLE 1. DESCRIPTIVE CHARACTERISTICS OF PARTICIPANTS (N=132)**

| Age | n (%) |
|---|---|
| 30 and below | 23(17.42) |
| 31-35 | 38(28.79) |
| 36-49 | 42(31.82) |
| 50 and above | 29(21.97) |
| **Gender** | |
| Female | 107(81.06) |
| Male | 25(18.94) |
| **Education** | |
| High school | 18(13.64) |
| Undergraduate | 43(32.58) |
| Graduate | 56(42.42) |
| Postgraduate | 15(11.36) |
| **Marital status** | |
| Married | 99(75) |
| Single | 33(25) |
| **Child** | |
| None | 23(17.42) |

| | |
|---|---|
| 1 | 38(28.79) |
| 2 | 61(46.21) |
| More than 3 | 10(07.58) |
| **Occupation** | |
| Head nurse | 12(09.09) |
| Nurse | 105(79.55) |
| Paramedic/EMT** | 15(11.36) |
| **Workplace in emergency healthcare** | |
| Emergency Call Center | 15(12.12) |
| Hospital | 59(44.70) |
| Health Center | 57(43.18) |
| **Seniority (healthcare)** | |
| 1-4 | 11(08.33) |
| 5-9 | 18(13.64) |
| 10-14 | 44(33.33) |
| 15-19 | 21(15.91) |
| More than 20 | 38(28.79) |
| **Seniority (emergency healthcare)** | |
| 1-3 | 36(27.27) |
| 4-7 | 35(26.52) |
| 8-10 | 20(15.15) |
| More than 10 | 41(31.06) |
| **Weekly working hours** | |
| 40-44 | 53(40.15) |
| 45-49 | 34(25.76) |
| 50-54 | 10(07.58) |
| 55-59 | 35(26.52) |
| **Total** | **132(100)** |

EMT: Emergency Medicine Technicia

Fifty-two participants (39.39%) declared that they had occupational disease/accidents. However, only 14 of them (10.61%) had a report related to this condition. Ninety-seven participants stated that they received integration training because of the recruitment standards by the Ministry of Health in Northern Cyprus. Also, 68.8% of the participants said they had been educated on updated emergency guides throughout the year. Unfortunately, nearly half of those who received ongoing update training said they had received training more than two years ago (Table 2).

**TABLE 2. DISTRIBUTION OF PARTICIPANTS' OCCUPATIONAL DISEASE/ACCIDENT AND TRAINING (N=132)**

| Occupational disease/accident | n(%) |
|---|---|
| Yes | 52(39.39) |
| No | 80(60.61) |
| **Occupational disease /accident report** | |
| Yes | 14(10.61) |
| No | 118(89.39) |
| **Integration training** | |
| Yes | 97(73.48) |
| No | 35(26.52) |
| **Update training** | |
| Yes | 90(68.18) |
| No | 42(31.82) |
| **Last training** | |
| 1-4 months ago | 13(9.85) |
| 5-9 month ago | 11(8.33) |
| 1 year ago | 51(38.64) |
| More than 2 years | 57(43.18) |
| **Total** | **132(100)** |

Table 3 presents descriptive statistics related to job satisfaction and sub-dimension levels of the health personnel participating in the study. The mean score of the participants on the scale was 143.59 ± 26.86. Researchers obtained the lowest score from the sub-dimension of the capacity of consumables with 11.51 ± 4.97, and the highest score was achieved from the sub-dimension of the nature of work with 34.96 ± 7.46.

By variance analysis and T-test, researchers compared the participants' overall satisfaction scores according to their sociodemographic characteristics. Table 4 statistically evaluated the job satisfaction scores of the participants according to their sociodemographic characteristics. When the participants were assessed according to their age, the number of children, and weekly working hours, no significant difference was found in their job satisfaction scores (p>0.05).

However, high school graduates had higher scores than graduate and undergraduate participants, which was considered statistically significant. In addition, the head nurse and other participating nurses' job satisfaction score was significantly higher than paramedics/EMTs. Also, the job satisfaction score of the emergency call center participants was considerably higher than the other participants working in the hospital or health center. Finally, although there was no significant difference according to seniority in emergency healthcare scores, those with seniority in healthcare 1-4 years had higher scores than all other groups. This result was considered statistically significant (p<0.05) (Table 4).

**TABLE 3. PARTICIPANTS' JOB SATISFACTION AND SUB-DIMENSIONS' SCORES (N=132)**

| Job satisfaction | $\bar{x}$ | s | Min | Max |
|---|---|---|---|---|
| Nature of work | 34.96 | 7.46 | 10 | 50 |
| Relations with co-workers | 19.63 | 4.04 | 5 | 25 |
| Integration training | 16.73 | 4.33 | 5 | 25 |
| Relations with supervisors | 28.25 | 9.07 | 9 | 45 |
| Economic and cultural aspect | 17.75 | 5.17 | 6 | 30 |
| Social aspect | 14.76 | 5.56 | 7 | 35 |
| Capacity of consumables | 11.51 | 4.97 | 5 | 25 |
| **Total** | **143.59** | **26.86** | **47** | **235** |

**TABLE 4. VARIANCE ANALYSIS OF JOB SATISFACTION ACCORDING TO SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS (N=132)**

| Age | n | $\bar{x}$ | s | Min | Max | F | p | Difference |
|---|---|---|---|---|---|---|---|---|
| 30 and below | 23 | 148,39 | 31,76 | 95 | 226 | 0,91 | 0,44 | |
| 31-35 | 38 | 139,82 | 26,59 | 94 | 188 | | | |
| 36-49 | 42 | 141,12 | 28,27 | 62 | 187 | | | |
| 50 and above | 29 | 148,31 | 20,21 | 94 | 185 | | | |
| **Education** | | | | | | | | |
| High school | 18 | 153,28 | 20,90 | 115 | 187 | 4,10 | 0,01* | 1-3 |
| Undergraduate | 43 | 151,37 | 29,50 | 62 | 226 | | | 1-4 |
| Graduate | 56 | 135,27 | 24,50 | 76 | 187 | | | |
| Postgraduate | 15 | 140,73 | 25,70 | 95 | 168 | | | |
| **Child** | | | | | | | | |
| None | 23 | 144,83 | 36,03 | 88 | 226 | 0,19 | 0,90 | |
| 1 | 38 | 140,87 | 29,91 | 62 | 188 | | | |
| 2 | 61 | 144,92 | 20,72 | 86 | 187 | | | |
| More than 3 | 10 | 143,00 | 27,28 | 95 | 187 | | | |
| **Occupation** | | | | | | | | |
| Head nurse | 12 | 143,58 | 24,20 | 95 | 175 | 4,13 | 0,02* | 1-3 |
| Nurse | 105 | 140,99 | 25,60 | 62 | 188 | | | 2-3 |
| Paramedic / EMT ** | 15 | 161,80 | 31,92 | 114 | 226 | | | |
| **Workunit in emergency health care** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Emergency Call Center | 16 | 159,31 | 28,83 | 114 | 226 | 5,04 | 0,01* | 1-2 |
| Hospital | 59 | 137,00 | 28,28 | 62 | 217 | | | 1-3 |
| Health Center | 57 | 146,00 | 22,69 | 86 | 187 | | | |
| **Seniority in health care (year)** | | | | | | | | |
| 1-4 | 11 | 162,45 | 36,95 | 103 | 226 | 3,44 | 0,01* | 1-2 |
| 5-9 | 18 | 140,11 | 21,87 | 95 | 168 | | | 1-3 |
| 10-14 | 44 | 134,98 | 29,07 | 62 | 188 | | | 1-4 |
| 15-19 | 21 | 142,24 | 24,55 | 76 | 171 | | | 1-5 |
| More than 20 | 38 | 150,50 | 20,22 | 103 | 187 | | | |
| **Seniority in emergency health care (year)** | | | | | | | | |
| 1-3 | 36 | 149,31 | 30,71 | 94 | 226 | 0,76 | 0,52 | |
| 4-7 | 35 | 142,26 | 22,06 | 94 | 171 | | | |
| 8-10 | 20 | 140,65 | 30,72 | 62 | 187 | | | |
| More than 10 | 41 | 141,15 | 25,19 | 76 | 187 | | | |
| **Weekly working hours** | | | | | | | | |
| 40-44 | 53 | 147,51 | 25,49 | 76 | 226 | 1,47 | 0,23 | |
| 45-49 | 34 | 146,35 | 27,67 | 62 | 217 | | | |
| 50-54 | 10 | 134,90 | 29,51 | 95 | 171 | | | |
| 55-59 | 35 | 137,46 | 26,84 | 86 | 187 | | | |

**EMT: Emergency Medicine Technician, *p<0,05

When the participants were evaluated according to their gender, marital status, occupational disease, and even updated training status, no statistically significant difference was found in their job satisfaction scores (p>0.05). However, the job satisfaction of 97 participants who had the integration training in recruitment was significantly higher than 35 participants who did not receive this training (p<0.05) (Table 5).

**TABLE 5. T-TEST OF JOB SATISFACTION ACCORDING TO SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS (N=132)**

| Gender | n | $\bar{x}$ | s | t | p |
|---|---|---|---|---|---|
| Female | 107 | 144,75 | 25,87 | 1,02 | 0,31 |
| Male | 25 | 138,64 | 30,84 | | |
| **Marital status** | | | | | |
| Married | 99 | 144,19 | 24,51 | 0,44 | 0,66 |
| Single | 33 | 141,79 | 33,33 | | |
| **Occupational disease/accident** | | | | | |
| Yes | 52 | 140,10 | 25,76 | -1,21 | 0,23 |
| No | 80 | 145,86 | 27,48 | | |
| **Integration training** | | | | | |
| Yes | 97 | 147,10 | 25,90 | 2,55 | 0,01* |
| No | 35 | 133,86 | 27,45 | | |
| **Update training** | | | | | |
| Yes | 90 | 145,10 | 28,51 | 0,94 | 0,35 |
| No | 42 | 140,36 | 22,92 | | |

*p<0,05

## DISCUSSION

This study was conducted to investigate the job satisfaction of the personnel working in emergency health services in Northern Cyprus. 132 of the 138 staff included were reached for this study. 81.06% of the participants were female, and 31.82% were in the 36-49 age. In our study, similar to the literature, 11.36% were paramedics and EMTs; most participants were female and under 35. [15-17] When job satisfaction was evaluated according to in own occupational groups in studies, nearly half of the participants were paramedics or EMTs. [14, 18,19] We believe that paramedics' and EMTs' low rate in our study is because they worked under another nurse's status. Paramedics started working in the public sector in their occupation group in 2018 in Northern Cyprus. The first recruitment as a paramedic in Northern Cyprus in the Ministry of Health occurred in 2005. [13] However, despite the increased workload due to the pandemic, emergency health services are still not structured as separate units. It is believed that with the increase in recruitment, the government will further modernize the institutional organization. This study collected data from 3 groups: hospital emergency services, healthcare centers, and emergency call centers. Although the first recruitment of paramedic personnel was in 2005, this situation does not appear statistically in the records. The most crucial problem in Northern Cyprus is still the definition of the paramedic profession and the institutional structuring of the emergency health services as a separate department. For this reason, it was not forgotten that the majority of the participants in this study were nurses and that patient care, treatment, and practice were at the forefront rather than emergency health services in their vocational training.

According to the results, 12.12% of the participants were working in the emergency call center, and the rest were working in the hospital emergency services and healthcare centers. There are currently five government hospitals, 15 healthcare centers, and 12 more limited health facilities in Northern Cyprus. Also, there are 17 ambulance networks in healthcare centers and limited healthcare facilities. The total number of admissions (outpatient examination + emergency) to government hospitals in 2010 was 512,545. However, according to the 2018 records, the number of hospital applications (outpatient examination + emergency) increased to 905.917. [20]

Regardless of profession, working in emergency health services is a considerable risk factor for stress. Emergency calls must be responded to in a short time. Responding to these calls and assessing the cases requires many medical initiatives. In addition, all these processes must be completed in a short time. The main problem here is the necessity of successive correct decision-making and implementation. In such cases, the fact that the emergency health personnel is in one-to-one communication with both the patient and the patient's relatives, the diversity of the patients carries the risk of many diseases or accidents in occupational diseases. Injury, violence, infection, and musculoskeletal disorders are healthcare workers' most common causes of occupational disease/accidents. [21,22] Emergency services are one of the places where these risks increase the most. [22,23] When weekly working hours are added, risk increases, job satisfaction decreases, and burnout syndrome becomes common. More than half of our study participants had no occupational disease/accident. 90% of those with an occupational disease/accident did not receive a report. According to these results, the relationship between job satisfaction and occupational disease/accident was not statistically significant. On the contrary, those with high weekly working hours have higher job satisfaction. However, the literature supports the exact opposite. [8,24,25]

Although there is no research on emergency healthcare providers' job satisfaction in Northern Cyprus, when the sub-dimensions of overall job satisfaction and satisfaction levels are evaluated, the highest score is obtained from the nature of work and the lowest score from the capacity of consumables. In other research on healthcare personnel in Slovenia and Iceland, the satisfaction rate related to the job's economic aspect, updated training, and relations with co-workers was low. [26,27] According to our study results, job satisfaction of high school graduates, nurses and head nurses, and emergency call center personnel was significantly higher than in other groups (p <0.05). Also, participants with occupational seniority by 1-4 years and integration training had high job satisfaction. However, when all sub-dimensions are evaluated, the participants' job satisfaction is moderate. A similar scale with seven sub-dimensions was used in a study evaluating the job satisfaction of nurses and doctors working in the same health facility. It was concluded that the motivation of the nurses on the job was higher. According to this study, even if researchers couldn't find any statistical difference between education level and job satisfaction, at the same

time, they found that age and seniority significantly affect job satisfaction. In our research, the job satisfaction of high school graduates and those working in the profession for 1-4 years was higher than the other participants. [28]

In a study in which the job satisfaction of emergency ambulance personnel was evaluated, even though the participants stated that superiors did not consider their opinions regarding the nature of work and environment, job satisfaction was found high. However, our study found that job satisfaction is moderate in relationships with superiors and co-workers. This result shows that the participants have reservations about communicating with their co-workers and supervisors. [15]. On the other hand, Eiche et al., in a study evaluating the job satisfaction of paramedics working in emergency health services in Germany, stated that although the overall dissatisfaction rate was low, more importance should be paid to the ratio of qualified personnel. Similarly, in that study, the participants stated that supervisors should consider their employees' opinions more. [12]

Job satisfaction is synonymous with quality in health services. Regardless of their departments, all healthcare providers are exposed to intense stress at work. These conditions increase, especially among emergency, intensive care units, and oncology services.[3] The most common problems are admission prevalence, high mortality rate, frequent communication with colleagues and patients, and maximum working hours. [25,29] The literature supports that although emergency healthcare providers' sociodemographic data vary, job satisfaction is generally moderate.[30]

In this study, 31.82% of the nurses are between the ages of 36-49, and the majority are women, married, and undergraduate. The average seniority is 10-14 years; 97% of them received integration training, and 43.18% of the last received update training more than two years ago. In addition, the job satisfaction of the participants was moderate. However, the fact that the study was carried out in a single institution is a research limitation. Moreover, it only reflects the opinions of the emergency personnel of the Ministry of Health.

According to the results, the researchers believed that job conditions should be modernized, regular update training should be given to the emergency health personnel, and the duties, authorities, and responsibilities of the personnel working in the 112 unit should be re-established. For example, suppose uncertainties eliminate, and more paramedics recruitment in the emergency system are employed in the 112 system. In that case, modernization can be achieved to a certain extent by accelerating the legal studies to separate the benefits from the existing system.

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# EFFECT OF HEALTHY EATING HABITS ON THE ACADEMIC PERFORMANCE OF GRADUATING STUDENTS

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## ABSTRACT

### INTRODUCTION

This study was necessary as most graduating students were studying hard but, for some, academic achievement was not achieved as expected, leading to disappointment. When students move to undergraduate courses, their lifestyles changed. Diet, is relevant in that can help them achieve higher academic performance.

### OBJECTIVE

The present research work was undertaken to examine the effect of a healthy diet on the overall academic performance of graduating students in India.

### METHODS

For the study, 279 students from RTM Nagpur University were used as sample size and were selected randomly. A structured questionnaire was used to collect the responses from the participants. Student academic achievement was evaluated based on their semester grade point average scores.

### RESULTS

Results obtained state a strong and positive association between a healthy diet and academic performance. Results confirmed the hypothesis that if students adopt the practice of having a daily healthy diet their academic performance will improve.

### CONCLUSION

Many students at this university have habits of skipping breakfast or taking it a few times a week but not daily. Also, they are not generally good at eating healthy foods. This directly affects their performance in academic work. Therefore, parents are advised to keep a strict check on these habits.

### KEYWORDS

academic performance, eating habits, health, students

# INTRODUCTION

Academic performance can be defined as knowledge acquisition, acquisition of competencies and skills, getting good grades, picking a progressive career, tenacity, and intention for education [1]. Educational attainment influences their future-related achievements, well-being, and health. Studies show that healthy dietetic behavior and practices are fundamental aspects that can predict undergraduate performance in academics [2]. Healthy eating can be defined as eating a balanced diet to meet the body's physiological needs [3]. A healthy diet involves grain cereals, organic products, vegetables, and fruits and can prompt better mental capacity, further development of memory, best grades on tests, and better college presence, prompting a generally better performance of students academically [4].

Academic performance is fundamentally impacted by various determinants including school or college indicators (i.e., financial status, education level of the parents, and educational attitudes). Social media is a factor that affects academic performance [5]. Social Media can affect academic performance positively as well as negatively [6, 7]. Further, more determinants incorporate a greater number of individual qualities (i.e., aptitude, Behavior or conduct, natural inclination, and motivation) all of which have set up independent impacts [8]. While dietary examples such as omission/intake of breakfast can influence intellectual capacity and conduct in young people, meal patterns and nutrient composition can over the long run apply to have helpful or adverse effects as these may connect with cognition [9]. Therefore, in these many factors, researchers wish to know the effect of a healthy diet on academic performance. Breakfast as a component of a healthy diet and way of life decidedly impacts children and students' well-being and general prosperity, particularly including supplements rich in whole grains and high fiber, fresh fruits, and dairy items [10]. Students who can eat a balanced diet do better in their exams than those who do not. Similarly, nourished students show better performance as compared to malnourished students [11]. Thus, in the aforementioned context, it tends to be argued that individual wellbeing and nutritional status are additional interesting factors and decision makers/indicators of educational presentation [10].

It is important to look at how lifestyle factors, especially diet, affect student performance, with an emphasis on Semester Grade Points Average (SGPA) and general academic performance at the college and university levels. As 12th standard going college students move to graduate college, firstly their eating habits often transform as they adapt to new resources, different environments, and lack of parental supervision [12]. Secondly, unhealthy habits of eating have been related to deprived academic performance and might influence understudies' general well-being status [13, 14]. Hence this research work was carried out to investigate the effect of a healthy diet on the overall academic performance of college students by using SGPA as a measure of outcome.

For this study, undergraduate students evaluated on their SGPA were considered. The scale used for evaluation is from 1 – to 10. The academic performance in a semester for each student is specified by a figure called SGPA. The SGPA is the average (weighted) of the grade points achieved in all the courses and projects recorded by the undergraduate during the particular semester.

Many studies have confirmed that students taking a healthy breakfast and a good and healthy diet perform better in their academic achievements. They concluded a straight association between healthy dietary habits and improved school performance [15, 17, 20 and 21]. Hence it would be interesting to know the item which is generally taken in breakfast by the majority of the students as none of the studies have done in this direction so far.

# LITERATURE REVIEW

Consumption of fast food on daily basis is a risk factor for poor performance in academic achievement [16]. A detailed investigation of the connection between the diet of college students and their academic performance examined seven different studies and revealed that five of them reported high performance in academic with increased consumption of fruits [17]. Peter et. al. [18] conducted an online survey with 577 undergraduate university students in the US to find a relationship between their consumption habits and academic performance. They found that eating a healthy breakfast had a constructive consequence on self-reported GPA and that eating fast food had a negative outcome. Their overall conclusion was that a healthy diet has a constructive effect on the academic performance of students. Bernadetta, [19] supported a solid association between students' habits for eating, in phrases of frequency and

quality of feeding, breakfast quality, and their performance academically. In addition, students perceived that taking a light breakfast complements their interest span to learn, researcher encourages parents from rural backgrounds to give adequate vitamins and nutrition to their children to enhance their performance in the school. Jessica et. al. [20] found that high levels of physical activity and taking daily main meals are directly related to improved performance in school and emphasize the essentialness of encouraging these habits in the school children. Rola and Ahlam [21] revealed that students' scores were better if their dietary intake was healthy and regular. Farahbakhsh et. al. [22] found that the students fronting insecurity in food reported that their academic performance is adversely affected and that poor concentration leads to exam failure or poor academic performance.

**For this study the following Hypothesis was framed**

Ho: More frequent practice of a healthy diet will improve the academic performance of college students.

## METHODS

The objective of this research work was to examine the effect of a healthy diet on the general academic performance of graduating students by using SGPA as a measure of outcome. For this study, the population involved students from RTM Nagpur University, Nagpur Maharashtra, India. All colleges are compulsorily affiliated to RTM Nagpur University. Few affiliated colleges were selected and permission to collect data from the students was taken from the principal/director. Hence all ethics were followed to collect data. This research is quantitative and the researcher has surveyed using a questionnaire to collect the responses. For the study, students were requested to complete self-rated questions which include various questions on eating habits, frequency of eating, the content of eating, fruit intake, drinking habits, juice intake, and consumption of egg and milk. The questions were divided into 3 sets. The first set of questions was on demographic profile, the second set was on eating habits (questions such as weekly consumption of breakfast, number of times, type, and quantity). and the last set of questions was on SGPA (questions such as score on subjects and time of exam). Overall, 341 students took part in the survey but only 279 responses were able to be used if they were complete in every sense. Thus, making the response rate of 81.81% of the sample size (n=279). Undergraduate college students were randomly selected from different colleges in the university during the January - February (winter session) and August – September (summer session) of 2021. The research instrument used in this survey was a structured questionnaire. Quantitative answers were analyzed using tools such as the frequency and percentage method. Standard least squares regression was utilized to check whether self-revealed current SGPA (Scale 0.00 to 10.0) was connected with various sorts and rates of drink utilization and weekly food. Statistical software SPSS (Version 23) was used. Cronbach alpha was found to be 0.895 which means excellent internal consistency. Students were asked both open-ended and closed-ended questions. Closed-ended questions were on the 5-point rating scale. This scale ranges from strongly agree = 5 and strongly disagree = 1.

## ANALYSIS AND RESULTS

TABLE 1: DEMOGRAPHIC PROFILE OF THE PARTICIPANTS

| | | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 152 | 54.48 |
| | Female | 127 | 45.52 |
| Age (in years) | 18 - 19 | 87 | 31.18 |
| | 20 - 21 | 98 | 35.12 |
| | 22 - 23 | 59 | 21.15 |
| | 24 - 25 | 28 | 10.04 |
| | Above 25 | 7 | 2.51 |
| Bachelor Degree | Engineering | 34 | 12.19 |
| | Science | 79 | 28.31 |
| | Commerce | 65 | 23.30 |
| | Arts | 41 | 14.69 |

| | Architecture | 13 | 4.66 |
| --- | --- | --- | --- |
| | Law | 21 | 7.53 |
| | Others | 26 | 9.32 |

For this research project, male students participated more than female students - 54.48 % were male students and 45.52% of the total population were female students. Most of the respondents were in the age range of 20 to 21 years. The mean age was found to be 19.5 years. Of the total respondents. There were 28.31% of students from the science stream. The second-highest number of respondents was from the commerce field which constituted 23.30% of the whole population. Arts students were 14.69% of the total population. In the demographic profile, there were a few open-ended questions as well. Most of the students were from the 2nd and 4th semesters meaning most of the respondents are from the 1st and 2nd years. The average SGPA was found to be 6.87.

### HEALTHY EATING HABITS AND SGPA:

Table 3 shows the complete analysis of healthy eating habits and their SGPA. Respondents how frequently they

have eaten green salads, vegetables, fruits, fruit juice, milk, and eggs, responses varied widely (Table 2).

It is evident from Table 2 that most of the respondents (23.3%) consume green salads 7 to 9 times a week and a little less than that (21.15%) take green salad items 10 to 12 times a week. It was found that most students take vegetables in their food consumption. As high as 91 (32.62%) respondents consume vegetables more than 12 times a week and 83 respondents take vegetables 10 to 12 times per week. It was found that 85 respondents of 275 take fruits 7 to 9 times a week and 81 take fruits 4 to 6 times a week. 91 (32.62%) students have a habit of taking fruit juice at least once a day. However, 75 students take juice 4 to 6 times a week. It was found that 43.37% either don't drink milk or take it less than 3 times a week. At the same time, 70 respondents take milk 7 to 9 times a week. Most of the students take eggs almost daily. In general, vegetable and fruits is the only healthy food intake that most students take almost daily.

**TABLE 2: EATING HABITS REPORTED AS CONSUMPTION NUMBERS TIMES PER WEEK OF RESPONDENTS**

| No. of times/week | 0 | | 1 -3 | | 4 - 6 | | 7 - 9 | | 10 - 12 | | more than 12 | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | f | % | f | % | f | % | f | % | f | % | f | % |
| Green Salad | 24 | 8.6 | 48 | 17.2 | 44 | 15.77 | 65 | 23.3 | 59 | 21.15 | 39 | 13.98 |
| Vegetables | 4 | 1.43 | 11 | 3.94 | 21 | 7.53 | 69 | 24.73 | 83 | 29.75 | 91 | 32.62 |
| Fruits | 3 | 1.07 | 34 | 12.19 | 81 | 29.03 | 85 | 30.46 | 64 | 22.94 | 12 | 4.3 |
| Fruit Juice | 11 | 3.94 | 37 | 13.26 | 75 | 26.88 | 91 | 32.62 | 58 | 20.79 | 7 | 2.51 |
| Milk | 57 | 20.43 | 64 | 22.94 | 67 | 24.01 | 70 | 25.09 | 15 | 5.38 | 6 | 2.15 |
| Eggs | 42 | 15.05 | 61 | 21.87 | 82 | 29.39 | 85 | 30.46 | 7 | 2.51 | 2 | 0.72 |

**TABLE 3: RELATION BETWEEN VARIOUS TYPES OF EATING HABITS AND SELF-REPORTED PRESENT SGPA USING LEAST SQUARES REGRESSIONS AMONG UNIVERSITY STUDENTS (N = 279)**

| Eating Habits | No. of times consumed/Week | Result of Test | p-Value |
| --- | --- | --- | --- |
| Consumption of green salad | 0/1-3/4-6/7-9/10-12/12+ | DF=4, F-Ratio=1.2272, $R^2$=0.007 | 0.2982 |
| Consumption of vegetables | 0/1-3/4-6/7-9/10-12/12+ | DF=4, F-Ratio=1.1235, $R^2$=0.008 | 0.3434 |
| Consumption of fruits | 0/1-3/4-6/7-9/10-12/12+ | DF=4, F-Ratio=2.1209, $R^2$=0.02 | 0.0763 |

| | | | |
|---|---|---|---|
| Consumption of fruit juice | 0/1-3/4-6/7-9/10-12/12+ | DF=4, F-Ratio=1.3582, $R^2$=0.01 | 0.2496 |
| Consumption of Milk | 0/1-3/4-6/7-9/10-12/12+ | DF=4, F-Ratio=1.3873, $R^2$=0.007 | 0.2387 |
| Consumption of Egg | 0/1-3/4-6/7-9/10-12/12+ | DF=4, F-Ratio=1.1241, $R^2$=0.007 | 0.2639 |
| Consumption of Breakfast | 0/1/2/3/4/5/6/7 | DF=1, F-Ratio=41.5317, $R^2$=0.07 | <0.0001 |

Source: SPSS Output

Eating Habits and Self-reported SGPA were analyzed. Consumption of green salad, vegetables, fruits, fruit juice, Milk, Egg, and Breakfast consumption and the number of times consumed in a week were analyzed (Table 3, p>0.0763). Respondents who mentioned having taken 10 to 12 times of milk per week reported having the best SGPA (7.19). It was followed by respondents who take green salad 10 to 12 times a week and scored 7.11 SGPA (reflected in Figure 1).

Here, it is important to note that the SGPA of the participants who have self-reported has increased significantly with the number of days that they have reported having breakfast/week (Regression, DF = 1, F-Ratio = 41.5317, R2 = 0.07 and p<.0001)

**FIGURE 1: HEALTHY EATING HABITS AND SGPA**
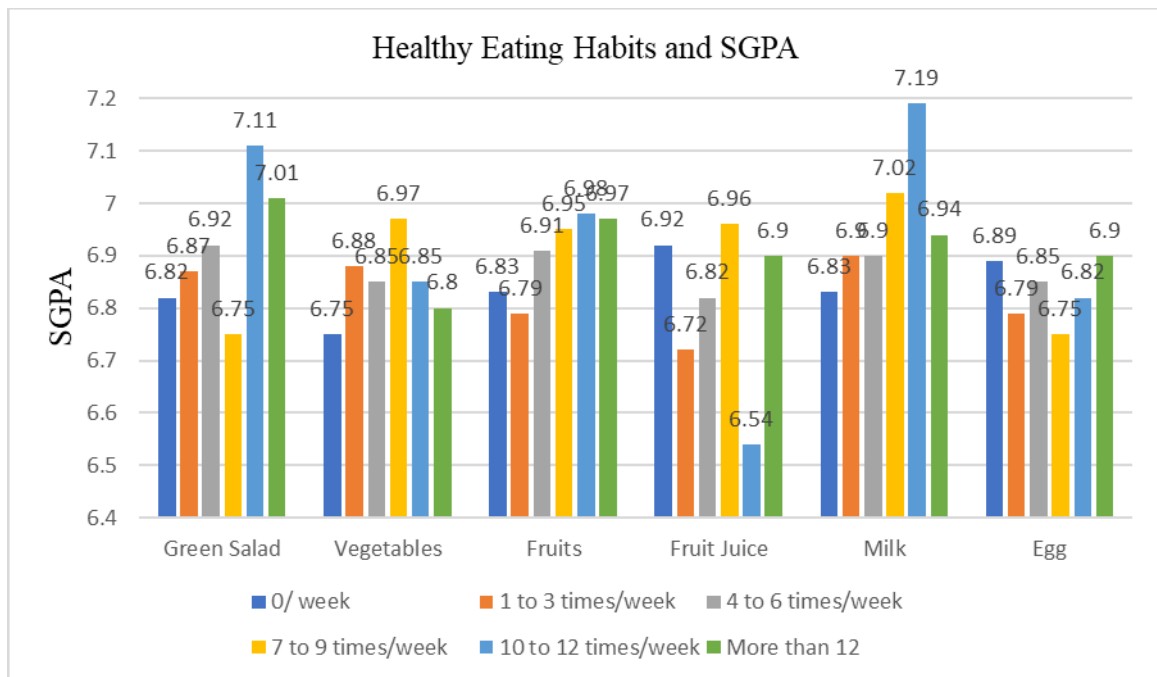


Source: Survey Interpretation

**TABLE 4: CONSUMPTION OF BREAKFAST/WEEK AND SGPA**

| No. of times have Breakfast | f | Average SGPA |
|---|---|---|
| 0 | 38 | 6.47 |
| 1 | 42 | 6.62 |
| 2 | 49 | 6.59 |
| 3 | 47 | 6.71 |
| 4 | 32 | 6.85 |
| 5 | 27 | 6.98 |
| 6 | 21 | 7.28 |
| 7 | 23 | 7.46 |

Source: Survey Interpretation

Upon asking about the number of times breakfast is consumed and their respective SGPA. The following details were obtained from the respondent. It was gathered that 38 respondents do not have a habit of eating breakfast, 42 respondents have taken breakfast only once a week, and 49 of the total 279 respondents have consumed their breakfast two days a week. 16.85% (47 students) have taken breakfast thrice a week before they start their day. All of these students have not scored well in their respective SGPA. 32 of 279 had their breakfast 4 times a week and were near to the average SGPA of all students. 27 students have scored more than the average of 6.87 and they have eaten 5 times breakfast in a week. 21 and 23 students score excellent marks and their SGPA was very good, and they take 6 times and 7 times respectively in a week. Respondents' self-reported present SGPA has improved significantly with the no. of days per week stated to have eaten breakfast. (Regression, DF =1, F-Ratio = 41.5317, R2 =0.007 and p-value < 0.0001, refer Table 3). This gives us evidence to accept the hypothesis which confirms that eating a healthy diet every day will help to improve academic performance among the students.

In summary, it is evident that having daily breakfast helps students to score well in their examinations. Their scores keep on improving the number of times they take breakfast weekly. It is also important for them to take a healthy breakfast and should not depend upon junk food, especially for breakfast as these days' students have the habit of taking quick snacks from roadside sellers.

## DISCUSSION

Most parents want their children to score well in their examinations. This study was undertaken to examine the effect of the eating habits of undergraduate students in one university on their overall score in terms of SGPA. Hence the researcher attempted to find a correlation between these two factors. A positive correlation was found between daily healthy eating habits and the overall SGPA score. A strong relationship was also found between having breakfast daily and an increase in SGPA.

This research is in line with the research done by Adolphus et. al., Reuter et. al., and Reuter and Forster [23, 25, 26] where the researcher also concluded and supported correlations of higher academic achievement in college students having daily breakfast. Similarly, Nasir and Tahir

[24] also found a correlation between breakfast consumption and grades. This research also supports their finding. College students who consumed breakfast at least five times a week reported significantly higher grades than the students having breakfast three times or less (Table 4).

## CONCLUSION AND RECOMMENDATIONS

According to the results obtained in this study, it was evident that there is a strong and positive association between a healthy diet and academic performance.

The results obtained conclude that the students who take healthy and regular breakfast score good grades and do excellent in their examinations. These students have habits of taking all types of food items in their breakfast. Their academic performance is far better than the students having low-quality meals or less number of times eating breakfast in a week. The result obtained supports the hypothesis framed for this study. It was proved that having no or fewer times breakfasts or unhealthy food consumption leads to poorer academic performance. RTM Nagpur University students do have habits of taking breakfast and healthy foods. In this study, it was observed that a large number of students were not having breakfast daily which directly affects their academic performance. At the same time, it was also found that students took milk 10 to 12 times a week has helped them to score higher.

It is strongly recommended that parents provide healthy food and daily breakfast to improve their mental health. College management can help the students too by providing them healthy breakfast enabling them to score well. Students should also need to understand the importance of breakfast in their educational life and should not ignore it and should develop a habit to have a healthy daily breakfast.

### LIMITATIONS:

This research work was dependent on self-reported information by students. There is a strong probability that the student might forget his/her actual SGPA. Students may not remember what and how often they have taken breakfast or any other healthier food items. Students might have given false information projecting that they follow a healthier lifestyle. Since the sample size was small, having a larger sample would have given more precise results.

## FUTURE SCOPE FOR RESEARCH:

Researchers study other factors such as lunch, proper sleep, high-impact diets, and physical activity into consideration as an extension of this research work. The effect of healthy eating habits based on the gender of the students can also be studied.

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# HOSPITAL ONLINE BRANDING DURING THE PANDEMIC: A HEALTHY CHANGE IN INDIA

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## ABSTRACT

The COVID-19 pandemic has changed the way brands communicate to their potential and current customers. This paper uses a multimethod approach to specifically study nine corporate Indian chain hospital brands and their online social media presence during COVID-19. The authors sought to decipher the implicit information gained from Facebook pages and conducted a qualitative study with NVivo 12.3. to understand online branding activity over a year, which was for six months pre-COVID-19 and the first six months during COVID-19. This study corroborated these findings through qualitative interviews with six marketing managers from these brands and thus triangulated the findings. The objective of this paper is to understand these changes, and this will pave the way for the country's smaller hospitals that are yet to delve into Social Media Marketing.

## KEYWORDS

COVID-19, branding, hospital marketing, crises management, social media, online marketing.

## INTRODUCTION

Whether an economic crisis or a healthcare one, businesses have understood that even though their work has slowed down and been impacted by the pandemic their brand communications have to continue. With the increased use of online platforms and social media during the lockdown, customers would hear them more now than ever. Currently, where the markets are fiercely competitive, it is of extreme important to continue to stay on top of the minds of customers or else brands will lose the position they held and lose out in terms of impact.

Health care service providers and other healthcare companies such as pharmaceutical firms and medical device manufacturers have understood the gains of advertising as the market they are catering to today has become more curious and healthcare consumers make informed choices when it comes to anything and that includes healthcare products and services.

In the past, a patient would go to whichever hospital their family physician (general practitioner) would refer them to, but situations have turned and now physicians have started giving their patients options where they can have treatment provided and it is the patient who is the decision-maker. Based on word of mouth and the reviews of hospitals, patients choose the hospital to receive their treatment.

According to recent findings, consumer satisfaction and not exploiting the crisis to boost revenue appears to be a key factor in determining whether or not a business is seen as trustworthy. Brands must exhibit the correct techniques to assist organizations and respond to this public health emergency while remaining true to their beliefs [1]. In addition, the fear of the pandemic has resulted in delayed treatment thus patients reach hospitals in a critical state due to initial neglect [2]. The pandemic has given hospitals a chance to reclaim their standing, by being there for society when the majority of the hospitals had closed their doors to COVID-19 patients due to fear from their doctors, nurses, and other healthcare workers [3]. The COVID-19 pandemic has led to an increase in social media usage as people have been indoors and due to more time at hand, has increased the time spent on social media platforms. This has called for increased engagement on these platforms [11].

Prior to being affected by COVID-19, most organizations focused their marketing strategies towards promoting their services to increase their market share, but brands have shifted with time towards branding in a way to contribute to help ease the patient's situation. Organization's that pay greater attention to their brand image are using this crisis situation as an opportunity to build relationships and strengthen them to form long-term bonds. Hospitals have changed their focus from just advertising and promoting services to health education and preventive healthcare.

## THEORETICAL DEVELOPMENT

Change is inevitable. As such, all global economies are susceptible to being impacted by a catalyst capable of altering the economy as well as the behaviours of consumers within that economy. COVID-19 may prove to be such an economic catalyst. The Harris Poll conducted between late March and early May 2020, found that between 46% and 51% of US adults were using social media more since the outbreak began [1]. In the May 2020 survey, 51% of total respondents 60% of those ages 18 to 34; 64% of those ages 35 to 49; and 34% of those ages 65 and up reported increased usage on certain social media platforms [1]. While some businesses are struggling others are doing well if they have adapted to the change in time. Everything has changed in consumer behaviour and buying patterns, there is an increased demand for food takeout or home delivery; immunity booster consumption has increased; increased demand of household items and cleaning materials; and the subscription to internet and online entertainment services have also increased.

Businesses that were highly dependent on physical visits like supermarkets, shopping malls, street shopping, salons, theatres, hospitality have all been affected drastically by the pandemic.

This study focuses on understanding the direction in which the corporate hospitals are moving with regards to the marketing trend. There is very sparse literature in this area.

## Marketing as a function in hospital

When compared to previous years, there has been a major shift in hospital management priorities, with a greater emphasis on the hospital's performance in terms of clinical, operational, and financial metrics. The emphasis on the bottom line has grown, as have efforts to improve the patient experience by offering high-quality treatment and care while keeping costs low. Performance has becoming more important in hospitals. Hospitals need a marketing department so that they can educate the patients on the services available. This department plays a role in increasing the footfall of patients to the hospital. Hospitals that do not stay ahead and market their services may lose out if there are hospitals proximally that are marketing [5]. Even the most loyal patients, if not reminded of the hospital brand, can shift brands if they get captured by the marketing of another hospital. It is not only the responsibility of the doctor to retain the patients, but it is very important that every aspect of the hospital shows the patient that they care, right from all the staff within the hospital, to follow up and reminders after the patient is out of the hospital. Modern hospitals are focusing on providing a wholesome experience where they attend to the patient's physical health, mental health and psychological wellness [6]. They cater to all the needs of patients and ensure that they are the only place and one-stop location that patients can go to for all their needs.

The competition in healthcare has increased in the last decade with a large number of private hospitals and corporate chains setting up hospitals across the country [7]. With this increased competition it is important that hospitals get visibility so as to get an influx of patients.

The majority of the private corporate chain hospitals are located in tier one and tier two cities in India and are mostly targeting the same consumer base [8]. In the past, hospitals would solely depend on word of mouth promotion where the work of the physician and the services provided would be spoken about voluntarily. There has been a constant debate on the suitability of using modern marketing

strategies by hospitals. It has been the belief that the work done by the hospital will speak for itself and attract patients and no special advertisements or promotion efforts should be made [5,9]. Most of the marketing activities carried out by hospitals involved radio and television advertisements, brochures, testimonial videos, press coverage, launch events, television education series, where services were marketing with the view of educating the public. The majority of the hospitals use Corporate social responsibility activities through free health check camps to promote their services to patients [10–12]. They categorize activities such as information, education and communication to the public and not an advertising activity which is considered inappropriate for hospitals.

## Branding activities carried out by Healthcare Organisations

Previously, corporates and private equity firms did not consider hospitals to be good investments because they were poorly managed and coordinated [13]. Healthcare professional businessmen had little awareness of hospital management and were more focused on clinical aspects, which should ideally be the case [14,15]. Because of the way hospitals and the healthcare industry have transmogrified and evolved, they have now become one of the most lucrative investment attractions for investors. [16,17] [10,18]

Hospitals are shifting business tactics in order to deliver excellent treatment to more patients at a lower cost, while attempting to maintain profitability in the midst of ever-regular updates in the forms of the latest medical technology while cutting costs[12,19]. As business practices evolve to include investments in new systems, software, partnerships, health agencies, as well as other innovations, the way hospitals identify themselves must evolve as well [20]. To ensure a favourable return, hospitals must go above and beyond their traditional functioning. Investments and their justifications must be part of a wider brand that represents the most significant advantages to every one of the various stakeholder groups. This could entail additional elevated, accessible care for individuals and the wider public. An investment could offer a new possibility for health care workers to give care in a more efficient or effective manner. In an era of rising investment and competition, a hospital's brand can be one of its most valuable business assets, assisting it in attracting new patients as well as qualified health care personnel, and establishing itself as the region's preferred provider, which is exactly what most of these corporate hospitals are aiming

for.[3,22,23] Even within a single county, the needs and expectations of patients can be radically different. These inconsistencies were discovered thanks to research, which helped get to the heart of what patients really valued. According to some studies, the country lacked high-quality patient care that was provided in other countries.

Employees were enabled to deliver on the brand promise through a number of internal branding activities. All of these efforts result in precise promises to patients and measurable behavioural expectations for health professionals and employees [1,9,14,24]. Healthcare workers are continually encouraged to live up to that standard, and their performance is measured in part by how well they do so. As a result, the brand serves as a solid foundation for a more patient-centred approach to thinking about issues, operations, and standards, as well as a guide for many crucial decisions and metrics.

The brand is then marketed externally through a synchronised marketing campaign after employees have been trained. Print, online, and outdoor advertising, direct mail, a new literature system, and a mobile-optimized, responsive website that communicated a clear commitment to patients and other external constituencies were all part of this strategy.

Consistent actions and messaging generate a compelling brand. Employees are focused on the experience, and hospital brands will be more successful in recruiting patients and extremely competent medical practitioners if they use a combination of internal and external marketing. The term "patient experience" encompasses more than just personalised physician attention. All components of hospital brands, including social media profiles and websites, should be focused on providing exceptional treatment.

When hospitals use social media to customise health treatment and share information, they are partaking in Health 2.0. [20] Hospitals ought to have a strong social media presence that complements their overall marketing plan. Consumers and prospective patients spend a significant amount of time on social media sites. According to a recent report by PricewaterhouseCoopers (PwC) US's Health Research Institute (HRI), one-third of consumers were using sites like Facebook, Twitter, YouTube, and online forums to find health-related information, track symptoms, and broadcast their opinions about doctors, drugs, treatments etc. The social media pages help to engage

with patients and prospective patients thus building a brand name that will stick and come in handy when the time is right.

The issues that hospitals face have also evolved. Increased competition, and balancing administrative costs and efficiency, are only a few of them. The industry is under tremendous pressure to put systems in place to increase efficiency and better manage cash while maintaining high levels of patient care and satisfaction. To reach the desired goal, a hospital's performance must be measured and managed effectively.

## METHODOLOGY

This paper is a multi-method study. Multi-method research is research that uses multiple forms of qualitative data such as interviews and observations or multiple forms of quantitative data such as survey data and experimental data. The study has focused on primary data that has been collected through in-depth interviews with six marketing managers of Corporate Hospital Brands in India. The authors have also analysed the social media activity on Facebook pages for six months pre COVID-19 and six months during COVID-19 have been reviewed so as to understand patterns of nine corporate hospital brands in India. NVivo 12.3 software was used to undertake analytic clustering of key themes and corresponding subthemes. NVivo (version 12.3) is a software programme that is commonly used to complete thematic analysis, sentiment analysis, and hierarchical clustering based on word frequency using Pearson's coefficient.

The objective of this research is to examie the pre-COVID-19 marketing strategies used by the participating hospitals, as well as the shifts and changes that happened for six months during COVID-19. Understanding the trajectory of large corporate hospitals is crucial because it will pave the way for most of the country's smaller hospitals, which have implemented modifications based on big chain hospital's experience.

The objective of this study can be stated through the research questions which are as follows.:

**RQ1.** What was the favored marketing mode, and what changes occurred during the six months prior to and during the early COVID-19 phase?

**RQ2.** What was the content that these hospitals focused on during the six months pre-COVID-19 and during the COVID-19 phase?

### SAMPLE
When choosing the sample for the study the authors kept in mind the criteria, which was that the hospitals had to:
1. be private corporate chain hospitals
2. be in India
3. have an active Facebook page.

We have extracted Facebook posts available for a span of 12 months broken down to the timeframe of six months from September 2019 to February 2020 and March 2020 to August 2020 as the study period during COVID-19 six months.

The Goa Institute of Management, ethics commitee granted the ethics clearance to undertake this study.

### INTERVIEWS
There were six telephone interviews conducted with officials having the designation of Marketing Head, Group Marketing Head and Regional Head of large corporate chain hospitals in India. The interviews took between 10 -15 minutes. The interviews were stopped when data saturation was attained. The interviews were anonymized and verbatim transcribed, with a thematic analysis conducted. The interview protocol was tested through a pilot study. Some of the questions asked were:
1. What are the modes of marketing that you all focussed on in the first six months when hit by COVID-19? What is the trend now?
2. What were the main thoughts or messages you were seeking to get across to the community during these months while most people were staying indoors?
3. What was the shift in the budget from before the epidemic to six months after the outbreak?
4. In online marketing what was the shift in the areas of marketing as in where all which platforms would you focus the online marketing in?

## DATA ANALYSIS

**Findings from the Online Branding in Hospitals**

Hospitals have been one of the very few industries to adopt an online marketing platform. Until approximately the last 4-

5 years even the corporate hospitals have had a very minimal presence online.

Prior to COVID-19 marketing budgets have mainly been focused on offline activities which included activities like organizing specialty Outpatient Department's, Continuous Medical Education (CME's), One to one doctor meetings, outreach activities, clinical engagements, and training programmes for various groups. The focus was on educating people with various medical conditions and its treatment. During the initial months when COVID-19 hit India, hospital marketing was purely online. This mainly focused on topics such as protocols to be followed and the precautionary measures to be followed by the public to fight COVID-19, vaccination drives by various hospitals and organizations, and discussions amongst doctors regarding the increase in the cases of new variants of COVID-19 were organized. The webinars were increased to a very large extent from one or two webinars in the pre COVID-19 period to 50 to 60 webinars in the first six months during COVID-19.

Healthcare infrastructure by various healthcare fraternity was discussed as well and the need for any further changes in case of another wave was discussed. As hospitals and society accepted that COVID-19 is a reality that they would need to live with for a while, the marketing departments moved their focus on educating the public on the lifestyle changes that one needs to adapt to during-COVID-19 and the various ways to cope with it.

In the past, 90% of the marketing budget spend of hospitals would be focused on above the line marketing activities such as radio, advertising, local TV, Newspapers, magazines, outdoor hoardings, bus shelter branding and the press.

The scenario during COVID-19 is inclined towards posting and promotions where hospitals mainly use online platforms. From the nine hospitals that were part of this study, all of them had a presence on social media platforms such as Facebook, Instagram, LinkedIn, Twitter and YouTube. Some hospitals also had their presence on platforms such as Pinterest, Tumblr, blogs and were also present on private sites like Practo.

**Table 1: Social Media Presence amongst the nine hospitals studied**

| Social Media Platform | Study Hospital's usage % |
|---|---|
| Facebook | 100 |
| Instagram | 100 |
| Twitter | 100 |
| LinkedIn | 100 |
| YouTube | 100 |
| Pinterest | 87 |
| Others(WeChat,TikTok etc) | 72 |

**Findings on Online Branding trend during COVID-19**

Branding during the lockdown has important implications for marketers who are focused on maintaining and building a lasting relationship with customers. Organizations that have understood the importance of this connection, have increased their online output as compared to prior to the pandemic. The representatives of the nine hospitals interviewed have shown a clear increase in the number of Facebook posts from the pre COVID-19 to more than double in the first six months during COVID-19 phase.

Planning has always required careful assessment of data and changes in relation to customer behavior. During the outbreak, traditional marketing and advertising spend declined as there was not much movement of people, but digital marketing spends increased. Several marketers increased their output, so as not to miss out when the situation stabilized. This helps to stay in touch and engage with the public who could likely need the hospital services for either themselves or their relatives and the increased usage of social marketing so as to reach customers better.

**TABLE 2: BREAKUP OF THE EXPENDITURE ON SOCIAL MEDIA AMONGST THE NINE HOSPITALS STUDIED**

| Online Platform | Study Hospitals % of budget expenditure |
|---|---|
| Website | 25 |
| Blogs | 5 |
| Online CME | 10 |
| Online booking Sites like Practo | 20 |
| Facebook | 5 |
| Instagram | 5 |
| Twitter | 5 |

| LinkedIn | 5 |
|---|---|
| YouTube | 10 |
| Pinterest | 5 |
| Others(WeChat,TikTok etc) | 5 |

**Social Media Activity during the pandemic**

While looking through the words that came up when we ran the word analysis in NVivo, we ran two separate analyses, the first being an analysis of the posts that were pre COVID-19 and the other was post hit by COVID-19. The image below clearly shows that the hospital didn't give much attention to the online posting and the focus was more towards promotion of services and education, while relationship building, engagement and behavior change were not given much priority.

**FIGURE 1: NVIVO ANALYSIS, WORD CLOUD OF FB POSTS ANALYZED 6 MONTHS PRE COVID-19**
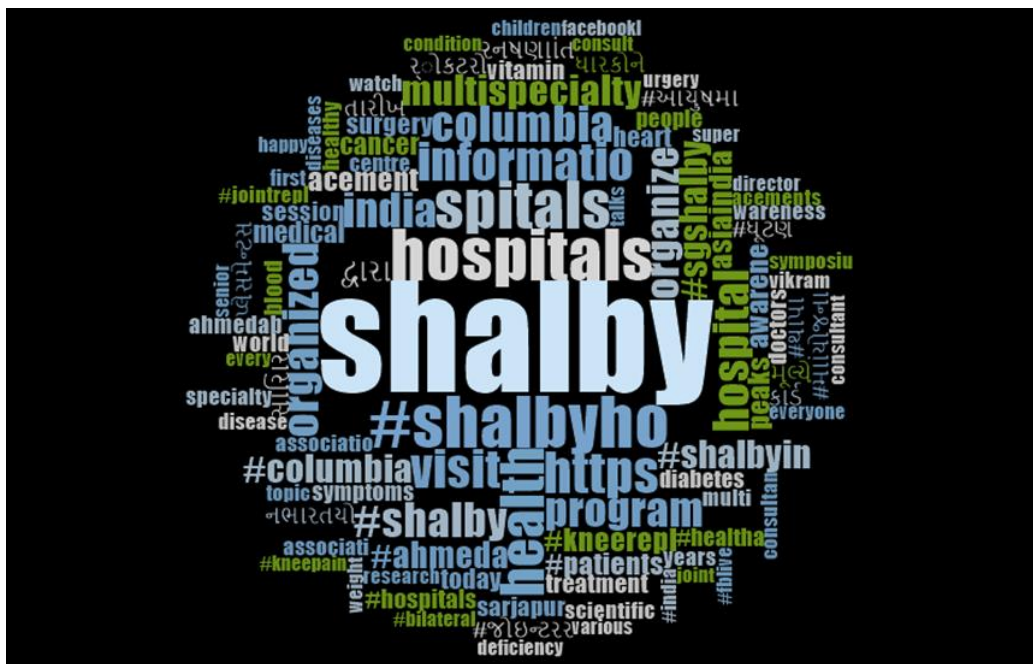


When the gravity of COVID-19 became clear and the World Health Organization (WHO) proclaimed a pandemic, India went into lockdown a few days later, and hospitals understood they should be on the front lines of change. Healthcare is a service that is required in all circumstances and cannot be terminated. The COVID-19 outbreak had instilled such terror in the population that individuals had ceased leaving their homes for any reason. AS hospitals are places where the unwell go, the general population desired to avoid them even more, due to the fear of contracting COVID-19. Several cases were overlooked, and as a result, their condition worsened. Untimely treatment resulted in many deaths that could have been avoided. Figure 2 gives a clear indication of the posts and Figure 3 gives an indication of the topic categories that were focused on social media. There was more clarity as compared to the six months pre-COVID-19 phase.

**FIGURE 2: NVIVO ANALYSIS, WORD CLOUD OF FACEBOOK POSTS ANALYZED DURING THE FIRST SIX MONTHS OF COVID-19**



**FIGURE 3: HIERARCHICAL CLUSTER ANALYSIS OF WORD FOR THE CATEGORIES OF FACEBOOK POSTS (NVIVO 12)**

In line with this study's findings, the focus of online social media posts during COVID-19 shifted towards education. This included COVID-19 and non-COVID-19 related health education, relationship building, encouraging behavior change to bring in better health outcomes, and a smaller part of the posts was related to the promotion of services. Several of the education activities were also engagement activities conducted by specialist doctors over a live Facebook session., With doctors also having more time during the lockdown, this was a good way to keep in touch with the public and address the most important needs of the time, which is wellness. Prior to the pandemic Facebook and other social media posts were not given much importance and didn't have a structured plan. The posts would be very random and focused more on service promotion rather than relationship building, engagement or education.

There were other marketing activities that were given more importance and these were highlighted in this study.

*Interviewer*: What is the marketing trend in the first six months when hit by COVID-19. And how has it shifted from pre-COVID-19?

*Marketing Manager*: "Prior to COVID-19, the market only focused on educating people with various medical conditions and their treatment. During COVID-19, topics such as protocols/precautionary measures to be followed by people to fight COVID-19, vaccination camps by various hospitals and organizations, increase in the cases of new variants of COVID-19 were discussed. Healthcare infrastructure by various healthcare fraternities was discussed too. But during COVID-19, they are focusing on the lifestyle changes one needs to adapt to during COVID-19 and the various ways to cope with it."

*Interviewer*: What online marketing platforms did you'll focus on? What were the main thoughts or messages you were seeking to get across to the community during these months while most people were staying indoors?

*Marketing Manager*: "For posting and promotions, we mainly use Facebook, Instagram, LinkedIn, and YouTube. But we generally do post on Twitter too. We focus on Community building campaigns, Online CMEs, Health education via blogs, videos, and FB Live, Package promotion via means of various campaigns, generating leads to cater to international patients, and promoting events to generate traction to the OPDs."

The choice of marketing platforms was similar with some organizations choosing to focus on some platforms more than others. The activities also were similar, and most managers agreed that the focus was to connect to the patients and build a relationship so that they were the first choice whenever required.

*Interviewer*: What was the shift in the budget from before the epidemic to six months after the outbreak?

*Marketing Manager*: "Previously we were 60% offline and 40% online, now our budgets are just the opposite, 60% of the marketing budget is spent online and 40% is offline, and this may continue even after things settle."

Although these were the words of one of the interviewees, most of the responses were similar (data saturation), with a few minor exceptions.

Some managers were pleased with the new budget plan since it allows them to spend more money online for a reduced price.

*Interviewer:* In the online marketing what was the shift in the focus areas of marketing?

*Marketing Manager*: "We conducted a lot of webinars, FB Live events, and posts to discuss topics related to the safety measures to be followed by everyone during COVID-19, COVID-19 and other co-morbidities, Ways to improve one's immunity and health post-COVID-19, Vaccination, Healthcare infrastructure, post-COVID-19 care, new normal, promoting OPD consultations and even Online consultations."

"In the past, we would be promoting Cardiology-related videos, and patient testimonials related to nephrology. Sometimes we would be promoting women's health packages and gynae-related packages. Since World Heart Day is nearing, we would keep talking about Precautions/choices for a healthy heart, Cardiac consultations at the hospital, Cardiac emergencies, and Symptoms of cardiac attack via promotions. Celebrating these health days will continue. We have promoted cardiac-related packages too."

Marketing managers stated that COVID-19 has pushed them to do several positive things like online CME's etc. They believed that they would continue this way as its also a form of giving back to the society and the people

appreciate the live sessions and health tips a lot. It is the specialists who they turn too for correct advice as there are incorrect messages passed around very often.

## DISCUSSION AND CONCLUSION

This study contributes to the body of knowledge on marketing in hospitals. It has implications for hospital administrators and marketers who are focussed on engaging people to maintain or increase brand visibility and increase their market share.

As a result of their online marketing presence, customers may feel more attached or disengaged from a hospital. The study brings out the deatail of rapid adaptation and the shift of corporate hospitals to stay in touch with the patients through the online mode during the pandemic when the lockdown was announced. The hospitals continued to provide value to patients through online education which has become a major focus.

At times of such uncertainty, it is of great importance that the hospitals show the public that they are always there at the times of need. They are accountable for all the healthcare needs of the patients and their families and are a reliable service provider. The hospitals through their online marketing strategy communicate care by using terms like "#stayhealthy", "#nhcares", "#staysafe" and at the same time communicate trust and that they are reliable by using terms like "#happypatient", "#patientspeaks", "#Indiafightscorona" etc.

The marketing budget allocation has a clear motive and purpose that the hospitals have to achieve. Most of these leading hospitals have understood that gaining the trust and building relationship with the public is the way forward and thus all their activities are aligned along these lines. The new marketing plan must be based on a strategic plan for achieving broad marketing goals and directions. In the past there was no clear strategy of what the hospitals were to focus on.

Educating the public and conducting online CME's have gained traction and is the way most of the corporate hospitals are moving towards.

The interviews and the Facebook post-analysis corroborated the findings that education, engagement, and relationship building had the largest share of the posts, followed by promotion of services and behavior change activities. In fact, behavior change activities also could be categorized under education, engagement, and relationship building as they show patients that they care. The pandemic was a push for hospitals to be the torchbearers of change. Adaptation was the need of the hour which got them to shift everything online including consultation and CMEs.

### LIMITATIONS AND AREAS FOR FUTURE RESEARCH

The findings of this study were limited to corporate hospitals in India, and they may not be applicable elsewhere. Future research might look at corporate hospitals around the world. Hospital marketing has yet to be fully explored for this industry and examining global patterns will provide a better insight. Future research can look at the changes that have occurred after the pandemic as a longitudinal study, to examine what other changes have occurred and there impact. Other factors also can be studied such as the economic, cultural, and geophysical impact of the activities carried out by the corporate hospitals. Future studies can also look at the presence on other social media platforms and consider other factors such as the number of 'likes' and reach that these hospitals are engaging with. Social media marketing is the way forward in the hospital domain, to engage patients and society and can be a huge benefit if used in a proper and planned manner.

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# ACCESSING ELECTRONIC HEALTH RECORDS OF THE UNCONSCIOUS PATIENT

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## ABSTRACT

Electronic Health Records are a digital version of paper-based records. Studying previous treatment, care and medications is important for making diagnosis for the current situation. The aim of this paper relates to the use of EHR as a means of communication between patient and health care provider with a focus on how EHRs communicates health information for unconscious patient to physicians. As accessing records requires credentials of patient and if the patient is not in a condition to enter his credentials, this leads to the scope of dynamic access control. Dynamic access control is provided by dividing EHRs into different levels. The basis for these levels is physician's specialization and patient's health status. This framework is implemented with the help of a WAMP server using PHP and MySQL.

**KEYWORDS**

Electronic Health Records, Dynamic access control

## INTRODUCTION

The aim of this paper is to describe access control to Electronic Health Record (EHR) specifically for the unconscious patient. An EHR is a digital version of patient's records. These records include sensitive information about a patient's health. The majority of the research is aimed at static access control where the access permissions are predefined [2,7] and describes requirements of access control. In their view, patients should have control over their records, grant and revoke access, should delegate control to someone to access certain parts of their health records, also patients should be able to hide certain details. One important requirement of access control is the need-to-know aspect during emergencies. Most of the articles considered static access policies, they considered that patients have predefined permissions to certain doctors, healthcare workers, or hospitals. Defining access permissions is based on a patient's knowledge of the people treating them or an institute to which they get admitted. During emergencies, patients may not be in a condition to remember passwords or security numbers, may be admitted to institutes for which they have not given access permissions. As per Rosenthal [28] article, a model patient's access key may be known by their relatives but at that time relatives may not present or have access. Due to all these possibilities finding the right information at the right time becomes a difficult task. To resolve these issues different levels of EHR are maintained and to access these levels different login credentials are required based on sensitivity of information. To see the records of unconscious patient we used his fingerprints. Also, to track accountability of clinicians viewing the records we used the physician's fingerprint.

## RELATED WORK

Several studies have been conducted to examine different situations or scenarios in relation to access control.

## 1. HEALTH COMMUNICATION:

Berry's [3] health communication is the situation among different players which include doctors, patients, relatives, family friends and carers. The communication may be verbal or non-verbal. Ruben [8] explains the wide nature of health communication ranging from face-to-face to settings outside clinical environment, which include local grocery stores, retail stores, television, billboards, and magazine advertisements. With the expansion of this range health communication has potential to boon or bane. This hampers the quality, security, and applicability of information given in the situation. To make an accurate diagnosis patient-doctor communication is important. [35] The patient's level of consciousness, the amount of physical care given to the patient and the presence of relatives are the factors influencing the communication. [36] Physical examination depends on history but tracking of history is possible only when patient is conscious and carries his/her previous prescriptions. There is possibility that patient is unaware about medical jargons and can't remember medicine names. [38] In case of unconscious patients, history is collected by questioning person who is familiar with the recent history of patient. [34] Personalized care can be achieved by addressing unconscious patients by their preferred names, encouraging family and friends to contribute the sound of familiar voices and discussing subject in which patient has interest. [36,38] strategies to communicate with unconscious patient work only when patient is accompanied with his/her relatives, which is not possible all the time. Arar [5] found that the use of EHR plays important role in information exchange by providing information about medications, prescriptions, renewals and refills. [1] The EHR assists physicians in preparing prescriptions by giving information about their medications. The use of EHR has positive impact on patient-doctor communication.

## 2. ACCESS CONTROL IN EHR:

Badr [22] proposed an authentication and authorization protocol to manage EHR using a public-key cryptosystem. In this paper, the hospital has access rights on long-term historical EHRs of a targeted patient. When the patients want to transfer their EHR from previous organization to a new one (which may be clinics, hospitals, social organizations), the patient must grant access permission to the new organization. Assigning permissions to new organization is possible when patient is conscious. If patient is unconscious and admitted to new organization then it is difficult to access EHR. [28] proposed a framework in which the patient encrypts personal medical data according to different access policies and stores it in the cloud.

Ming [23] set out that the EHR owner (patient) formulates the access policy, encrypts the data, and uploads it to the cloud server. EHR users (doctor or nurse) who can download data from the cloud server and decrypt it. Rosenthal [28] says to provide accountability this system provides access to only authorized doctors. The patient's key is known to his relatives only. Here patient accompanied by relative who knows the key is mandatory condition, which is not possible every time.

Darnasser [29] focused on system which require coordination among doctors and patients. In this system user of the system has to give a reason for accessing the EHR. Grunwell [27] presents a system in which hospital staff members authorized by a medical institute are allowed to access EHR. Grunwell [27] used three scenarios, which are: a parent is given complete access to manage their child's EHR. 2. A healthcare worker is given access to manage the record of a patient with a mental disability under their care. 3. A doctor grants access to one of the nurses caring for one of his patients to add data to record. Nelson [33] proposed four different levels of consent. In general, there is full access to citizen's health data. General consent with specific conditions is a general agreement but some restrictions in terms of the person, data, and purpose are defined. General denial with specific conditions complements the consent type to give access to his/her data. General denial does not consent to give access to his/her health data.

In Lo [21] and Grunwell [27] models, the hospital has access to EHR of regular patient. But who is actually going to access the EHR is not clear. Sun [20] provides access control to doctor but patient's key is known by relative. There is no facility to track unauthorised access by patient's relative. [24] provides different levels but, these levels are statically defined. We can't predict in emergency which information doctor will require? Ming [23] also, focuses on static access control. [27] used three scenarios which use static access policy and which are prone to insider threat.

In the existing work, the data owner may be a patient, doctor, or hospital. When the data owner is a doctor or hospital, the patient has to request for data access and patient data is prone to insider threat. When data owner is patient information is collected by wearables or maybe by using sensor devices which is not possible every time for

every patient. Also, remembering key or password depends on the patient's physical and mental health.

In this paper, we applied dynamic access control as well as information accountability to EHR. The focus of this work is on the patient's health status (unconsciousness) which is the motivation behind the use of dynamic access control.

TABLE 1: PATIENT IDENTIFIERS USED IN LITERATURE

| SR.NO. | FINDINGS | REFERENCE |
|---|---|---|
| 1 | Patient identifiers-Patient's fingerprint | [10], [26], [11], [12], [13], [14] |
| 2 | Patient identifiers-Facial data | [16], [17] |
| 3 | Patient identifiers- encrypted mobile number, gender and name-value of patients | [18] |
| 4 | Patient identifiers-Iris identification | [15] |
| 5 | Patient identifiers-finger-vein system | [25] |
| 6 | Patient identifiers-DNA sequences | [19] |
| 7 | Patient identifiers-citizen ID | [10] |

Facial recognition is not suitable as it is affected by different expressions, different physical and metal conditions, age. Remembering Citizen Id, mobile number is difficult for patient as physical condition may hamper his mental ability. Also, it is easy for intruder to get access to patient's EHR using his name, citizen id, mobile number. DNA sequences are highly intrusive and more expensive.

As our focus is to identify unconscious patient and access his health record, in this paper to capture patient identity we used fingerprint. For conscious patient we used his unique identification number.

## ALGORITHM

### 1. THEORETICAL BASE FOR THE ALGORITHM

We used Northouse [6] and Northouse's health communication model as a base for the implementation of this algorithm. According to this model health communication refers to transactions between

## 3. PATIENT IDENTIFIERS:

Patient identifier is defined as information associated with patient that uniquely identifies individual as a patient to whom treatment is intended. From literature the patient identifiers used are fingerprint, DNA sequences, Iris scan, Facial recognition, Citizen ID, finger vein system.

participants in healthcare and about health-related issues. [6][3] The model illustrates four relationships: professional-professional, professional-client, professional-client's significant others, client-significant others. Professional and client have unique characteristics, beliefs, values, and perceptions to the healthcare settings, which affects their interaction. Here, professional is doctor and client is patient under treatment. The client's significant other's include family, friends, work colleagues. This model considers the communication which is conducted among patient and doctor in doctor's cabin or hospital ward, which is face-to-face. In our work, we consider the changes in communication between patient-doctor, due to introduction of Electronic Health Record. In our model there are three role players: patient, doctor and relative. Most of the communication and information exchange is between doctor and patient. The role of relative is just to give consent to doctor to access most sensitive information of patient. This information exchange is designed for treatment setting, in which doctor requires information about patient's health history. Any role player can misuse

information available to him, which is not considered by Northouse and Northouse's health communication model. We design our model by considering misuse of information and made the communication more secure. Our model also focus on availability of information when two (patient and relative) of the three role players can't provide information and still third role player (doctor) can access the records without disturbing security. In all this procedure information accountability is also prevented by taking credentials of each user.

## 2. MODEL FOR LEVEL-BASED ACCESS CONTROL:

This section explains about different level are maintained. These levels are based on doctor's specialization as well as patient's health status. As per doctor's specialization the model is classified into three main levels. General, Special, and complete, for which login gets changed as per patient's health status which may be conscious or unconscious. There are many definitions to define consciousness. In this model we used definition of consciousness given by [28] as condition of people or creature when they are awake and responsive to sensory stimulation. The three levels in this model are:

- General EHR: contains data about patient's visit to general physician.
- Special EHR: contains data about patient's visit to specialized physician and general visits. Ex. if Alice visits gynaecologist her doctor can view details filled by gynaecologist if any and her general EHR.
- Complete EHR: Contains data about patient's complete health.

We present here six scenarios that describes access control process in a hospital to enable medical staff members to gain access to patient's EHR even if patient is unconscious.

1) Conscious patient comes to general physician:
   When Alice comes to doctor bob, doctor used his login id and asks patient for her login id and can view the general EHR.
2) Unconscious patient comes to general physician:
   When unconscious Alice admitted to general physician Bob, doctor use his login id and uses Alice's fingerprint to view her general EHR.
3) Conscious patient comes to specialized physician:
   When Alice comes to gynaecologist, she wants to show her gynaecology records to doctor Bob, but she doesn't want to disclose about her psychiatry treatment. In this case doctor uses his login id, Alice

uses her login id and fingerprint to access special EHR. This displays only gynaecology records and records filled by general physician.

4) Unconscious patient comes to specialized physician:
   When unconscious Alice admitted to gynaecologist, she wants to show her gynaecology records to doctor Bob, but she doesn't want to disclose about her psychiatry treatment. In this case doctor uses his login id and fingerprint, Alice's fingerprint is used to access special EHR. This displays only gynaecology records and records filled by general physician

5) Patient wants to view his records:
   When Alice wants to view her EHR by entering her login id she can view complete EHR.

6) Doctor (general or specialized) wants to view complete EHR of unconscious patient:
   When unconscious Alice admitted to any physician Bob who may be general or specialized and doctor wants to view complete EHR bob has enter his login credentials id and fingerprint, Alice's fingerprint and Alice's nominated relative's fingerprint.

## 4 PROTOCOL DEFINITION:

This section about how algorithm works with different access permissions.

**Meaning of symbols:**
D=Doctor,
Ds=Specialised doctor,
Dg=General doctor
P=Patient,
Pc=Conscious patient,
Pu=unconscious patient
T=Tuples of EHR,
Ts=Tuples of SEHR,
Tg=Tuples of GEHR
GEHR=general EHR,
SEHR=special EHR,
CEHR=complete EHR
$d_{gid}$, $d_{sid}$ = id for a generalized and specialized doctor
$p_{cid}$ = id for conscious patient
$d_{sf}$, $p_{uf}$, $R_f$ =fingerprint for doctor, patient, relative

When doctor login in system as general physician $d_g$ and patient is conscious $p_c$ then login requires patient and doctor id ($D_{gid}$, $P_{cid}$) respectively. Then displayed records belongs to general EHR (gehr), which is intersection of all

tuples T and tuples with general visits $T_g$. When doctor enters new record $T_{new}$ one more tuple gets inserted in general tuples $T_g$ and then updated $T_g$ will be union of original $T_g$ and $T_{new}$.

```
If {D=dg && P=pc}
{
      Login (dgid, pcid)
      Display (gehr where dsp=general)
      Tg ← Tg ∩T
      Insert(gehr)
      Tg ← Tg U Tgnew
}
```

When doctor is general physician $d_g$ and patient $p_u$ is unconscious, then login requires doctor id $d_{gid}$, doctor fingerprint df and patient fingerprint pf. Records displayed includes general EHR are intersection of general tuples and all tuples. New entry results in union function.

```
Elseif {D=dg && P= pu}
{
       Login (dgid,df ,pf)
       Display (gehr where dsp=general)
      Tg ← Tg ∩T
      Insert(gehr)
      Tg ← Tg U Tgnew
}
```

When doctor is specialized and patient is conscious, then records related $r_{sp}$ to doctor's specialization $d_{sp}$ get displayed. Login requires doctor's id, $d_{sid}$ and patient's id $p_{cid}$. Ts includes tuples with doctor's specialization and tuples with general visits.

```
Elseif {D=ds && P=pc}
{
      Login (dsid, pcid)
      Display (Sehr where dsp=rsp)
      Ts ← Ts∩ T
      Tg ← Tg ∩ T
       Ts ← Ts U Tg

      Insert(sehr)
      Ts ← Ts U Tsnew
}
```

When doctor is specialized and patient is unconscious, then login requirements are doctor's id $d_{sid}$, doctor's fingerprint $d_{sf}$ and patient's fingerprint $p_{uf}$. Result displayed includes

records matching to doctor's specialization and general records.

```
Elseif {D=ds && P=pu}
{
      Login (dsid, dsf, puf)
      Display (Sehr where dsp=rsp)
      Ts ← Ts∩ T
       Tg ← Tg ∩ T
       Ts ← Ts U Tg
      Insert(sehr)
      Ts ← Ts U Tsnew
}
```

When patient wants to view his records, then login requires patient's id $p_{cid}$ and complete EHR (cehr) get displayed.

```
Elseif {p= pc}
{
Then    Login(pcid)
        Display (cehr)
        T ← T U null
         Insert (cehr)
        T U Tnew
}
```

When doctor may be general or specialized and patient is unconscious and doctor wants to view complete EHR, login requires doctor's id $d_{id}$, doctor's fingerprint $d_f$, patient's fingerprint $p_{uf}$ and patient's nominated relative's fingerprint $R_f$. Tuples displayed include all tuples.

```
Elseif {D=ds || dg && P=pu}
{
      Login(did, df,puf,Rf)
      Display(Cehr)
      T ← T U null
      Insert(cehr)
      T ← T U Tnew
}
```

## IMPLEMENTATION

[33] five methodologies namely: Formal, Experimental, Build, Process, and Model which are applicable to computing science research. Computing Science (CS) most of the time uses experimental methodology. Experimental methodology includes two steps. One is identification of a question and another is finding suitable solution. [37] define Experimental Computer Science (ECS)

as "the building of, or the experimentation with or on, nontrivial hardware or software systems." [31] discussed three methodologies in computing science: Theoretical, Experimental, and simulation. Theoretical methodology uses logic to prove relationships among different objects. Simulation enables scientists to examine their models virtually. Experimental methodology studies concepts which are related to human creation. Here, experiments are related to information. [31] conducted a survey to investigate methods applicable to research in computing. The results show strong support to experiments as the method of data collection. Experimental method is related to creation of new algorithms comparison of existing algorithms. So, considering all these points researcher has used experimental method to achieve research objective of this research. This model is implemented using WAMP server with PHP and MySQL. We have created databases in MySQL which described doctor, patient and relative information. Patient database includes fields which are, name of patient, his unique id, date of record insertion, Symptoms, doctor's specialization, medicines and medication_till_date. To complete this database, we took data from webMD and drug.com websites. This data includes names of medicines and symptoms to which medicines get applied. The focus is to implement access control scenarios and to view patient's records, so pseudo database is generated. The data is not related to any real patient, leads to no scope for ethical consent. Following are the steps user has to perform while searching health records:

1) Account creation and login
2) If user is doctor, he can access data based on his specialization
3) If doctor is general physician, then he can access GEHR
4) If doctor is specialist, then he/she can access SEHR matching to his/her specialization
5) If doctor (General Physician/ Specialist) wants to access CEHR he has to take permission from patient if he/she is conscious or from patient's relative if patient is unconscious.
6) When patient is unconscious patient identifier is fingerprint
7) For searching SEHR and CEHR identifier used for doctor and relative is also fingerprint.

## DISCUSSION

The objective of this paper was to develop dynamic access control in EHR which will access even records of unconscious patients. To achieve this objective, researchers have used an experimental methodology. This paper discussed Northouse and Northouse's health communication model. The model described importance of players in the communication. According to this model, the setting in which communication is carried out also play important role. The settings which are mentioned in this model are doctor's cabin or hospital ward. The purpose of this communication is to capture more information about patient's problem, his health history, his symptoms and give his accurate treatment. We used this model, with players patient, doctor and relative. The prior model is best when doctor-patient or doctor-relative or patient-relative interact face-to-face. Whereas latter proves best when unconscious patient comes to doctor and doctor has no way other than patient's Electronic Health Record to access his health history. As introduction of EHR brings ease of access to information, security issues and information misuse together make up the other side of the coin. At that time our model with dynamic access control provides better solution. Researchers proposed this model which access system with fingerprints. When there is a scenario in which unconscious patient without hands comes to hospital there is need to use another patient identifier, which is future scope for this model. Dynamic access control will be applicable to other sensitive databases.

## CONCLUSION

As EHRs are storing sensitive, as well as important information, we classified this information based on its sensitivity and importance. Sensitive information is classified as general EHR, Special EHR and complete EHR. To access details of unconscious patient we used fingerprints. Use of different access scenarios and different patient identifiers leads to future scope.

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# PUBLIC ACCEPTANCE 0F COVID-19 RELATED LOCATION TRACKING TECHNOLOGY WHILE IN QUARANTINE: EVIDENCE FROM SOUTH KOREA

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## ABSTRACT

**INTRODUCTION:**

Since the outbreak of the COVID-19 pandemic in December 2019, public policy debate has been increasingly focusing on developing and implementing new disease prevention measures based on tracking of geographical location, in particular during the quarantine period. Limited studies have so far investigated possible public acceptance of such measures.

**METHODS:**

We analyzed a sample data of 1,000 respondents from the 2021 Korean Social Science Data Center using descriptive statistics and logistic regression modelling. The outcome variable was the binary variable measuring the public acceptance of COVID-19 related tracking devices for people subjected to quarantine, explanatory variable included socio-economic characteristics and subjective perception measures.

**RESULTS:**

The results suggest that subjective factors, such as perceived likelihood of virus contraction (OR=1.78) and severity of the disease (OR=2.21), rather than socio-economic factors, are key determinants of public acceptance of COVID-19 related location tracking technology. Elderly participants in the middle socio-economic class have shown the highest acceptance rate for tracking device implementation

**CONCLUSION:**

Although the use of location tracking devices has been increasing exponentially, there is still limited understanding in terms of public acceptance of such devices. The results of this study contribute to identifying such determinants, this contributing to policy design related to COVID-19 prevention.

**KEYWORDS**

COVID-19, location tracking, digital health, disease prevention, personal information, South Korea

## INTRODUCTION

As of 14 March 2022, 458 million cases of COVID-19 were confirmed including 6.04 million deaths globally [1]. Americas ranked the first for the confirmed cases and is followed by Europe, South-East Asia, Eastern Mediterranean, Western Pacific and Africa [1]. Moreover, as of 14 March 2022, it was reported that around 4.46 billion people (57.2%) have been fully vaccinated worldwide. In East Asia, there have been a cumulative total of 12.8 million cases of COVID-19 with South Korea coming in first, Japan and China in second and third as of 14 March 2022 [1]. There have been many global efforts to contain the spread of highly infectious disease, COVID-19. Governments encouraged people to improve their hygiene standards and took protective measures by closing schools and stores and advising people to stay home [2]. However, due to the emergence of Delta and Omicron variants, the global society is likely to face another crisis.

Information and Communication Technologies (ICT) are products that store, process, transmit, convert, duplicate, or receive electronic information. ICT is especially useful when it comes to tracking individuals who are in contact with coronavirus patients. One study argues that epidemic trackers must be prepared to track primary, secondary, and tertiary contacts of the people who have tested positive by using data analytics and data management technology [3]. This means that ICT makes it easier for medical personnel to track down people and prevent the further spread of the disease. Another study revealed that mandatory mobile tracking and monitoring of individuals who are or potentially COVID-19 positive can reduce further cases a day by 3.3 on average, holding other things constant [4].

In South Korea, as of 14 March 2022, a cumulative total of 6,866,222 cases were reported with 9,875 deaths [5]. On the same day, 309,790 domestic cases and 62 new foreign cases were confirmed. Among the 309,790 confirmed cases, Gyeonggi province accounted for 28.4% followed by Seoul 22.4%, Busan 7.7%, and Incheon 6.7% [5]. As of 14 March 2022, the government eased social distancing regulations due to low fatality rate and to revive the economy. However, before this happened, the South Korean government's reaction to contain the spread of the pandemic received a lot of praise. According to a recent study, when it comes to publicizing data, South Korea took a maximalist approach, which was judged as a necessary and efficient prevention measures, but also resulted in some personal data protection issues [3]. Those who were in contact with coronavirus patients and asymptomatic were advised to be in quarantine and report their status on applications. As of 14 March 2022, an overwhelming number of cases made it difficult for the country to contain further spread of COVID-19 as Omicron swept the country.

A recent study [6] stated that there was an extensive use of South Korea's advanced information technology system for tracing people who are suspected to be infected or who had been in contact with an infected person. South Koreans were also required to use cameras and apps on their phones to scan a QR code to enter places and their phone numbers were sent to the government to notify their presence in crowded places [7]. A recent study on South Korea's responses to COVID-19 found that mobile applications for tracking self-quarantine and self-check-in apps were pivotal in enabling the systematic management of government responses [8]. The apps made it easier for GPS trackers to identify infected people and know their symptoms in advance by lessening the procedure of having to do patients' on-site health questionnaires [8]. These measures also reduced the burden on contract tracers and enabled alert of exposure via SMS.

There have generally been mixed responses to the use of location tracking technologies. One recent study found that people showed favorable response to adopt novel location-tracking systems (e.g. SimSense) as long as the system is transparent about its data collection and ownership and reflects users' tracking preferences [9]. However, another study conducted amongst the group of 2,000 adult Americans revealed that there was more support for contact tracing, which did not disclose users' location [10]. The authors point out that people might have distrust towards some official policies, tech companies, or third parties that can facilitate or gain access to personal data. In South Korea, some people suffered from disclosure of their private information, with some coronavirus patients being mentally hurt from the public disdain caused by the unwanted privacy invasion [6].

While there is already a growing body of literature on the use of ICT in disease prevention context, there is still limited evidence regarding the public acceptance of COVID-19 related location tracking technology with the empirical data from South Korea. To fill this gap, the present study provides an analysis of survey data of public acceptance of COVID-19 related location tracking technology focusing

specifically on the individual subject to quarantine. The findings of this paper are expected to contribute to the ongoing debate and policy design regarding potential use of location tracking technology.

## DATA AND METHODS

### THE DATASET

This study used data from the Public Perception Survey on COVID-19 Self-quarantine survey which was designed and implemented by Korean Social Science Data Center (KSDC). It applied proportional sampling method and random selection based on regions, gender, and age. The survey was undertaken on April 8th and 9th, 2020. After proportional allocation by region, gender and age, random sampling was used. The confidence interval was set at 95% and the maximum allowable sampling error was ±3.1%. To conduct the interviews, both CAWI (Computer Assisted Web Interview) and CAMI (Computer Assisted Mobile Interview) systems were used [11].

In total, 1,000 respondents were interviewed from Seoul, Incheon, Gyeonggi, Daejeon, Chungcheong, Sejong, Gwangju, Jeolla, Daegu, North Gyeongsang, Busan, Ulsan, South Gyeongsang, Gangwon, and Jeju. Among the respondents, 493 were males and 507 were females.

Incheon and Gyeonggi accounted for 30.7% of the sampled respondents by regions with Seoul coming in second, Busan, Ulsan, South Gyeongsang; in third, Daejeon, Chungcheong, Sejong; in fourth, Daegu, North Gyeongsang; in fifth, Gwangju; Jeolla in sixth; and Gangwon / Jeju in last place.

The dependent variable in this study was the willingness to accept being tracked by a location device during the quarantine period. The device was defined as a wrist-worn electronic device that tracks real-time location of people subject to quarantine with smart app usage. The independent socio-economic variables included age ('above 60' and '60 or less'), education (primary, secondary, and tertiary), gender (male and female), geographical location (SMA and other), socio-economic class ('upper or upper middle', 'middle', and 'low or lower middle'), working status (working and not working). Subjective perception factors included the measure of how serious people think of the domestic spread of COVID-19 ('serious or very serious' and 'not serious or neutral'), and the perceived likelihood of contraction ('very likely or likely' and 'very unlikely or unlikely or even chance').

The relevant parts of the survey questionnaire (variables used in the analysis) are provided as a supplementary file (Supplementary file 1).

**TABLE 1 DISTRIBUTION OF SAMPLED RESPONDENTS BY THE GEOGRAPHICAL REGION**

| Geographical region | Frequency | Percent |
|---|---|---|
| Seoul | 192 | 19.2 |
| Incheon / Gyeonggi | 307 | 30.7 |
| Daejeon / Chungcheong / Sejong | 107 | 10.7 |
| Gwangju / Jeolla | 99 | 9.9 |
| Daegu / North Gyeongsang | 101 | 10.1 |
| Busan / Ulsan / South Gyeongsang | 151 | 15.1 |
| Gangwon / Jeju | 43 | 4.3 |
| Total | 1,000 | 100 |

Source: KSDC, 2021

## STATISTICAL ANALYSIS

The data was examined using descriptive statistics (frequencies, chi-square test) and statistical modelling. Given the distribution of the data and binary nature of the outcome

The logistic regression models are used when dependent variables are discrete, i.e., when dependent variables have more than one mutually exclusive category, and in the case of binary logistic regression the target variable should be binary [12, 13]. These models presuppose that each option can be described by a utility function that

depends on the attributes of the option and on the characteristics of the individual. The binary logistic regression model is as follows.

$$\text{logit}(\pi) = \beta 0 + \beta 1 X 1 + \beta 2 X 2 + \cdots + \beta p X p + e$$

where $\beta 0, \beta 1, \ldots, \beta p$ are logit regression parameters; $X1, X2, \ldots, Xp$ are independent variables (explanatory variables), and $\pi$ is the probability of success.

Binary logit model generally measures the proportion to predict the probability of belonging to two groups (e.g., the acceptance intention group as 1 and the acceptance intention unclear or rejection group as 0). Here, π is the probability that the respondent selects '1 (acceptance group)' and 1-π is the probability that the respondent selects '0 (acceptance unclear or rejection group). In this state, the logit model taking natural logarithm on both sides can be calculated and displayed as a general regression relationship as follows.

$$log \left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1 X$$

The goal of logistic regression is to predict the "true" proportion of success, π, at any value of the predictor. Logistic regression results are parsed using odds ratio (OR) and its 95% confidence interval.

Finally, the specific reasons for supporting or opposing the introduction of a wrist-worn electronic device that tracks real-time location during quarantine was analysed graphically using a bar chart.

## RESULTS

Overall, most survey participants supported the idea of having a tracking device attached, although this support was slightly lower amongst the individuals over 60 (83.91% vs. 85.61% for individuals aged 60 or lower). However, based on the results of chi-square test, neither age, education, gender or working status were significantly associated with the perception towards COVID-19 related location tracking. On the other hand, socio-economic status, perceived likelihood of virus contraction and its perceived severity were all significant at different significance levels. More specifically, compared to other socio-economic classes, survey respondents from the middle socio-economic class showed the highest support (87.62%) for potential implementation of tracking devices. In addition, the vast majority of the respondents who considered the contraction of the virus as likely or very likely and its severity as serious or very serious would agree to a policy implemented COVID-19 related tracking devices (91.19% and 87.17% respectively).

**TABLE 2 PERCENTAGE OF RESPONDENTS AGREED TO ACCEPT A TRACKING DEVICE ATTACHED BY THEIR DEMOGRAPHIC AND SOCIOECONOMIC CHARACTERISTICS**

|  | Agree n(%) | Disagree n(%) | p-value |
|---|---|---|---|
| **Age** | | | 0.513 |
| Above 60 | 219 (83.91) | 42 (16.09) | |
| 60 or less | 571 (85.61) | 96 (14.39) | |
| **Education** | | | 0.845 |
| Primary | 14 (82.35) | 3 (17.65) | |
| Secondary | 362 (84.58) | 66 (15.42) | |
| Tertiary | 414 (85.71) | 69 (14.29) | |
| **Gender** | | | 0.319 |
| Male | 393 (83.97) | 75 (16.03) | |
| Female | 397 (86.30) | 63 (13.70) | |
| **Geographical location** | | | 0.206 |
| SMA | 200 (82.64) | 42 (17.36) | |
| Other | 590 (86.01) | 96 (13.99) | |

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| Socio-economic class | | | |
|---|---|---|---|
| Upper or middle-upper | 75 (78.13) | 21 (21.88) | 0.070 |
| Middle | 283 (87.62) | 40 (12.38) | |
| Middle-low or low | 432 (84.87) | 77 (15.13) | |
| **Working status** | | | |
| Working | 483 (85.04) | 85 (14.96) | 0.919 |
| Not working | 307 (85.28) | 53 (14.72) | |
| **How serious** | | | |
| Serious or very serious | 686 (87.17) | 101 (12.83) | 0.000 |
| Not serious or neutral | 104 (73.76) | 37 (26.24) | |
| **Likelihood of contraction** | | | |
| Very likely/likely | 176 (91.19) | 17 (8.81) | 0.008 |
| Very unlikely, unlikely or even chance | 614 (83.54) | 121 (16.46) | |

Note: Chi-square test was performed for all categorical variables.

Regarding the determinants of the public acceptance of tracking devices (Table 3), it can be observed that socio-economic characteristics are generally less important compared to subjective factors, such as perception of the seriousness of virus contraction and the likelihood of contraction. Thus, for respondents who believed that contracting the various was a serious or very serious matter where, the odds of accepting a tracking device were 2.21 times as large as the odds for accepting such a device by respondents who did not share this view. Similar, compared to other respondents, the odds of accepting an electronic tracking device were significantly higher (OR=1.78) for respondents who believed that contracting the virus was very likely or likely. When considering only the elderly respondents (65+), the socio-economic class was also a significant predictor of public acceptance of COVID-19 tracking devices. More specifically, compared to other elderly respondents, elderly respondents from lower-middle

and low socio-economic classes were significantly more likely to accept such a device (OR = 3.02).

Survey data also provided information about the detailed reasons for agreeing or disagreeing to have an electronic tracking device attached. The illustrative summary of responses is presented in Figure 1. it can be noticed that the respondents who do support implementation of location tracking devices see these as an important virus spread prevention method stating that "Prevention of infection is more important" (46.82.% of those supporting the tracking devices measure). On the other hand, respondents who oppose such measure cite human rights violation as a key reason against electronic tracking devices (42.03% of all the respondents opposing this measure quote this reason). The top four reasons for instance are presented in Figure 1.

**TABLE 3 FACTORS ASSOCIATED WITH ACCEPTANCE OF AGREEING OR DISAGREEING TO ATTACH ELECTRONIC TRACKING DEVICES USING LOGISTIC REGRESSION MODELS**

| DV: Public acceptance of COVID-19 related location tracking technology | Model 1 (all respondents) | Model 2 (elderly respondents) |
|---|---|---|
| | OR (95% CI) | OR (95% CI) |
| **Age** | | |
| Above 60 | 0.882 (0.578-1.345) | |
| 60 or less | 0.00 | |
| **Education** | | |
| Primary | 0.00 | 0.00 |
| Secondary | 0.943 (0.259-3.432) | 1.550 (0.365-6.593) |

| | | |
|---|---|---|
| Tertiary | 1.029 (0.279-3.797) | 3.655 (0.741-18.022) |
| **Gender** | | |
| Male | 0.00 | 0.00 |
| Female | 1.165 (0.789-1.719) | 1.751 (0.796-3.852) |
| **Region** | | |
| SMA | 0.753 (0.504-1.125) | 1.355 (0.595-3.090) |
| Other | 0.00 | 0.00 |
| **Socio-economic class** | | |
| Top | 0.00 | 0.00 |
| Middle | 1.740 (0.969-3.125) | 2.210 (0.663-7.371) |
| Lower-middle and low | 1.43 (0.821-2.49) | 3.018 (0.930-9.800)* |
| **Working status** | | |
| Working | 0.981 (0.651-1.478) | 0.959 (0.432-2.126) |
| Not working | 0.00 | 0.00 |
| **How serious** | | |
| Serious or very serious | 2.206 (1.425-3.414)*** | 3.632 (1.582-8.334)*** |
| Not serious or neutral | 0.00 | 0.00 |
| **Likelihood of contraction** | | |
| Very likely/likely | 1.776 (1.028-3.067)** | 1.776 (0.698-14.251) |
| Very unlikely, unlikely or even chance | 0.00 | 0.00 |
| **Constant** | 2.042 (0.483-8.629) | 0.034 (0.234-1.728) |

**FIGURE 1 REASONS FOR AGREEMENT OR DISAGREEING TO ATTACH ELECTRONIC TRACKING DEVICES (TOP 4)**
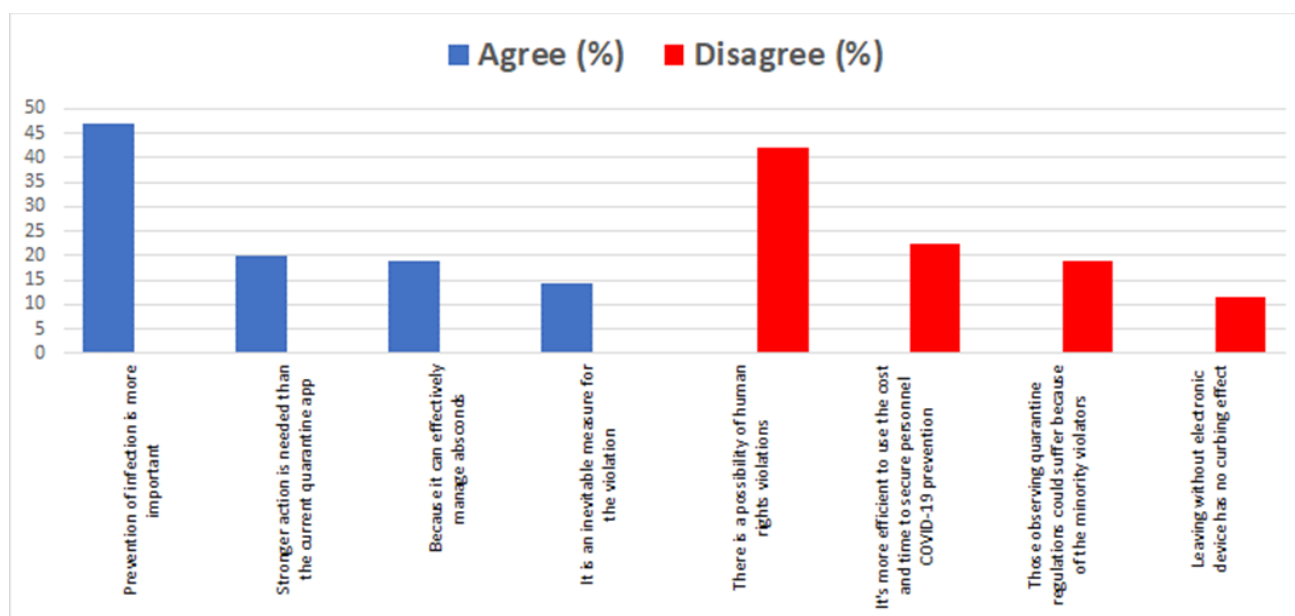


## DISCUSSION AND CONCLUSION

This study aimed at investigating the factors determining the public acceptance of COVID-19 related location tracking devices in South Korea, specifically focusing on the quarantine period. The results revealed that age, education, gender, and working status showed no significant association with the perception towards such

devices. On the other hand, socio-economic status, perceived likelihood of virus contraction and perceived severity were significantly associated with the respondents' perception of location tracking devices. Elderly participants in the middle socio-economic class has shown the highest support for tracking device implementation while in quarantine. Those who thought that virus contraction was likely or very likely and perceived severity of the virus, were likely to agree to a policy implementing COVID-19 related tracking devices. People who supported implementation of electronic tracking devices considered it as important virus spread prevention method while others opposing the measure stated that using the device was a human rights violation.

One recent study from South Korea examined to the usage of various COVID-19 related apps (including apps showing where diagnosed patients were found) by dividing the data periods into three phases; before the peak of the first wave, during the peak, and after the peak [14]. The results showed that there was a high likelihood of adoption of such apps by people with higher education before the peak of the first wave [12]. Then, during the peak, people with higher income tended to adopt the apps. After the peak, people with higher education levels were more likely to adopt the apps [12]. On the other hand, low-income respondents were prone to utilize COVID-19 apps more frequently even though they tended to use COVID-19 apps late [14]. Moreover, the findings indicated that younger respondents as well as respondents with lower income and lower education levels were less likely to adopt COVID-19 apps [14]. In our study, we did not find significant age effects, however our study did not use a detailed age classification, which might be considered in future research.

On a slightly different, but related topic of contact tracing apps, a study conducted on a sample size of 1,963 respondents in the U.S. found that gender, household income, education, age, and residence had significant effects on app adoption intentions [15]. Females had significantly lower intentions to adopt the app, high household income showed significant positive effects on intentions to install the app and keep the app installed, higher education had significant positive effects on intentions to keep the app installed particularly when the COVID-19 cases were rising, older people had significantly lower intentions to install the app, and people who are frequent public transit users and people who live in urbanized area had significantly higher adoption intentions [15].

While contact tracing and location tracking are key elements of diseases prevention strategies [16], it should be noted that they often have important privacy and ethical concerns. A number of existing studies [e.g., 16, 17, 18] already raised important concerns around anonymity of the data. Higher research also highlighted that privacy concerns vary amongst countries, compared to South Koreans for example respondents in the USA were found to be less likely to consider control measures acceptable [18]. This was explained by a stronger collectivist culture and perceived social benefits of COVID-19 prevention measures involving location tracking [18].

Considered as an unprecedented crisis in human history, the COVID-19 pandemic has without doubt compelled many governments to implement radical measures including location tracking technologies [19, 20] to help control the spread of the virus. These measures have however raised significant personal security risks and breaches [21], human rights and individual freedom violation, fears of surveillance [22, 23, 24, 25] as well as dwindling public trust in government [26]. Whiles individual data-breaches might be inevitable and do not disappear especially during crisis such as COVID-19, data protection, data governance, security, and human rights issues must always be upheld as important values. Addressing these concerns calls for key policy measures which include – ensuring high personal data security; promoting data privacy and anonymity; upholding transparency, building public trust and voluntary acceptance of such technologies as attested by recent studies [20, 27]. It should be noted that stringent and involuntary enforcement of such intrusive location tracking technologies has a tendency of increasing individual stress, anxiety and possible worsening mental health and wellbeing.

This study is not without limitations. First, the study was conducted during the first wave of the pandemic and since then, especially given the recent peaks due to omicron cases, public perception might have changed. Secondly, the study did not ask detailed questions about the potential tracking devices as well as questions related to use and storage of potentially collected data. It would be useful if future research considered designing a more comprehensive survey which among other things would explore the influence of religion, cultural belief systems, and

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political orientation of people on the acceptance of COVID-19 related location tracking technologies.

This study is helpful in that it identifies the determinants of public acceptance of location tracking devices in the context of COVID-19 prevention. Although the use of tracking devices has been increasing significantly, the current legal system and public awareness are not up to speed to deal with the potential consequences of such extensive use. The law stipulates that information, such as travel routes should be disclosed only when necessary to prevent infectious diseases, however once reported to the media or through text messages, the personal information exposure becomes inevitable [28]. This might inflict damage on many individuals since they unwillingly have to reveal their private information, including details of daily activities [28]. Therefore, this paper depicts the characteristics of COVID-19 infections in South Korea and the empirical results act as a guide that enables policymakers to take proper action to contain the pandemic.

## CONFLICT OF INTEREST:
We declare no conflict of interest.

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## SURVEY QUESTIONNAIRE (VARIABLES USED IN THE ANALYSIS)

**Q1. Choose the region you live in.**

Seoul=1, Busan=2, Incheon=3, Gwangju=4, Daejeon=5, Ulsan=6, Gyeonggi=7, Gangwon=8, Chungbuk=10, Chungnam=11, Jeonbuk=12, Jeonnam=13, Gyeongbuk=14, Gyeongnam=15, Jeju=16, Sejong=17

**Q2. What is your sex?**

Male=1, Female=2

**Q3. How old are you?**

19-29=1, 30-39=2, 40-49=3, 50-59=4, Over 60=5

**Q4. What educational background do you possess? Please respond based on your graduation.**

Middle school graduate or below=1, High school graduate=2, Attending university/University graduate or higher=3

**Q5. What do you think of attaching wrist-worn electronic device to those who are subject to quarantine by using smart app to check the real-time location of them?**

agree=1, disagree=2, I don't know=3

**Q6. What is your main reason for this measure?**

Prevention of infection is more important=1,

Stronger action is needed than the current quarantine app=2,

Because it can effectively manage absconds=3,

It is an inevitable measure for the violation=4,

No problem will arise as it is being used in some foreign countries=5,

Other=6

**Q7. What is the main reason against this measure?**

There is a possibility of human rights violations=1,

The rate of absconds is low during quarantine and the existing quarantine system might be enough=2,

Leaving without electronic device has no curbing effect=3,

Majority who observe the quarantine regulations could suffer because of the minority violators=4,

It's more efficient to use the cost and time to secure personnel for prevention of COVID-19 than to make electronic devices=5,

Other=6

**Q8. How serious do you think the domestic spread of COVID-19 is?**

Not serious at all=1, Not that serious=2, Neutral=3, Serious=4, Very serious=5

**Q9. What do you think are your chances of contracting COVID-19?**

Very unlikely=1, Unlikely=2, Even chance=3, Likely=4, Very likely=5

**Q10. What is your occupation?**

Agriculture/forestry/fishery=1, Self-employment=2, Sales/business/service work=3, Production/profession=5, housewife=6, student=7, unemployed/retired/other=8

**Q11. Which of the following do you think is your socio-economic class?**

Top=1, Mid-high=2, Middle=3, Middle-low=4, Low=5, I don't know=6

# HEALTH SERVICES AVOIDANCE AND SELF-TREATMENT DURING THE COVID-19 PANDEMIC: EVIDENCE FROM RURAL INDIA

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## ABSTRACT

**OBJECTIVES:**

This paper is one of the first studies that identifies factors that inhibit access to healthcare services and healthcare-seeking behaviour (HCSB) in rural India during the COVID-19 pandemic.

**METHODS:**

The data source was the household sample survey of the World Bank on 'COVID-19-Related Shocks in Rural India 2020, Rounds 1-3'. Binomial and multinomial regression analysis was carried out to estimate the determinants of health care avoidance and HCSB.

**RESULTS:**

Families belonging to low consumption quartiles not only delayed obtaining health care but also underutilized formal health resources at public and private facilities. The majority of non-agricultural households, as well as those that reduced their consumption during the outbreak, were forced to self-medicate through pharmacies. Family planning, immunization, child growth monitoring, and routine medical check-ups were among the services that were not availed during the pandemic.

**CONCLUSION:**

The findings of this study emphasize the need of removing financial obstacles to care during the COVID-19, as well as the importance of child-related care continuity (child development monitoring, antenatal care, and immunization) and routine check-ups.

**KEYWORDS**

Healthcare, avoidance, healthcare-seeking behaviour, COVID-19, India, poor

## INTRODUCTION

The unprecedented health crisis caused by SARS Cov-2, known as COVID-19 overburdened the resource-constrained health infrastructure in India that experienced an acute shortage of intensive care unit beds, oxygen supply, ventilators, and personal protection equipment kits resulting in significant loss of lives. Also, non-COVID-19 care was delayed, resulting in negative health and well-being

outcomes, which could be caused by anxiety or fear of contracting the disease, government-imposed COVID-19 restrictions on people's freedom of travel, the use of teleconsultations, and required COVID-19 protocols that raise hospital bills.[1]

Several studies conducted during the epidemic, including those on SARS [2], Middle East respiratory syndrome [3], and Ebola [4, 5, 6] indicated a decline in timely access to health care services. Few researchers found a decrease in hospital-based care, particularly in paediatrics [1], non-communicable disorders, and immunizations. [7] A study from India observed a higher level of stress due to COVID-19 lockdown measures and the consequent loss of jobs and health. [8] A similar finding was reported in the United Kingdom. [9]

The factors that inhibit the rural population from accessing services during the COVID-19 in India have been relatively unexplored. An understanding of why some households avoid accessing health services and why they choose certain facilities and not others during the COVID-19 pandemic would assist current interventions aiming to improve access to quality health services and reduce mortality during pandemic times. The influence of COVID-19 on rural India's access to health care and healthcare-seeking behaviour (HCSB), as well as rural households' understanding of COVID-19 prevention procedures and symptoms, has not been studied. An understanding of HCSB would aid policymakers and healthcare planners in efficiently allocating and managing resources to improve health outcomes. The findings would provide insight into the unique barriers that rural Indians may face in accessing health facilities, allowing a more comprehensive and context-relevant strategy to service delivery to be developed.

## LITERATURE REVIEW

Access to health services is determined by financial or non-financial restraints that limit one's ability to acquire health care when they are required.[10] The activities and decisions include deciding whether to seek health care in private (clinics, nursing homes, hospitals, mobile clinics) or public facilities (hospitals, mobile clinics, primary health centers), whether contemporary or traditional (Ayush) facilities, self-medication (pharmacy) or using home remedies. The contextual and individual factors categorized into predisposing, enabling, and need for care

explain HCSB.[11] Of these, individual determinants include age, gender, and religion, as well as education, caste, social relationships, and health beliefs.[11] The financial factors such as income and wealth, as well as travel time to health facilities, are enabling factors that directly influence access and utilization of health care, as well as the cost of proper diet, and basic cleanliness.[11,12,13]

The three A's that determine access to health care and type of care are availability, acceptability, and affordability.[14] The affordability of health care was determined by the people's income class, while the location of their domicile determined the availability of health care. The ill person's gender was used as a proxy for assessing the acceptability of care. The financial, structural, and cognitive barriers are intertwined and contribute to disparities in health outcomes.[15] These models emphasize poverty as a significant obstacle to healthcare access.[16,17,18] The 'capabilities approach' of Amartya Sen demonstrates that the access to health care services by poor households is well explained with the help of endowments and entitlements.[19] Deprived access to tangible and intangible assets (endowments) and lack of ability to translate these assets into 'entitlements' by the vulnerable rural households determine their capability to access health services and HCSB. These restrictions in accessing health services in rural areas have an impact on HCSB, whether it is a government facility, a private hospital, or a pharmacy.

The efficiency of the healthcare system would be negatively affected when people resort to self-treatment including self-prescription when drugs are freely available in the market.[20] The choice and usage of public or private health care providers, as well as formal and informal health care providers including self-medication, has been associated with lack of access to professional healthcare, lack of government-sponsored health insurance coverage, and socioeconomic status related to lower education, age, living in rural areas, lower-income, cost of treatment, gender roles, and fewer assets.[21,22,23,24,25] Several studies have indicated that socioeconomic factors influence access to health services.[26,27,18] The low status of women within the household, low income, and literacy rates prevent them from voicing their health needs, and having less control over decisions involving allocation of resources for health prevents timely access to health care.[28,29] Income, age, chronic conditions, and gender were found to significantly influence HCSB. [25,30] The self-

help group (SHG) members in India were found to visit private providers for both outpatient and inpatient services [31] and maternal health services due to the social capital generated by women's participation in these community groups that would have a positive impact on health outcomes.[32] Another study from India observed women prefer informal care due to socio-cultural barriers whereas men considered cost and quality of treatment, accessibility, and health outcomes in choosing formal providers.[33]

## METHODS

This paper is based on a household sample survey data of the World Bank on "COVID-19-Related Shocks in Rural India 2020, Rounds 1-3". The survey was conducted in six Indian states namely Uttar Pradesh, Madhya Pradesh, Bihar, Jharkhand, Rajasthan, and Andhra Pradesh in three rounds during the period May to September 2020. The survey framework was developed based on the information of the four completed projects of IDinsight and one site from the Ministry of Rural Development, Government of India. The detailed sampling design and final sample were selected for the survey are available on the World Bank website.[34]

The data was collected with the help of a computer-assisted telephone interview using the structured questionnaire. The study considered the sample households that are provided complete information on access to health services and HCSB of rural households across six Indian states. The study used consumption quartile instead of income due to the lack of income data of sample households, which has been used in earlier studies.[35] Logistic regression (binary and multinomial) methods are used to analyse the avoidance of health services and HCSB of rural households.

## RESULTS

An analysis on the avoidance of seeking health care services during the COVID-19 pandemic considers 723 households that did not seek health services and 3955 households that accessed health services despite COVID-19. As depicted in Table 1, 45.1% of large households with 6-9 members, 59.5% of agricultural households and 42.3% of households who avoided seeking care had curtailed consumption (limited portion size, ran out of food, hungry but did not eat, or went without eating for a whole day) due to shortage of money.

**TABLE 1: SUMMARY STATISTICS: HEALTH SERVICES AVOIDANCE DUE TO COVID-19**

| | No avoidance (%) | Avoidance (%) |
|---|---|---|
| Self-help group member | (N=3510) | (N=677) |
| Yes | 48.1 | 48.3 |
| No | 59.9 | 51.7 |
| Gender | (N=1983) | (N=475) |
| Male | 84.2 | 81.5 |
| Female | 15.3 | 18.5 |
| Ration card | (N=1983) | (N=1990) |
| Yes | 81.9 | 80.3 |
| No | 18.9 | 19.6 |
| Household size* | (N=3947) | (N=725) |
| 1-3 members | 9.4 | 7 |
| 4-5 members | 38.4 | 36.1 |
| 6-9 members | 39.9 | 45.1 |
| 10 members or more | 12.3 | 11.8 |
| Agriculture** | (N=3948) | (N=426) |
| Yes | 57.1 | 59.5 |
| No | 42.9 | 40.5 |
| Caste** | (N=3789) | (N=699) |
| General | 14.4 | 13.4 |
| Scheduled caste | 27.7 | 29.3 |
| Scheduled tribe | 16.3 | 14.5 |
| Other backward castes | 40.3 | 40.2 |

| | | |
|---|---|---|
| Others | 1.3 | 2.6 |
| Religion* | (N=3877) | (N=715) |
| Buddhism | 1.1 | 0.6 |
| Christianity | 5.1 | 3.1 |
| Hinduism | 85.7 | 89.9 |
| Islam | 7.5 | 5.3 |
| Sikhism/Jainism | 0.6 | 1.1 |
| Education of head of the household Illiterate | (N=222) | (N=35) |
| Below primary | 41.9 | 40 |
| Primary | 5.4 | 8.6 |
| Higher primary | 14 | 8.6 |
| Secondary | 17.6 | 17.1 |
| Higher secondary | 12.2 | 11.4 |
| Graduate or higher | 5 | 8.6 |
| | 3.2 | 5.7 |
| Occupation of the head of household | (N=1651) | (N=280) |
| Did not work for income | 2.5 | 4.3 |
| Self-employed in non-cultivation | 56.1 | 55.4 |
| Salaried job in a private company | 4.4 | 3.9 |
| Salaried job in government sector | 2.1 | 2.5 |
| Daily wage labour in agriculture | 11.6 | 13.2 |
| Daily wage labour in non-agriculture | 23.3 | 20.7 |
| Consumption quartile | (N=3562) | (N=672) |
| Q1 (INR<=3000) | 27.4 | 24.7 |
| Q2 (INR 3001-5000) | 28.2 | 29.9 |
| Q3 (INR 5001-8000) | 20.2 | 20.1 |
| Q4 (INR >8000) | 24 | 25.3 |
| Area of residence | (N=171) | (N=31) |
| Rural | 69.5 | 80.6 |
| Urban | 30.5 | 19.4 |
| Reduction in consumption during the last seven days due to shortage of money* | (N=1591) | (N=246) |
| Yes | 24.1 | 42.3 |
| No | 75.9 | 57.7 |
| Reduction in consumption compared to pre-COVID 19 times | (N=3347) | (N=642) |
| Yes | 47.1 | 44.4 |
| No | 52.9 | 55.6 |

1US Dollar=INR 73.64, as of 21 September 2021

The socio-economic characteristics of the households who sought health services during the COVID-19 pandemic are shown in Table 2. Almost 19% of the household where the head is female visited private facilities (81.2% for men) and 20.5% used pharmacy (79.5% for men) whereas 88.7% of men as the decision-maker chose government facilities compared to 11.3% of female households. Nearly 61.7% of non-agricultural households visited pharmacies compared to agricultural households who chose private facilities (60.7%). Inter-group analysis reveals that 62.3% of households who reduced consumption compared to pre-COVID 19 visited pharmacy compared to those who did not reduce consumption (37.7%).

The majority of the respondents were aware of cough (91.1%) and fever (80.9%) as symptoms of COVID-19, and

44.4% of them knew the difficulty in breathing whereas only a few of them knew about the loss of appetite (2.7%), loss of smell and taste (35) and Diarrhoea (0.8%) (Table 3).

Regarding the awareness of the prevention of COVID-19, most of the respondents knew about wearing a mask (63.6%), washing hands (60.4%), using hand sanitizers (45.5%), and social distancing (45.3%) (Table 4)

**TABLE 2: SCIO-ECONOMIC CHARACTERISTICS: HEALTH SEEKING BEHAVIOUR**

| | Government facilities (%) | Private facilities (%) | Pharmacy (%) |
|---|---|---|---|
| Self-help group member | (N=582) | (N=962) | (N=49) |
| Yes | 47.1 | 51.1 | 53.1 |
| No | 52.9 | 48.9 | 46.9 |
| Gender* | (N=283) | (N=644) | (N=39) |
| Male | 88.7 | 81.2 | 79.5 |
| Female | 11.3 | 18.8 | 20.5 |
| Ration card | (N=283) | (N=644) | (N=39) |
| Yes | 83.4 | 80.4 | 82.1 |
| No | 16.6 | 19.6 | 17.9 |
| Household size | (N=642) | (N=1063) | (N=60) |
| 1-3 members | 7.5 | 7.8 | 13.3 |
| 4-5 members | 38.3 | 34.5 | 40 |
| 6-9 members | 41.6 | 45.2 | 36.7 |
| 10 members or more | 12.6 | 12.4 | 10 |
| Agriculture** | (N=641) | (N=1065) | (N=60) |
| Yes | 57.1 | 60.7 | 38.3 |
| No | 42.9 | 39.3 | 61.7 |
| Caste** | (N=620) | (N=1012) | (N=59) |
| General | 15.8 | 12.1 | 15.3 |
| Scheduled caste | 28.1 | 29.2 | 33.9 |
| Scheduled tribe | 14.4 | 12.7 | 10.2 |
| Other backward castes | 41 | 43.4 | 39 |
| Others | 0.8 | 2.6 | 1.7 |
| Religion | (N=631) | (N=1051) | (N=59) |
| Buddhism | 1.1 | 1.7 | 1.7 |
| Christianity | 4 | 3.1 | 0 |
| Hinduism | 88.3 | 86.6 | 86.4 |
| Islam | 6.7 | 8.6 | 11.9 |
| Current occupation of respondent | (N=275) | (N=420) | (N=37) |
| Unemployed | 2.5 | 3.3 | 2.7 |
| Self-employed (non-cultivation) | 46.2 | 51 | 45.9 |
| Salaried in private sector | 4.7 | 5.2 | 8.2 |
| Salaried in government sector | 3.3 | 1.7 | 0 |
| Labour in agriculture | 15.3 | 13.6 | 13.5 |
| Labour in non-agriculture | 28 | 25.2 | 29.7 |
| Consumption quartile | (N=605) | (N=977) | (N=55) |
| Q1 (INR<=3000) | 25.8 | 23.5 | 18.2 |
| Q2 (INR 3001-5000) | 26.4 | 29.1 | 36.4 |
| Q3 (INR 5001-8000) | 22.5 | 19.9 | 21.8 |
| Q4 (INR >8000) | 25.3 | 27.5 | 23.6 |

| Reduction in consumption during the last seven days due to shortage of money | (N=247) | (N=424) | (N=28) |
|---|---|---|---|
| Yes | 27.5 | 33.7 | 28.6 |
| No | 72.5 | 66.3 | 71.4 |
| Reduction in consumption compared to pre-covid times** | (N=582) | (N=919) | (N=53) |
| Yes | 45.2 | 47.6 | 62.3 |
| No | 54.8 | 52.4 | 37.7 |

*p<0.05,**p<0.1

1US Dollar=INR 73.64, as on 21 September 2021

**TABLE 3: AWARENESS ABOUT SYMPTOMS COVID-19**

|  | N | Percent % | Percent of cases % |
|---|---|---|---|
| Fever | 3019 | 27.4 | 80.9 |
| Cough | 3398 | 30.9 | 91.1 |
| Tiredness | 441 | 4.0 | 11.8 |
| Difficulty breathing | 1657 | 15.0 | 44.4 |
| Muscle pain/ body aches | 792 | 7.2 | 21.2 |
| Loss of appetite | 102 | 0.9 | 2.7 |
| Sore throat | 743 | 6.7 | 19.9 |
| Diarrhoea | 31 | 0.3 | 0.8 |
| Nausea | 37 | 0.3 | 1.0 |
| Nasal and throat congestion | 681 | 6.2 | 18.2 |
| Loss of smell and taste | 112 | 1.0 | 3.0 |

**TABLE 4: AWARENESS ABOUT PREVENTION OF THE COVID-19 PANDEMIC**

|  | N | Percent | Percent of cases |
|---|---|---|---|
| Wash hands frequently | 2824 | 15.7 | 60.4 |
| Use alcohol-based hand sanitizer | 2128 | 11.8 | 45.5 |
| Cover nose/mouth with handkerchief/tissue | 618 | 3.4 | 13.2 |
| Avoid touching face, eyes, nose, or mouth | 295 | 1.6 | 6.3 |
| Be at least one meter away from everyone | 2116 | 11.7 | 45.3 |
| Avoid crowded places | 1174 | 6.5 | 25.1 |
| Stay away from people who sneeze or cough | 154 | 0.9 | 3.3 |
| Avoid physical contact with infected individuals | 226 | 1.3 | 4.8 |
| Avoid touching common surfaces | 122 | 0.7 | 2.6 |
| Keep cleaning common surfaces | 216 | 1.2 | 4.6 |
| Wear a mask | 2970 | 16.5 | 63.6 |
| Don't spit in public | 35 | 0.2 | 0.7 |
| Stay at home | 484 | 2.7 | 10.4 |

The estimated result on the relationship between avoidance of health services during the pandemic and other independent variables is given in Table 5. The Odds Ratio (OR) for the households having a shortage was

significantly higher than 1 (odds ratio 2.08), which implied that these households were more likely to avoid access to health services. The results also indicate that the odds of not accessing health care were higher if the individuals were in consumption quartile Q1 (odds ratio 1.7), Q2 (odds ratio 1.75), and Q3 (odds ratio 1.83) than Q4. As the cost of accessing care is high, better-off individuals have a higher likelihood to visit health facilities. The model was checked for robustness by using the omnibus test of model coefficients, Hosmer and Lemeshow test, -2 log-likelihood ratios. The results of these tests show that the model is significant at the 0.05 level and 82.4% of cases were correctly predicted by the model. Hosmer and Lemeshow's test value of 0.756 indicates good discrimination.

Multinomial logistic regression analysis was applied to estimate the probability of visiting private hospitals, private mobile clinics, and government facilities during the COVID-19 pandemic (Table 6). When self-care by visiting a pharmacy is considered as the reference category, non-agricultural households were 0.39 times less likely to visit government hospitals compared to agricultural households. The households not reducing the proportion of consumption compared to the pre-COVID19 period were 2.08 times more likely to seek care at government hospitals and not self-care. Similarly, non-agricultural households were less likely to seek health services at private facilities and more of self-care, compared to agricultural households (odds ratio 0.38). The chances of households not curtailing consumption compared to pre-COVID-19 pandemics while visiting private facilities were higher (odds ratio 2.5) than self-care when the reference category was the households reducing the proportion of consumption due to the pandemic. 65.8% of cases were correctly classified by the predicted model.

**TABLE 5: BINARY LOGISTIC REGRESSION: AVOIDANCE OF HEALTH SERVICES DURING COVID-19**

| Variables | Exp. (B) | p | 95% C.I. for EXP(B) | |
|---|---|---|---|---|
| | | | Lower | Upper |
| Self-help group member No (Ref: Yes) | 1.21 | 0.32 | 0.83 | 1.76 |
| Gender Female (Ref: Male) | 1.13 | 0.63 | 0.68 | 1.86 |
| Ration card No (Ref: Yes) | 0.69 | 0.16 | 0.42 | 1.16 |
| Size of the Household | | 0.17 | | |
| <3 members | 0.58 | 0.25 | 0.23 | 1.46 |
| 4-5 members | 0.72 | 0.30 | 0.39 | 1.33 |
| 6-9 members | 1.07 | 0.81 | 0.59 | 1.95 |
| (Ref: More than 10 members) | | | | |
| Caste | | 0.71 | | |
| General | 0.65 | 0.52 | 0.18 | 2.38 |
| Scheduled Caste | 0.84 | 0.78 | 0.25 | 2.82 |
| Scheduled Tribe | 0.81 | 0.74 | 0.22 | 2.92 |
| Other backward castes | 0.63 | 0.46 | 0.19 | 2.13 |
| (Ref: Others) | | | | |
| Consumption (in quartiles) | | 0.19 | | |
| Q1 | 1.70 | 0.06 | 0.96 | 3.00 |
| Q2 | 1.75 | 0.05 | 0.99 | 3.11 |
| Q3 | 1.83 | 0.06 | 0.98 | 3.44 |
| (Ref: Q4) | | | | |
| Religion | | 0.48 | | |
| Minority | 0.81 | 0.82 | 0.14 | 4.68 |

| | | | | |
|---|---|---|---|---|
| Hindu (Ref: Islam) | 1.51 | 0.34 | 0.64 | 3.53 |
| Reduction in consumption during the last seven days due to shortage of money Yes (Ref: No) | 2.08 | 0.00 | 1.37 | 2.94 |
| Constant | 0.70 | 0.76 | | |

Minority includes Buddhism, Sikhism, Jainism, and Christianity

Number of observations=818; chi2 =28.26; Prob> chi2 = 0.029;  -2 Log pseudolikelihood (df 50) = 733.01; Hosmer and Lemeshow Test p=0.756

Note: The case of "Did not avoid health services" is included as the base (omitted) category

**TABLE 6: HEALTH SEEKING BEHAVIOUR: PRIVATE HOSPITALS, PRIVATE MOBILE CLINICS,  AND GOVERNMENT FACILITIES**

| | | Exp(B) | p | 95% Confidence Interval for Exp(B) | |
|---|---|---|---|---|---|
| | | | | Lower Bound | Upper Bound |
| Government facilities | Intercept | | 0.00 | | |
| | Self-help group member No (Ref: Yes) | 0.67 | 0.31 | 0.32 | 1.49 |
| | Gender Female (Ref: Male) | 0.53 | 0.22 | 0.19 | 1.46 |
| | Consumption (in quartiles) Q1 Q2 Q3 (Ref: Q4) | 1.59 0.59 0.75 | 0.48 0.33 0.63 | 0.44 0.21 0.24 | 5.74 1.68 2.38 |
| | Caste Socially disadvantaged (Ref: General) | 0.82 | 0.74 | 0.26 | 2.56 |
| | Religion Hindu (Ref: Minority) | 0.62 | 0.44 | 0.18 | 2.07 |
| | Size of the household Small household (Ref: Large household >5 members) | 1.04 | 0.92 | 0.48 | 2.25 |
| | Agricultural household No (Ref: Yes) | 0.39 | 0.02 | 0.18 | 0.87 |
| | Reduction in consumption compared to pre-COVID-19 times No (Ref: Yes) | 2.08 | 0.08 | 0.9 | 4.78 |
| Private facilities | Intercept | | 0.00 | | |
| | Self-help group member No (Ref: Yes) | 0.68 | 0.31 | 0.33 | 1.43 |
| | Gender Female | 1.16 | 0.75 | 0.45 | 2.96 |

| | | | | |
|---|---|---|---|---|
| (Ref: Male) | | | | |
| Consumption (in quartiles) Q1 Q2 Q3 (Ref: Q4) | 1.02 0.51 0.72 | 0.97 0.18 0.57 | 0.29 0.19 0.24 | 3.57 1.37 2.18 |
| Caste Socially disadvantaged (Ref: General) | 1.16 | 0.79 | 0.38 | 3.57 |
| Religion Hindu (Ref: Minority) | 0.79 | 0.68 | 0.25 | 2.46 |
| Size of the household Small household (ref: Large household >5 members) | 0.85 | 0.68 | 0.40 | 1.8 |
| Agricultural household No (Ref: Yes) | 0.38 | 0.01 | 0.18 | 0.82 |
| Reduction in consumption compared to pre-COVID 19 period No (Ref: Yes) | 2.50 | 0.02 | 1.11 | 5.59 |

Number of observations (subpopulation)=216; chi2 =36.87; Prob> chi2 = 0.012; -2 Log pseudolikelihood (df 50) = 561.63; Pseudo R2

Note: The case of self-care (pharmacy) is included as the base (omitted) category.

Government facilities include hospitals, primary health centers, dispensaries, mobile clinics, Ayush and Anganwadi.

Private facilities include hospitals, clinics, mobile clinics, and Ayush.

## DISCUSSION

This study, the first of its kind in India, looked at the pattern of HSCBs and the factors that impact avoidance of healthcare services in rural areas during the COVID-19 pandemic. Due to financial and non-financial barriers, people would not seek care during illness. During the COVID-19 pandemic in India, respondents' characteristics such as belonging to the lower consumption quartile and a reduction in spending due to shortage of money influenced avoidance of health care. The majority of non-agricultural households, as well as those that cut back on their consumption during the epidemic, had to turn to pharmacies for self-medication. These findings imply that the burden of the COVID-19 pandemic on impoverished households will harm their health outcomes, which will be exacerbated if they become infected, even after the epidemic has passed.

HCSB was remarkably better for households that have not curtailed consumption during the pandemic compared to those who were forced to reduce consumption and also for agricultural households. Furthermore, self-care or self-medication was substantially associated with a drop in consumption compared to pre-COVID 19 periods and belonging to non-agricultural households. These households primarily used formal health care rather than going to the pharmacy. Earlier research supports the current study's conclusions that the majority of India's high-income households seek formal health care. [16,17] Few scholars have found a link between socioeconomic position and adequate HCSB, with the affordability of health services influencing the use of formal health care. [36,37,30] During the COVID-19 pandemic, poor 'capabilities' of non-agricultural rural households due to limited employment opportunities, poor access to health services, and government relief measures may also contribute to inappropriate HCSB. The pandemic has interrupted appropriate HCSB due to COVID-19 limits and protocols, with preventive and elective visits deferred.[38] In contrast to our findings, another study [39] discovered that COVID-19 has a favourable impact on HCSB in terms of regular check-ups and increased health awareness.

However, in India, during the pandemic, several services were not availed, including family planning, immunization, child development monitoring, prenatal care, and regular medical check-ups.

The majority of respondents were aware of cough and fever as COVID-19 symptoms, but few were aware of the loss of appetite, odour or taste, diarrhoea, and nausea. At least one symptom was recognized by 78.5% of respondents. Only a handful understood about avoiding touching common surfaces, not spitting in public, avoiding physical contact with infected persons, staying away from people who cough or sneeze, cleaning common surfaces, and staying at home. At least one preventative measure was mentioned by 90.8% of participants. The extensive public health education messages on COVID-19 that have been delivered through multiple media (television, radio, print, and social media) have resulted in better knowledge of COVID-19 symptoms and prevention strategies among the rural population. Health insurance systems that remove financial obstacles to care can help to reduce poor HSCB and negative health outcomes.[37] The flagship of Indian National Although health practitioners discourage the use of self-care or traditional healers; economically disadvantaged groups do not use formal health care facilities. Even after the pandemic, the comparative benefit of self-care through a pharmacy in terms of saving time and money may persist, although illness complications may have a detrimental effect on treatment outcomes. As a result, self-medication must be decreased by empowering lower-level institutions (*anganavadis,* mobile clinics, and PHCs), as well as training and supervision of workers at private drug stores to ensure referral compliance. A study from India indeed highlighted eh importance of documentation in tertiary hospitals.[40] Health Insurance, *Ayushman Bharat,* should be introduced to households whose income and consumption have fallen sharply due to the country's temporary lockdown to fight the pandemic. This will provide financial protection for insecure and disadvantaged households and encourage them to obtain appropriate medical resources during their illness. When barriers to access to care and adequate HCSB are removed, positive behavioural changes in response to the pandemic can be demonstrated. There is a need to improve health information campaigns, encourage changes in adaptive and protective behaviours, reduce reliance on self-care or self-treatment, and postponement of medical care and routine examinations related to children. The provision of government-funded mobile clinic services and the strengthening of community health workforce strategies (*anganavadis*) are particularly necessary for rural communities with limited access to health care facilities. Because the data on perceived health status, medication use, chronic conditions, income, and treatment costs were not available, the model could not include some of the predisposing factors that influence HCSB. In the absence of a complete set of data, some of the respondents' health-care alternatives had to be whittled down by grouping government-owned facilities under "government" and privately-owned facilities under "private" categories. The present study was unable to add the need factors, psychological variables (fear of developing the COVID-19 infection), and socio-cultural dimensions and interactions in the regression analysis due to a lack of data. One of the study's benefits, however, is that it provides nationwide comprehensive data that was methodically analysed to offer evidence on HCSB during the epidemic.

## CONCLUSION

The families under distress (reduction in consumption and low consumption quartiles) during the COVID-19 not only avoided seeking health care services but also underutilized formal health services at public or private facilities. The pandemic had a negative influence on access to health services for poor households who had cut back on food consumption due to a lack of funds. The results of the present study highlight the need for removing financial barriers to access care during the COVID-19 pandemic and the necessity of continuity of child-related care (growth monitoring of the child, antenatal care, and immunization) and routine check-ups. The study also observed greater awareness of rural households about symptoms and prevention of COVID-19 pandemic which could be attributed to better health information garnered by the government's tireless efforts in devising and effectively conducting ongoing awareness campaigns through various kinds of media and communication.

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# THE LINGERING EFFECTS: EXAMINING MENTAL HEALTH IN INDIA DURING A PERIOD OF COVID-19 REGRESSION

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## ABSTRACT

### PURPOSE:

COVID-19 has been recognized as a contagious disease which can cause serious health problems, even proving to be fatal in some cases. The swift spread of COVID-19 epidemic shook the world which led to lockdowns, isolation, and social distancing for the general population so as to curb and contain the spread. This was found to lead to mental health disorders amongst people. This study examines the prevalence and severity of anxiety, stress perception, and well-being levels among the people at the time when the COVID-19 was in regression (decline) in India.

### METHODS:

In this cross-sectional study, 374 respondents' mental health was evaluated using three standardized questionnaires: Generalized Anxiety Disorder [GAD-7], Perceived Stress Scale [PSS-4], and Five Wellbeing Index [WHO-5].

### RESULTS:

The study revealed that almost 82% of respondents had moderate to severe levels of stress while 66% of respondents had mild to moderate levels of anxiety. Overall, 60% of respondents had poor (low) mental well-being. A strong negative correlation was found between mental well-being and perceived stress, and mental well-being and level of anxiety, in comparison to the correlation between anxiety and perceived stress was positive and statistically significant.

### CONCLUSIONS:

This study identified several long-term psychological effects of COVID. The presence of stress and anxiety and poorer mental well-being even at the time of decline in COVID-19 cases, highlights the need for serious attention to be given to psychological and psychiatric help and support throughout the duration and regression of such diseases. Health policymakers must ensure coherent and consistent plans for screening the mental health of the general population are in place to provide the required support in managing the long-term psychological and psychiatric effects of COVID.

### KEYWORDS

mental health, COVID-19, generalized anxiety disorder [gad-7], perceived stress scale [pss-4] and five wellbeing index [who-5].

## INTRODUCTION

A novel strain of corona virus, identified as severe acute respiratory syndrome corona virus 2 (SARS CoV-2) was first found in December 2019 in Wuhan, China [1,2] to be the cause of the transmission of the novel coronavirusdisease-19 (COVID-19) amongst human beings. COVID-19 has the ability to transmit from human to human, quickly spreading all over the world and has led to very serious health problems and even proved to be fatal in many cases [3]. Seeing the increasing number of cases, the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC) - a global pandemic on March 12, 2020 [4].

COVID–19 is not the first outbreak of an infectious disease in the 21st century, there have been others including the Napa Virus, SARS and Ebola, although in some parts of the world but the magnitude of quick spread of COVID-19 was comparatively greater. Vaccines had yet to be developed, which led to the enforcement of mask wearing, quarantining, social distancing, isolation and countrywide lockdowns, as recommended ways to deal with the pandemic, resulting in the disruption of normal life both- personal and professional.

Such a widespread epidemic had not been seen in recent times and led to a great deal of negative psychological and economic consequences [5-7]. The enforced social isolation, uncertainty, increasing numbers of infections and related deaths, contributed to rising mental health issues, psychological distress, anxiety and physical problems [5–9]. As of April 30th, 2021, COVID-19 has led to the death of more than 3 million people all over the world [10].

The fear of becoming infected, the unpredictability of the symptoms, and the risk of stigmatization and discrimination, along with being socially isolated has led to mental health disorders, severe stress and other anxiety related issues, culminating in some instances in insomnia and other physical problems within the general public [11–14]. Previous studies have identified anxiety and stress as significant effects of epidemics, especially epidemics that involve risk of death in the general population. Such epidemics are often accompanied by depression and other psychological problems [15], with COVID-19 making people vulnerable to deteriorations in their mental health [16,17].

Duan et al. (2020) noted that COVID-19 has led to psychological distress amongst people and advocate for active and appropriate intervention to reduce this distress [18]. Similarly, Zheng (2020) has identified depression, post-traumatic stress disorder and other psychiatric disorders among survivors of the SARS-CoV-2 epidemic and emphasize the need for screening and treatment of associated psychiatric disorders during the COVID-19 pandemic [19].

Researchers are predicting that such pandemic may appear more frequently in the future, with some predictions that COVID will not perish, rather it will have phases of higher and lower infection rates, although it may never completely perish [20,21]. The majority of present-day research has focused on the ill effects of COVID-19 at its initial first wave, whilst minimal research has studied the mental health aspects at a time when the cases are declining. Considering the drastic lingering ill effects of such pandemics, it is imperative to monitor and research the mental health effects when the pandemic is in a phase of regression.

The study follows the theoretical approach of evidence-based management which believes in gathering the best available evidence so as to support the management decision-making for improving the performance of healthcare organizations and their services [22]. The current research globally are proposing that the use of an evidence-based approach results in better practice of health care management by progressing in the quality of managerial decisions [23-25]. This study therefore intends to gather the empirical data to examine the impact of COVID-19 on the mental health and wellbeing of a sample of the general population in India during the months of December 2020 to January 2021 when there was decrease in number of COVID cases. This would prove to be beneficial to form the fundamental evidence to support the decision making in managing the unknown long-term effects of Covid – 19 by the health providers.

This study measured the levels of stress and anxiety prevalent amongst the sample population and the impact on their mental wellbeing. This study further investigated the possible impact of occupational, social status and gender differentiation on the respondents' mental health. As a result of the interaction of anxiety and stress with mental wellbeing [26,27] identified in this study, the contributory relationship of anxiety and stress was also investigated

between these diseases and related psychiatric disorders in persons with COVID-19.

## METHODS

### PARTICIPANTS AND PROCEDURES

The methodology for the study was cross-sectional in nature. Data was collected over 2 weeks in the curbs relaxed period of 27th January to 10th February 2021 using survey questionnaire with the intent to investigate the impact of the COVID-19 pandemic on a representative sample of the Indian adult population.

Based on Cochran's formula the sample size for the study was initially planned as minimum of 370 and accordingly the survey was distributed amongst 396 Indian adults. For the sample, the consenting adults were recruited electronically using convenience and snowball sampling methods, referrals and through social media forums in order to guarantee a large-scale distribution and recruitment of participants. There was no restriction on the total number of participants but to be eligible for the survey the respondents had to be adults (≥18 years) and older, able to understand English since the standardized tools (in English Language) were adopted for survey and had to be living in India both during acute and the decline phase of Covid -19. Considering the data was being collected on a sensitive theme and provided the anonymity to respondents, therefore it was expected that respondents would be able to provide information truthfully and honestly.

In total, 389 respondents participated in the survey and provided mental health related information. Further evaluation and cleaning of the received data revealed that only 374 responses were valid.

## MEASURES

### STUDY INSTRUMENT

This study administered a questionnaire consisting of the Perceived Stress Scale (PSS-4), Generalized Anxiety Disorder Scale (GAD-7) and Wellness Index scale (WHO – 5) to understand the mental health of the respondents. These instruments PSS-4 [28–32], GAD-7[33–36], WHO–5 [37–40] have been used in other COVID studies that include mental health components in different countries and settings.

PSS is one of the most widely used tools for measuring psychological stress in clinical and non-clinical situations. The PSS-4 is a short form scale of PSS-14 containing four items 2 positive and 2negative phrases from the original scale (items 2, 6, 7, and 14). It is popular scale to measure stress as it is easy to use, has been found to also have strong reliability and validity measures even when used in multiple settings as well as in different languages [41–43]. Version 4 (PSS-4) ranges from 0-16 (low to high) and has a triple classification based on intensity as high, moderate, and low wherein the higher scores signify higher stress [44].

The Generalized anxiety disorder (GAD-7) scale is a globally used standardized seven item self-reported instrument designed to screen for symptoms of anxiety [45,46]. The respondents provide their rating on a 4-point Likert scale about how often they have experienced anxiety symptoms in the two weeks preceding the study. The ranges of GAD-7 scores are 0–4, minimal anxiety; 5–9, mild anxiety; 10–14, moderate anxiety; and 15–21, severe anxiety [47].Scores above 10 points indicate an anxiety disorder[48–51].

The World Health Organization-Five Well-Being Index (WHO-5) is a short, positively worded self -administered five item scale which assesses the level of emotional well-being during the past 14-day period on a six-point Likert scale graded from 0 [at no time] to 5 [all of the time]; the raw score ranges from 0 to 25 of well-being prior to test. Given its conciseness and focus on positive effect, the WHO-5, it is appropriate instrument to screen for low emotional well-being and depressive affect in respondents [52,53].

Overall, the questionnaire had four sections, consisting of demographics, PSS-4 scale, GAD -7 scale and WHO well-being index scale. The survey was developed and delivered in English. The study protocol consent form for the anonymity and voluntariness of participation, instructions about the scales formed the initial mandatory part of questionnaire. In order to ensure external validity of the survey, its contents were reviewed by a group of experts belonging to psychology domain, members of the medical education research group further to test internal validity the Cronbach alpha was calculated for the perceived stress scale, Anxiety Scale and WHO scale and was found to be above 0.7 individually and reliability of overall scale was found to be 0.693.

To test the normality of data, Kolmogorov-Smirnov test of normality was utilized. Descriptive statistics for the socio-demographic characteristics were reported as numbers

and percentages. Further a Chi-square (χ2) test and F test were used to determine the association between the levels of the categorical variables. A generalized linear model based on negative binomial distribution was used to assess the confounding effects of socio-demographic factors, Stress factors and anxiety on the wellbeing. Variables included in the final model were selected using univariant general linear analysis and only factors with a cut-off value of $p<0.5$ were considered to be statistically significant. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM, Chicago, IL, USA).

correlations, one-way analysis of variance (ANOVA) to evaluate significance of differences, and multiple linear regressions. In addition, descriptive statistics of the surveyed variables were presented.

Analysis of the demographics (Table 1) identified females constituted 44% of the sample and males 56% respectively. In terms of age, 18–24-year-olds and 25–39-year-olds represented 38% and 39% of the sample population respectively, while only 3.5% were 60 years or older. Of the sample of respondents 72% were post-graduate educated, 24% graduate educated, while only 4% had studied to secondary or senior secondary level. In salary brackets, 43.9% respondents were salaried, 31% were students, 12% were entrepreneurs, 7% were unemployed and 4.5% were homemakers.

## RESULTS

All valid responses were analyzed using SPSS.21 (IBM) software. The analysis consisted of Pearson's r coefficient

### TABLE1: DEMOGRAPHIC DATA DISTRIBUTION

| Variable | | N | Percent | Perceived Stress | | | Anxiety | | | | Well Being | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | High Stress | Low Stress | Moderate | Mild | Minimum | Moderate | Severe | Depressive | Healthy | Low |
| Gender | Male | 209 | 55.9 | 12 | 35 | 162 | 34 | 57 | 105 | 13 | 15 | 55 | 139 |
| | Female | 165 | 44.1 | 7 | 34 | 124 | 27 | 45 | 81 | 12 | 14 | 69 | 82 |
| Age | 18 - 24 | 145 | 38.8 | 8 | 14 | 123 | 28 | 40 | 65 | 12 | 13 | 54 | 78 |
| | 25 - 39 | 146 | 39.0 | 9 | 26 | 111 | 19 | 30 | 86 | 11 | 12 | 46 | 88 |
| | 40 - 60 | 70 | 18.7 | 2 | 23 | 45 | 12 | 26 | 30 | 2 | 3 | 21 | 46 |
| | 60 & above | 13 | 3.5 | 0 | 6 | 7 | 2 | 6 | 5 | 0 | 1 | 3 | 9 |
| Education | Secondary | 2 | .5 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 |
| | Senior Secondary | 12 | 3.2 | 0 | 0 | 12 | 3 | 2 | 5 | 2 | 1 | 7 | 4 |
| | Graduate | 90 | 24.1 | 4 | 21 | 65 | 15 | 37 | 31 | 7 | 8 | 25 | 57 |
| | Postgraduate & above | 270 | 72.2 | 15 | 48 | 207 | 43 | 63 | 148 | 16 | 20 | 90 | 160 |
| Employment | Unemployed | 26 | 6.95 | 1 | 0 | 24 | 7 | 4 | 10 | 4 | 3 | 9 | 13 |
| | Self Employed | 48 | 12.8 | 4 | 10 | 34 | 3 | 8 | 33 | 4 | 3 | 16 | 29 |
| | Prof/Serviced/ Salaried | 164 | 43.9 | 5 | 33 | 126 | 28 | 45 | 87 | 4 | 14 | 55 | 95 |
| | Homemaker | 17 | 4.5 | 1 | 8 | 8 | 1 | 7 | 7 | 2 | 1 | 3 | 13 |
| | Student | 119 | 31.8 | 8 | 18 | 94 | 22 | 38 | 49 | 11 | 8 | 41 | 71 |
| N → | | | | 19 | 69 | 286 | 61 | 102 | 186 | 25 | 29 | 124 | 221 |
| Percent → | | | | 5.1 | 18.4 | 76.5 | 16.3 | 27.3 | 49.7 | 6.7 | 7.8 | 33.2 | 59.1 |

Overall, high stress was identified within 5% of the sampled population, compared with 77% who had moderate stress levels. Only 18% of respondents reported low stress. Similarly, 77% respondents had minimum to moderate levels of anxiety, while only 16% had mild anxiety and 7% had severe anxiety. Healthy wellbeing was seen in only 33% of respondents, while 8% had a depressive mental state, with59% having low wellbeing.

Of the 209 males, 162 had moderate stress, 12 reported high stress, 105 had moderate anxiety, 13 had severe anxiety, 139 had low mental wellbeing and 15 had a depressive mental state. Of the 165 females, 124 reported high stress, 7 had high stress, 81 had moderate anxiety, 12 had severe anxiety, while 82 had low wellbeing and 14 were in a depressive mental state. Moderate stress was

identified in 123 respondents of the age group 18–24 years old and 111 within the age group 25-29 years old.

Of the 270 post graduate respondents, 207 had moderate stress, 15 had high stress, 148 had moderate anxiety, 16 had severe anxiety and low mental wellbeing in 160 respondents. Finally, of 164 salaried respondents, 126 had moderate stress, 33 had mild stress, 5 had high stress, 87 had moderate anxiety and 95 had low mental wellbeing.

The gender based comparison of stress (Table 2) identified in males a mean of 6.54 and s.d. 2.302, while a mean of 6.26 and s.d. 2.311 was noted in females. Comparison of the means presented no significance difference between the stress levels based on gender (F=0.13, p=.910). Furthermore, no statistically significant association ($\chi2$ = 1.220, p = 0.543) was observed between the levels of stress and the gender of the respondents.

Based on the age criteria, the 18–24-year-olds had a mean of 6.83 and s.d. 2.076, 25-39 year olds (mean 6.56, s.d.2.369), 40-60 years old (mean 5.54, s.d.2.339) and 60years and above (mean 4.93, s.d.2.2.90). The highest stress levels were seen among the 18–24-year-old age group, while the least stress levels were seen among the 60years and above group. The results also showed a significant relationship between age and Stress ($\chi2$ = 24.68, p = 0.00). As it pertains to education the mean was highest (mean 7.33, S.d.1.55) for the respondents pursuing senior secondary education, followed by those in secondary or having secondary education, although there was no significant association between education and stress ($\chi2$ = 1.224, p = 3.01).

In terms of employment, there is significant association between the stress levels and employment level ($\chi2$ = 4.247, p = 0.002), with the highest stress amongst the non-employed (Mean, 7.68, s.d. 2.015), followed by students and self-employed, with the lowest stress levels found amongst homemakers (mean 4.88, S.d. 2.736).

## TABLE 2: DESCRIPTIVE ANALYSIS

| Variable | | Gender | | Age | | | | Education | | | | Employment | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Male | Female | 18–24 yrs | 25–39 yrs | 40–60 yrs | 60 & above yrs | Secondary | Senior Secondary | Graduate | Post Graduate & above | Unemployed | Self Employed | Prof/ Serviced/ Salaried | Home maker | Student |
| Perceived Stress | Mean | 6.5 | 6.3 | 6.8 | 6.6 | 5.5 | 4.9 | 6.5 | 7.3 | 6.1 | 6.5 | 7.7 | 6.5 | 6.3 | 4.9 | 6.6 |
| | SD | 2.3 | 2.3 | 2.1 | 2.4 | 2.3 | 2.3 | 0.7 | 1.2 | 2.5 | 2.3 | 2.0 | 2.5 | 2.1 | 2.7 | 2.4 |
| | Lower Bound | 6.2 | 5.9 | 6.5 | 6.2 | 5.0 | 3.5 | 0.1 | 6.6 | 5.6 | 6.2 | 6.8 | 5.8 | 5.9 | 3.5 | 6.1 |
| | Upper Bound | 6.9 | 6.6 | 7.2 | 6.9 | 6.1 | 6.3 | 12.9 | 8.1 | 6.6 | 6.8 | 8.5 | 7.3 | 6.6 | 6.3 | 7.0 |
| | F | 1.4 | | 7.2 | | | | 1.2 | | | | 4.2 | | | | |
| | Sig. | 0.2 | | 0.0 | | | | 0.3 | | | | 0.0 | | | | |
| | $\chi^2$ | 1.220a | | 24.686a | | | | 5.943a | | | | 19.757a | | | | |
| | p | 0.5 | | 0.0 | | | | 0.4 | | | | 0.0 | | | | |
| Anxiety | Mean | 7.0 | 7.1 | 7.5 | 7.4 | 5.7 | 4.7 | 7.5 | 8.8 | 6.6 | 7.1 | 8.8 | 7.6 | 6.6 | 5.9 | 7.3 |
| | SD | 4.4 | 4.3 | 4.5 | 4.0 | 4.4 | 3.6 | 2.1 | 5.6 | 5.0 | 4.0 | 4.8 | 4.0 | 3.9 | 5.0 | 4.7 |
| | Lower Bound | -1.0 | -1.0 | 6.8 | 6.7 | 4.6 | 2.5 | -11.6 | 5.3 | 5.5 | 6.6 | 6.8 | 6.4 | 6.0 | 3.3 | 6.4 |
| | Upper Bound | 0.8 | 0.8 | 8.3 | 8.0 | 6.7 | 6.9 | 26.6 | 12.4 | 7.6 | 7.6 | 10.7 | 8.7 | 7.2 | 8.5 | 8.1 |
| | F | 0.0 | | 4.6 | | | | 1.1 | | | | 2.1 | | | | |
| | Sig. | 1.0 | | 0.0 | | | | 0.4 | | | | 0.1 | | | | |
| | $\chi^2$ | .178a | | 15.714a | | | | 18.931a | | | | 27.883a | | | | |
| | p | 1.0 | | 0.0 | | | | 0.0 | | | | 0.0 | | | | |
| Well-Being | Mean | 16.1 | 14.2 | 14.8 | 15.2 | 16.2 | 16.4 | 11.0 | 13.9 | 15.3 | 15.3 | 14.2 | 16.1 | 15.0 | 16.6 | 15.2 |
| | SD | 5.3 | 5.2 | 5.7 | 5.1 | 4.7 | 6.1 | 4.2 | 5.4 | 5.3 | 5.3 | 6.9 | 5.3 | 5.2 | 4.2 | 5.2 |

| | Lower Bound | 15.3 | 13.4 | 13.8 | 14.3 | 15.1 | 12.7 | -27.1 | 10.5 | 14.2 | 14.7 | 11.4 | 14.6 | 14.2 | 14.5 | 14.3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Upper Bound | 16.8 | 15.0 | 15.7 | 16.0 | 17.3 | 20.1 | 49.1 | 17.3 | 16.5 | 15.9 | 17.1 | 17.7 | 15.8 | 18.8 | 16.2 |
| | F | 11.4 | | 1.3 | | | 0.7 | | | | 1.0 | | | | | |
| | Sig. | 0.0 | | 0.0 | | | 0.6 | | | | 0.4 | | | | | |
| | $\chi^2$ | 11.296ᵃ | | 4.329ᵃ | | | 8.933ᵃ | | | | 3.583ᵃ | | | | | |
| | P | 0.0 | | 0.0 | | | 0.2 | | | | 0.9 | | | | | |

The analysis of GAD-7revealed that 163 (44%) of respondents had moderate anxiety, 6% had severe anxiety and 49% had mild anxiety. Of these, females had a higher level of anxiety, (mean 7.08, s.d.4.299) as compared to men, although there was otherwise no significant association between anxiety levels and gender ($\chi^2$ = 0.178, p = 0.981).

The highest anxiety levels in relation to age were found amongst the youngest respondents (18–24-year-old) (mean 7.54, s.d. 4.480), followed by the 25–39-year-olds (mean 7.38, s.d.4.040). The lowest levels of anxiety were seen amongst the 60 year and above group (mean 4.69, s.d. 3.614) and there was a significant association between age and anxiety ($\chi^2$ = 15.714, p = 0.043).

Based on education levels, the highest level of anxiety was amongst the senior secondary group (mean 8.83, s.d. 5.606), followed by the secondary level educated, and the postgraduate and above (mean 7.11, s.d. 4.207). There was a significant association between education level and levels of Anxiety ($\chi^2$ = 18.931, p = 0.026).

Based on employment status, the highest anxiety levels were amongst the unemployed (mean 8.76, s.d. 4.79), followed by the self-employed (mean 7.56, s.d. 4.031), with the least anxious being the homemakers (mean 5.94, s.d. 5.043). There was a significant association between the type of employment and levels of Anxiety ($\chi^2$ = 27.883, p = 0.006).

Analysis of WHO-5 results revealed 59% of respondents had healthy mental wellbeing, 32% were in the low mental wellbeing category and 8% had a depressive mental state. Further analysis revealed that males had a healthier wellbeing (mean 16.05, s.d. 5.272), as compared to females who had lower mental wellbeing (mean 14.21, s.d. 5.206). There was a significant association between levels of wellbeing and Gender ($\chi^2$ = 11.295, p = 0.004).

Similarly, it was identified that 40-60 years old and 25–39-year-olds groups had overall healthy mental wellbeing, with the people in the age group of60 years and above having the higher level of wellbeing (mean 16.38, s.d. 6.117) and followed by those in 40-60 years old (mean 16.17, s.d. 4.666). Low mental wellbeing was found amongst the 25–39-year-old group (mean 15.16, s.d. 5.111), while the lowest wellbeing was found among the 18–24-year-olds (mean 14.77, S.d.57.07). There was significant co relation between the categories of age and levels of wellbeing ($\chi^2$ = 4.329, p = 0.032.

Based on education, postgraduates and graduates had a healthy wellbeing, with the graduates (mean 15.34, s.d. 5.296) slightly higher on the scale and followed by postgraduates (mean 15.30, s.d. 5.332). Secondary and senior secondary respondents' mental wellbeing was low, with the lowest was amongst secondary students (mean 11.00, s.d. 4.243). No significant association was seen between education and the levels of wellbeing.

In relation to employment, the higher mental wellbeing was amongst the homemakers (mean 16.65, s.d. 4.197), followed by the self-employed (mean 16.15, s.d. 5.320) and low mental wellbeing was identified amongst the unemployed and professional/serviced/salaried respondents, with the unemployed being lower on the scale of mental wellbeing (mean 14.24, s.d. 6.894). There was no significant association found between categories of age, employment and levels of wellbeing.

Further to the Pearson product-moment correlation (Table 3) was calculated to determine the relationship between Perceived Stress and Anxiety in respondents. There was a moderately strong, positive correlation between Perceived Stress and Anxiety (r = 0.506**, p=0.000) which was statistically significant. Similarly, the analysis of correlation between Perceived stress and Mental wellbeing revealed moderately strong, negative correlation Perceived Stress

and Mental wellbeing (r =- 0.433**, p=0.000) which was statistically significant.

Lastly the product-moment correlation was calculated to determine the relationship between Anxiety and mental wellbeing in respondents. There was moderately strong, negative correlation between Anxiety and mental wellbeing (r = - 0.525**, p=0.000) which was statistically significant.

A multiple regression was run to predict the mental wellbeing of respondents based on gender, age, education level, employment type, stress levels and level of anxiety of the respondents.

The predicted wellbeing score of respondents is equal to **X =22.67+ (- 0.168) Age + (-2.067) Gender+ (0.742) Education+ (0.076) Employment+ (-0.572) Stress + (-0.492) Anxiety** per unit increase in each factor (Table 6). The individual predictors were examined further wherein age (t = -.576, p = .046), gender (t = -4.501, p=.000), stress (t = -4.993, p = .000) and anxiety (t = -8.913, p = .000) were significant predictors in the model. Thus, out of the six variables only four variables added statistically significantly to the prediction, p < .05. These were age, gender, anxiety and stress. These variables statistically significantly predicted wellbeing, F (6, 367) = 33.244, p < .0000, R2 = .6.32 (Table 4 and 5)

### TABLE 3: PEARSON CORRELATIONS COEFFICIENT

| | | PSSTot | GADTot | WHO tota1 |
|---|---|---|---|---|
| PSSTot | Pearson Correlation | 1 | .506** | -.433** |
| | Sig. [2-tailed] | | .000 | .000 |
| | N | 374 | 374 | 374 |
| GADTot | Pearson Correlation | .506** | 1 | -.525** |
| | Sig. [2-tailed] | .000 | | .000 |
| | N | 374 | 374 | 374 |
| WHO tota1 | Pearson Correlation | -.433** | -.525** | 1 |
| | Sig. [2-tailed] | .000 | .000 | |
| | N | 374 | 374 | 374 |
| **. Correlation is significant at the 0.01 level [2-tailed]. | | | | |

### TABLE 4: MODEL SUMMARY

| Model Summaryb | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | .793a | .652 | .642 | 7.313 |
| a. Predictors: [Constant], GADTot, Educ, Gender, Age, Employ, PSSTot | | | | |
| b. Dependent Variable: WHO tota1 | | | | |

### TABLE 5: ANOVA

| ANOVAa | | | | | |
|---|---|---|---|---|---|
| Model | Sum of Squares | df | Mean Square | F | Sig. |
| 1    Regression | 3710.802 | 6 | 618.467 | 33.244 | .000b |
| Residual | 6827.540 | 367 | 18.604 | | |
| Total | 10538.342 | 373 | | | |

**TABLE6: REGRESSION RESULTS**

| Coefficients^a | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Unstandardized Coefficients | | Standardized Coefficients | | | 95.0% Confidence Interval for B | | Collinearity Statistics | |
| Model | B | Std. Error | Beta | t | Sig. | Lower Bound | Upper Bound | Tolerance | VIF |
| 1  [Constant] | 22.677 | 2.128 | | 10.659 | .000 | 18.493 | 26.861 | | |
| Age | .168 | .292 | .026 | .576 | .046 | -.741 | .406 | .839 | 1.191 |
| Gender | -2.067 | .459 | -.193 | -4.501 | .000 | -2.970 | -1.164 | .957 | 1.045 |
| Educ | .742 | .424 | .078 | 1.747 | .081 | -.093 | 1.576 | .879 | 1.138 |
| Employ | .076 | .199 | .018 | .382 | .703 | -.315 | .466 | .817 | 1.225 |
| PSSTot | -.572 | .115 | -.248 | -4.993 | .000 | -.797 | -.347 | .715 | 1.399 |
| GADTot | -.492 | .060 | -.401 | -8.193 | .000 | -.610 | -.374 | .738 | 1.355 |
| a. Dependent Variable: WHO tota1 | | | | | | | | | |

Furthermore, the results revealed respondents' mental wellbeing decreased with increase of age, stress and anxiety, and decreased with changes in gender (male to female), as males had higher levels of mental wellbeing (by 2.067), as compared to females. Age was found to have the highest impact on mental wellbeing, followed by stress, with gender having the least impact on the mental wellbeing of respondent.

## DISCUSSION

The majority of the respondents were male, within an age bracket of 18 – 39 years old, with apost graduate educational qualification and in a salaried class or professional service. The majority of respondents had moderate level of stress and mild to moderate levels of anxiety, with59% reporting low wellbeing during the time of conducted study.

Regarding the relationship between socioeconomic status and stress, the highest levels of stress were seen amongst males 18–24-year-old, with lower levels of education and especially those who were unemployed. Stress was lower amongst people 60 years and above and those who were employed, and the rate of anxiety was higher amongst females as compared to males. Anxiety was highest in the 18–24-year-old group, with secondary and senior secondary degrees and who were unemployed, which is in contrast to the 40-60 years old who were employment and had achieved a bachelor's degree.

The relationship between socio-economic levels and education with stress and anxiety, has been previously studied and led to varied opinions, with a good proportion proclaiming an inverse relationship between these variables [54]. This study supports the same results, as lower age respondents with lower levels of education and being unemployment had the highest levels of stress and anxiety.

Due to COVID-19, countries are going into lockdown, sometimes with complete curfews, which not only slows down economies, but also further dwindles job opportunities. Therefore, it may be expected that young people with low levels of education could continue to face more uncertain future and job prospects, which may in turn lead to higher levels of stress and anxiety.

Previous studies reveal that employed and self-employed persons display high levels of stress and anxiety, as they are concerned about their occupation/business stability being negatively impacted by economic problems [55,56]. Interestingly, the present study also supported this argument, as people aged 60 years and above and those who are retired or homemakers, were found to be less stressed and anxious as compared to others in sample population.

Regarding the relationship between gender and perceived stress and anxiety, previous studies have suggested a gender-based relationship between stress and anxiety [57]. These studies found higher levels of stress and anxiety amongst males [58], however in comparison, the results of this study revealed stress was higher amongst females, while anxiety was higher amongst males.

These findings warrant further investigation as the gender-based roles in Indian social environment are unique, and with the added complexity of the conditions associated with COVID-19, an accurate interpretation of the relationship between gender and anxiety and stress requires further evaluation.

Studies have identified a direct relationship between stress and negative psychological effects [59]. This study supports previous studies findings in this aspect, as a significant positive statistical relationship between anxiety and perceived stress was identified, along with a negative statistical relationship between anxiety and mental wellbeing and perceived stress and mental being. These results identify reduced mental wellbeing as a result of the prevalence of stress and anxiety.

Healthy mental wellbeing is an important challenge during the COVID-19 pandemic, as stress and anxiety are higher than the normal amongst the general population [60]. This study supports earlier studies in identifying stress and anxiety as leading to the majority of respondents having low mental wellbeing.

High psychological stress levels and high levels of anxiety are often seen in patients who are in isolation for treatment of COVID-19 [61,62]. Lim et al. (2020) in their study described how a male with no history of physical/mental illness or drug use developed depression, insomnia, and suicidal ideation during a period of isolation. Further, Lim et al. (2020) noted he experienced stress and anxiety not only about contracting COVID but also as a result of the stigma associated with patients who have COVID-19, and as result of the aforementioned, he required psychiatric intervention.

Long-term quarantine, insufficient information, frustration, and stigmatization increase stress and anxiety and negatively impact psychological health [34,35,38]. This has led to recommendations that people should be provided disease related appropriate information, with quarantine periods kept as short as possible, so as to manage and reduce stress and anxiety [5]. Other studies have revealed a relationship between infections caused by respiratory viruses and mood disorders [63], with a possible direct connection between corona virus and long-term psychological effect [63,64,65].

During and after the SARS outbreak, long term psychological impact was seen amongst the survivors [59,66,67]. Lee et al. (2007) studied stress during the outbreak of SARS and one year thereafter and noted respondents had higher stress levels at the time of outbreak, and after a year they continued to show high levels of depression, anxiety, and post-traumatic stress [67]. Zatzick et al. (2008) noted subsequent occupational performance and functional decline issues in patients 12 months after a traumatic event and emphasized the need for early acute interventions in order to reduce these issues and maintain appropriate occupational performance [68].

This may also be true of COVID-19, as identified in the current study, at the time of rapid decline of COVID cases in India (end of February 2021), the stress and anxiety levels had not returned to normal levels, rather the mental wellbeing was still at low levels. People were back to living almost a normal life with markets open and economy booming, yet still the majority of respondents reported higher than normal levels of perceived stress and anxiety and reduced mental wellbeing.

COVID-19 and SARS have similar causative agent and similar outbreak pattern though according to experts, COVID-19 is more worrisome in terms of severity and extent than SARS [69]. This has led to fear of long-term persistence of the virus. Many studies post SARS, reveal the prevalence of reduced mental wellbeing, psychiatric disorders and PTSD 30 months post outbreak [59,66,67]. Researchers have stressed the need for proper planning to identify and treat psychiatric disorders especially during other infectious epidemics [66].

Therefore, given the serious concerns of people towards COVID-19, screening, effective and early treatment of stress and anxiety through counseling, may play an effective role in improving their mental health to reduce the long-term impact and effects.

## CONCLUSIONS AND FUTURE IMPLICATIONS

The current study was based on the evidence-based management approach to healthcare services as it is believed to a valuable means of improving healthcare outcomes and quality overall [70]. The results of the study can be beneficial for health policymakers and workers who can rely on empirical data that has been collected to understand the ground realities of such unknown pandemic. The strength of the current study lies in the fact that very few studies world over have focused on the mental health and wellbeing during a phase when COVID-19 infection cases were on a downward trend. It brings to focus the needs and requirements of such phase as well as see. Also, there are very scanty studies that have focused on Indian population, which being the second largest populated country becomes even more important to study considering the danger of vast spread of pandemic. Further it has utilized the standardized tools of PSS5, GAD7 and WHO5 to measure mental health; this makes the results easily comparable with studies utilizing similar scale in other parts of the world. This study revealed that perceived stress, anxiety, and low mental wellbeing is highly prevalent among the respondents under study during COVID-19 even at a time when the number of cases were decreasing and people were back to their normal lives, the levels of perceived stress and anxiety had not returned to normal. This suggests that the psychological and psychiatric effects of COVID-19 are long lasting. This brings into focus the implications and need for interventions by policymakers and health managers. Despite being out of isolation and quarantine, the psychological effects still persisted and lead to low mental wellbeing. These effects are of the utmost importance as researchers have predicted COVID-19 will persist and will have many waves, thus it's important for health policymakers to understand along with medical intervention, there needs to be continuous psychological and psychiatric help to overcome the emotional and psychological effects of COVID-19.

Additionally, if psychiatric help is required during a regression phase of COVID-19 infections, health policymakers need to be even more vigilant and alert to these needs when infections are increasing. The importance of health policymakers having coherent plans for mental health screening and interventions throughout all phase of the COVID-19 pandemic and beyond cannot be overstated.

Certain limitations apply to this study. Firstly, the current study could not gather data at large scale due to certain constraints, the future studies can overcome this shortcoming by collecting data in larger number to validate the results. Additionally, the study was conducted in online mode wherein the questionnaires independently were filled by the study participants following snowball sampling process, this might result in responses in self-assessment varying in objectivity when the interviewer is absent as well as the drawbacks of the snowball sampling. Also, the respondents with poor internet accessibility were likely not included in the study, creating a selection bias in the population studied. Therefore, future studies can undertake a similar study which is carried out under-supervision and in an offline mode to take care of selection bias like issues. The current study does not carry out any comparisons of acute and decline phases of pandemic; therefore, it is recommended that future studies can explore the difference between the two. Furthermore, other important domains that can be explored include the impact of vaccinations on mental health. Finally, future research should explore the different psychiatric support needed at different phases of the pandemic so health policymakers can draft guidelines for the various and future phases, understanding the need-based perspective, while dealing with an unknown disease and its unchartered territories.

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**RESEARCH ARTICLE**

# INTENTION OF COVID-19 VACCINATION IN THE SRI LANKAN CONTEXT: A STRUCTURAL EQUATION MODEL APPROACH

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## ABSTRACT

**INTRODUCTION:**

The intention on vaccination of COVID-19 is influenced by demographic and psychological factors. An understanding of the factors that influence the intention of COVID-19 vaccination is important to achieve the successful vaccination programs.

**OBJECTIVE:**

The objective of this study is to determine the critical factors affecting the intention of COVID-19 vaccination in Sri Lanka.

**METHODOLOGY:**

An online questionnaire was implemented amongst Sri Lankans to acquire the primary data. The questionnaire assessed the social demographic features, vaccination details, perception and intention about the vaccination, social norm, media exposure, and trust towards vaccines. Descriptive analysis was used to analyse the demographic characters and vaccination details. The structural equation model was used to analyse the relationship between the intention of COVID-19 vaccination and other relevant factors.

**RESULTS:**

The results showed that the perception of vaccine, social norms and trust were significantly related with people's intention towards vaccination, whereas media exposure showed an insignificant relationship with the intention towards vaccination. Meanwhile, perception about vaccine and media exposure had significant relationships between trust of the vaccines.

**CONCLUSION:**

It was conclusive that the intention of the COVID-19 vaccination was greatly influenced by the perception of vaccine, social norms and trust besides media exposure, which had an indirect effect on intention towards vaccination of COVID-19.

**KEYWORDS**

COVID-19, Perception, Sri Lanka, Structure equation model, Vaccination

# INTRODUCTION

Since the onset of COVID-19 pandemic, several nations have been fighting to control the community spread of COVID-19 virus. The World Health Organization (WHO) has provided several health guidelines as preventative measures to minimize the incidence of the COVID-19 virus such as hand hygiene, social distancing, and quarantine [1]. Since vaccination is one of the most efficient and cost-effective preventive measure to control the infectious diseases [2]. COVID-19 vaccines are considered critical for preventing and controlling the corona infections [3]. The Government provides the vaccines free of charge to the public, however, these vaccinations against COVID-19 are still challenged. The uncertainty on the acceptance of COVID-19 vaccines is considerable. Anti-immunization attitude has risen with vaccination reluctance resulting [4]. Anti-vaccination initiative comments, conspiracy theories, misconceptions and misperceptions, doubt about the speed of vaccine development, chronic side effects, and professionals' opinion about vaccines were the major concerns in vaccine hesitancy [5]. The intention to take the COVID-19 vaccinations are influenced by certain variables such as attitude, trust, risk perception, perceived benefits and social norms [6].

With reported variation in the COVID-19 vaccination intentions, it is critical to understand the human behaviours to develop health campaigns and educational initiatives targeted at fostering greater adoption of the Covid-19 vaccinations. To assess the public interest on getting vaccinated against COVID-19, the structural equational model is widely used by many researchers [6,7,8]. Structural equation modeling is the useful statistical method for dealing with causal relationships between latent variables and observable variables [9]. Structural equation modeling offers a particular advantage over traditional multiple regression analyses in that it has more statistical power in terms of rejecting a false null hypothesis than the other approaches. Furthermore, it outperforms other correlational approaches such as regression since it analyses several variables concurrently, and latent components minimize measurement error [10].

In the context of vaccinations, risk of perception may be described as concerns about vaccine efficacy and insecurity of concerns about vaccine adverse effects [11]. Intentions to be vaccinated are strongly influenced by risk of perception [12]. Individuals' perspectives and decisions making are impacted by such external factors, which are referred to as social norms [13]. According to Graupensperger et al. [14], social norms are positively associated with the intentions of participants towards the vaccination. People are utilising a variety of sources including mass media and social media to acquire the information and updates about the degree of infections during the COVID-19 pandemic, and these sources also might influence on people's acceptance or refusal of COVID-19 vaccinations [15]. In relation to this, acceptance of vaccines is heavily influenced by trust towards the vaccines [16]. Planning awareness programs and health campaigns to promote the vaccination rate in the society are important to understand the variables and how they are affecting the acceptance of COVID-19 vaccinations. The objective of this study is to investigate, the media exposure, perception about the vaccination, trust and social norms influence on the intention of COVID-19 vaccination.

## LITERATURE REVIEW

Previous research has revealed that vaccination hesitancy is a common occurrence across the world, with varying causes for refusal of vaccine adoption [17,18]. The most common reasons included were trust, social norms, media exposure and perception [7]. Recent research has discovered a substantial link between the intention to receive COVID-19 vaccinations and perceived safety. An association between a negative attitude toward COVID-19 vaccines and hesitation to obtain the vaccines, connection between religiosity and reluctance to obtain COVID-19 vaccines may contribute to COVID-19 vaccine hesitancy [7,17,18].

## TRUST

The public are cognitive misers, and they may lack the time or cognitive skills to comprehend a complicated and evolving pandemic situation like the coronavirus, which continues to confound the researchers [19]. Many researchers have discovered that, using information from a reliable source reduces cognitive process and gives a shortcut for making decisions about a situation [20,21]. Further, several studies have found that trust in scientists, the government, and the media are all key drivers of vaccination intentions and behaviour [22,23]. According to the study of Liu and Yang [24], trust was found to be a substantial predictor of vaccination intention and was positively related to it. Krishna [25] discovered that trust in the health sector regarding the vaccination were linked to

fewer negative thoughts against vaccinations, which were linked to vaccination intention.

## SOCIAL NORMS

Normative social behavior theory states that, individuals' activities are influenced by their perceptions of how others in their social group act (descriptive norms) and perceived social pressure to adopt similar behaviors (injunctive norms) [26]. According to a number of researchers, both descriptive and injunctive social norms have an influence on a range of behaviors, including vaccination intentions for a variety of diseases [22,27,28]. An iIndividuals' drive for group membership is activated by injunctive norms, which change their behaviour through perceptions of social incentives and consequences [29]. Many studies have discovered a positive association between social norms and health behaviours, such as vaccination intentions [14,30]. Bish et al. [31] discovered that relatives and friends had been vaccinated and that others closed to them to be vaccinated, were linked to the vaccination intention of individuals. Because COVID-19 is a novel pandemic and the science behind it is changing, and many behavioral judgments are undertaken with ambiguity, which enhances the significance of normative impact [32].

## MEDIA EXPOSURE

Social media platforms are the most popular places to find and discuss COVID-19 information [33, 34]. COVID-19 vaccination-related news on media has the ability to influence the public's intention to vaccinate [35]. Previous researches have demonstrated that internet information influences people's views, attitudes, and vaccination intentions [36,37,38]. People frequently use social media to obtain expert knowledge on the safety and efficacy of vaccines [39]. Accurate vaccination facts can boost their confidence and faith in vaccinations [40]. Previous research on influenza and HPV vaccinations found that the exposure to vaccination-related information on a regular basis via social media was favorably connected with positive perceptions and use of such vaccines [41,42]. However, false information and anti-vaccination views are occasionally spread on the social media, such as conspiracy theories, overstated side effects, and lowered vaccine efficacy, which may promote the vaccine reluctance [43,44]. Many worldwide health organizations have joined forces with social media behemoths to tackle COVID-19 and encourage COVID-19 immunization. For example, when users search for information on COVID-19 vaccines on Facebook, they are directed to WHO webpages in order to offer correct and trustworthy facts

and to eliminate misleading allegation regarding vaccines [35].

## PERCEPTION

In the context of vaccinations, the risk of perception may be described as concerns about vaccine efficacy and insecurity of concerns about vaccine adverse effects [11]. Previous studies have found that vaccination acceptance is low among women, the unemployed, and those with a lower level of education, and that they have a favorable relationship with risk perceptions [45,46]. Concerns about the vaccine's effectiveness or safety were cited as justifications for refusing to be immunized against COVID-19 [47,48]. Uncertainty about vaccine development or testing procedures, as well as scientific investigation, was discovered to be prevalent among vaccine-hesitant responders in the United States and Italy [49,50]. False information or acceptance of conspiracy theories, on the other hand, was found to be adversely linked with vaccination intentions [51].

## METHODOLOGY

### CONCEPTUAL FRAMEWORK

The proposed conceptual framework was developed with a detailed literature review, using five constructs including perception of COVID-19 vaccination (P), social norms (SN), perceived media exposure on COVID-19 vaccines (M), trust towards COVID-19 vaccines (T), and intention on the COVID-19 vaccination (I) (Figure 1).

The following hypotheses were developed using the proposed conceptual framework,

H1: Perceived media exposure about COVID-19 vaccine influence the intention of obtaining COVID-19 vaccination

H2: Social norms are affecting the intention of obtaining COVID-19 vaccination

H3: Perception on COVID-19 vaccination is influenced by the trust of participants towards COVID-19 vaccinations

H4: Perception about the COVID-19 vaccination is influenced by the intention of obtaining COVID-19 vaccination

H5: Perceived media exposure about COVID-19 vaccines is influenced by the trust of participants towards COVID-19 vaccinations

H6: The intention of obtaining COVID-19 vaccination is affected by the participants trust towards COVID-19 vaccinations

## DATA COLLECTION

A structured questionnaire was developed and administered through the internet during the period May to July 2021 among the adult population of Sri Lanka. The questionnaire was pretested with 20 participants to ensure the questions were understandable and adequate. It was administrated to obtain participant's socio-demographic data and Likert scale questions related to COVID-19 vaccination. The Likert scale varying from the 1 to 5, where 1 denoted strongly disagree and 5 denoted strongly agree. There were 300 participatant responses that were registered.

## STATISTICAL ANALYSIS

The collected socio-demographic data were analysed using the descriptive analysis with the SPSS 25.0. The Likert scale data were analysed using structural equation model (SEM) with SPSS AMOS 23.0. SEM consists of two models; measurement and structural models. Proposed model consisted of four constructs namely perception, media exposure, social norms and trust which were considered as independent variable and intention towards COVID-19 considered as a dependent variable. Prior to structural modelling, the study was evaluated the latent constructs of measurement model for dimensionality, validity, and reliability using a procedure known as confirmatory factor analysis (CFA) as suggested by Byrne [52]. CFA is carried out to determine whether all observed variables (indicator variables) appropriately reflected their underlying constructs (latent variables) and whether the measurement model had acceptably fit to the data. Twenty-one items were used to assess these four constructs other than demographic details of respondents. Two indicators which were less contributed to the construct (less than 0.4 factor loading) were removed and model was re-estimated. The Cronbach alpha was used to determine the internal accuracy of survey items. The measurement model was evaluated to verify a sufficient model fitness level and constructed validity and reliability. Afterwards, path analysis was used to examine the predicted causal relationship among the latent constructs [52].

# RESULTS AND DISCUSSION

## DESCRIPTIVE ANALYSIS

The demographic data of the participants were collected in order to understand the structure of the sample population. According to the results, most of the respondents were women, with equal proportion of lactating women (2.1 %) and pregnant women (2.1 %). The sample population were mostly aged between 18-29 (67.6 %). Among the sample population, most of them were obtained tertiary education (90.3 %) and majority of them were unmarried (69.1 %) (Table 1). Among the sample population, the individuals with 37.6 % were vaccinated with at least one dosage (79.4 %). The Sinopharm vaccine has been become mostly obtained vaccine type by the respondents. After the vaccination, most (61.4 %) answered as not experienced any discomforts. Fever, pain in the body, headache, and tiredness were the main discomforts experienced after the vaccination (Table 2).

TABLE 1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

| Features | Category | Percentage (%) |
|---|---|---|
| Gender | Male | 42.4 |
| | Female | 57.6 |
| Age | 18-29 | 67.6 |
| | 30-59 | 21.8 |
| | 60 & over | 10.6 |
| Female | Ordinary | 95.8 |
| | Pregnant | 2.1 |
| | Lactating | 2.1 |
| Employment status | Unemployed | 50.3 |
| | Employed | 49.7 |
| Educational Level | Primary | 1.8 |
| | Secondary | 7.9 |
| | Tertiary | 90.3 |
| Civil status | Married | 30.9 |

| | Unmarried | 69.1 |
|---|---|---|

**TABLE 2. STATUS OF VACCINATIONS**

| Parameter | Category | Percentage (%) |
|---|---|---|
| Already vaccinated | Yes | 37.6 |
| | No | 62.4 |
| Type of vaccine | Sinopharm | 71.6 |
| | Pfizer | 5.9 |
| | AstraZeneca | 18.6 |
| | Moderna | 3.9 |
| Number of doses | 1 | 79.4 |
| | 2 | 20.6 |
| Felt discomfort after vaccination | Yes | 38.6 |
| | No | 61.4 |
| Type of discomfort | Fever | 21.8 |
| | Pain | 35.6 |
| | Headache | 3.4 |
| | Tiredness | 27.6 |
| | Other | 11.5 |

## RELIABILITY AND VALIDITY ANALYSIS

Initially, the 21 question statements were used as indicators in the testing of the model fit of measurement model (Appendix 1). Thus, some indicator questions were excluded (I5 and P3) due to the low factor loading (less than 0.4) and insignificant at 0.05 probability. Afterwards, revised model was established and indicated in Figure 2. To test the internal consistency of each construct of the questionnaire, a reliability test was performed. The Cronbach's alphas of constructs were evaluated to assess the internal consistency which are higher than 0.7 and indicating good reliability for all indicator variables (Table 03).

Three indices were employed to assess convergent validity: factor loading values must be more than 0.7, average variance extracted (AVE) values must be greater than 0.5, and composite reliability (CR) values must be greater than 0.7 [53]. The composite reliability of all constructs was higher than suggested value 0.7 except perception construct. The CR of the perception construct was marginally less than 0.7, even though other constructs had higher CR value than threshold value indicating that model has a good convergent validity. The AVE of the constructs were higher than the threshold value 0.5 which indicating that model has strong convergent validity. The factor loading values are more than 0.7 which indicating a strong convergent validity (Table 04). Further, square root AVE of each construct must be greater than the correlation coefficient among sub constructs to achieve discriminant validity. Discriminant validity describes the degree to which one construct differs from another. Other than the correlation coefficient of intention and trust, rest of the values are following the condition which indicating good discriminant validity for all constructs (Table 05). In the context of divergent and convergent validity, the adequate degree of construct validity is shown by testing findings indicating that, for a structural model evaluation, research constructs are appropriately fitted.

**TABLE 3. RESULTS OF RELIABILITY TEST**

| Construct | Items | Cronbach's alpha |
|---|---|---|
| Trust | T1, T2, T3, T4, T5, T6, T7 | 0.922 |
| Media exposure | M1, M2, M3 | 0.768 |
| Social norms | SN1, SN2, SN3 | 0.757 |

| Perception | P1, P2 | 0.709 |
|---|---|---|
| Intention | I1, I2, I3, I4 | 0.849 |

**TABLE 4. RESULTS OF CONVERGENT VALIDITY TEST**

| Construct | Variable | Factor Loading | CR | AVE |
|---|---|---|---|---|
| Trust | T1 | 0.80 | 0.923 | 0.633 |
| | T2 | 0.84 | | |
| | T3 | 0.84 | | |
| | T4 | 0.83 | | |
| | T5 | 0.75 | | |
| | T6 | 0.85 | | |
| | T7 | 0.74 | | |
| Media exposure | M1 | 0.76 | 0.781 | 0.544 |
| | M2 | 0.76 | | |
| | M3 | 0.78 | | |
| Social norms | SN1 | 0.8 | 0.785 | 0.565 |
| | SN2 | 0.92 | | |
| | SN3 | 0.72 | | |
| Perception | P1 | 0.83 | 0.675 | 0.517 |
| | P2 | 0.69 | | |
| Intention | I1 | 0.74 | 0.880 | 0.648 |
| | I2 | 0.75 | | |
| | I3 | 0.90 | | |
| | I4 | 0.82 | | |

CR = Composite reliability; AVE = average variance extracted

**TABLE 5. RESULTS OF DISCRIMINANT VALIDITY TEST**

| | AVE | MSV | MaxR(H) | Trust | Media | Social Norm | Perception | Intention |
|---|---|---|---|---|---|---|---|---|
| **Trust** | 0.633 | 0.654 | 0.930 | **0.796*** | | | | |
| **Media** | 0.544 | 0.241 | 0.789 | 0.491 | **0.737*** | | | |
| **Social Norm** | 0.565 | 0.162 | 0.880 | 0.335 | 0.402 | **0.752*** | | |
| **Perception** | 0.517 | 0.323 | 0.729 | -0.490 | 0.008 | 0.041 | **0.719*** | |
| **Intention** | 0.648 | 0.654 | 0.899 | 0.809 | 0.398 | 0.363 | -0.568 | **0.805*** |

AVE = average variance extracted; MSV = maximum shared variance; MaxR(H) = maximum reliability; (*) = square root of AVE.

TABLE 5. HYPOTHESIS TESTING

| Hypothesis | Constructs | | | Estimate | S.E. | C.R. | P |
|---|---|---|---|---|---|---|---|
| H1 | Trust | <--- | Media exposure | .506 | .117 | 4.336 | *** |
| H2 | Trust | <--- | Perception | -.629 | .145 | -4.333 | *** |
| H3 | Intention | <--- | Social norm | .205 | .076 | 2.683 | ** |
| H4 | Intention | <--- | Trust | .655 | .156 | 4.199 | *** |
| H5 | Intention | <--- | Perception | -.518 | .174 | -2.972 | ** |
| H6 | Intention | <--- | Media exposure | .023 | .131 | .180 | .857 |

*** (p<0.001), **(p<0.01); CR=Critical ratio, SE= Standard error, P= Probability

## MEASUREMENT MODEL

The CFA was tested for the adequate model fitness level. Maximum Likelihood method was used to estimate the measurement model and model fit was assessed by using Multiple Fit Indices. The model fit was good as chi-square value ($\chi 2$) 194.77, degree of freedom (df) 138, probability less than 0.01; $\chi 2$/df is 1.411, comparative fit index (CFI) 0.959, Tucker-Lewis Index (TLI) 0.95, Root Mean-Square Error of Approximation (RMSEA) 0.057, Goodness of fit index (GFI) 0.864, and Adjusted goodness of fit index (AGFI) 0.813. The threshold values of the model fit were "$\chi 2$/df < 3.0, with the values of CFI, TLI ≥0.90, RMSEA ≤0.08, and AGFI ≥0.80 [7]. According to Hair et al. [53], the fit indices indicate a good model fit is obtained. It means COVID-19 vaccination intention can be assessed through these indicators and also public behaviour towards COVID-19 vaccination can be moderated through the measurements driven by these indicators.

According to the measurement model (Figure 2) SN2 indicator showed the highest factor loading (0.92) towards social norms which indicated that people who very close to the individual had an impact on decision to get the COVID-19 vaccination (by 92 %) the underlying construct of social norm. Based on this finding, the researcher can argue that influence of close relatives and friends' decision can greatly affect the someone's decision on taking COVID-19 vaccination. The thinking of COVID-19 vaccination is a viable option for treating and preventing the COVID-19 pandemic (T6) highly reflect the factor trust by 85 %. As a result, the researcher can recommend government-led awareness campaigns to boost trust in COVID-19 vaccinations.

The M3 observed variable showed a higher estimate (0.78) towards media coverage which showed the belief on information on COVID-19 vaccinations found on media was beneficial had highly reflect media coverage of the respondent by 78 %. It means, people have a believe that information revealed in the media has a significant impact on decision-making. Therefore, the researcher can suggest that promotional campaign through the media would reach the population effectively. The negative perception like COVID-19 vaccinations is produce negative side effects (P1) highly reflects the underlying construct perception by 83 %. Therefore, relevant bodies should take necessary actions to remove such negative thought among the population as it is greatly affecting the construct perception. The I3 indicator showed the highest factor loading (0.9) towards intention which indicated that thought of vaccines strengthen the immune system of respondents highly reflects (by 90 %) the underlying construct of intention.

## STRUCTURAL MODEL

The structural model was used to test the research hypotheses between proposed conceptual framework (Figure 3). The fitness of the structural model was tested using multiple fit indices. The model fit was good as chi-square value ($\chi 2$) 204.73, degree of freedom (df) 141, probability less than 0.01; $\chi 2$/df was 1.452, comparative fit index (CFI) 0.954, Root Mean-Square Error of Approximation (RMSEA) 0.060, Goodness of fit index (GFI) 0.862, Adjusted goodness of fit index (AGFI) 0.814, and Normal fit index (NFI) 0.825. Despite the fact that the GFI and AGFI values did not surpass 0.9 (the threshold value) and satisfied with the criteria proposed by Baumgartner and Homburg [54] and Doll et al. [55]. Therefore, the researcher can argue that intention towards COVID-19 vaccination in Sri Lanka can be enhanced by promoting through these indicators (Figure 3) included under each Construct.
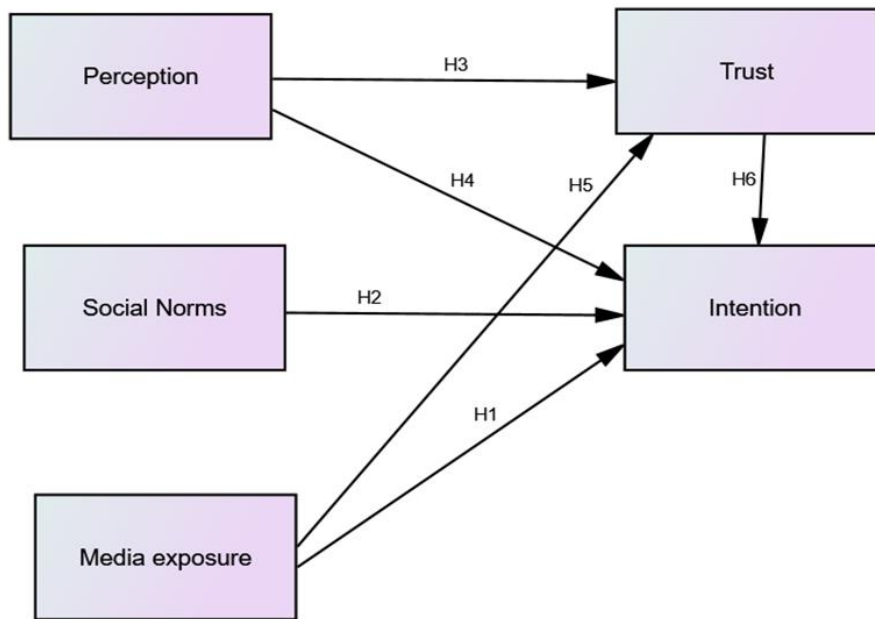
**FIGURE 1: CONCEPTUAL FRAMEWORK**
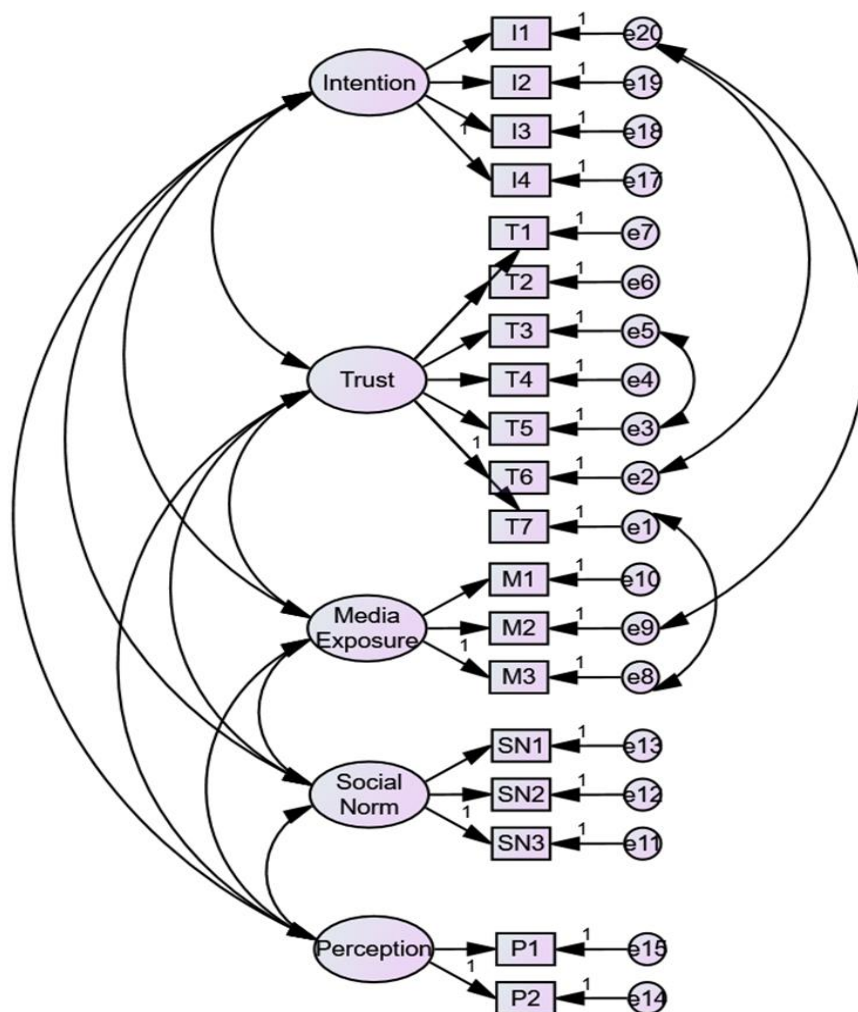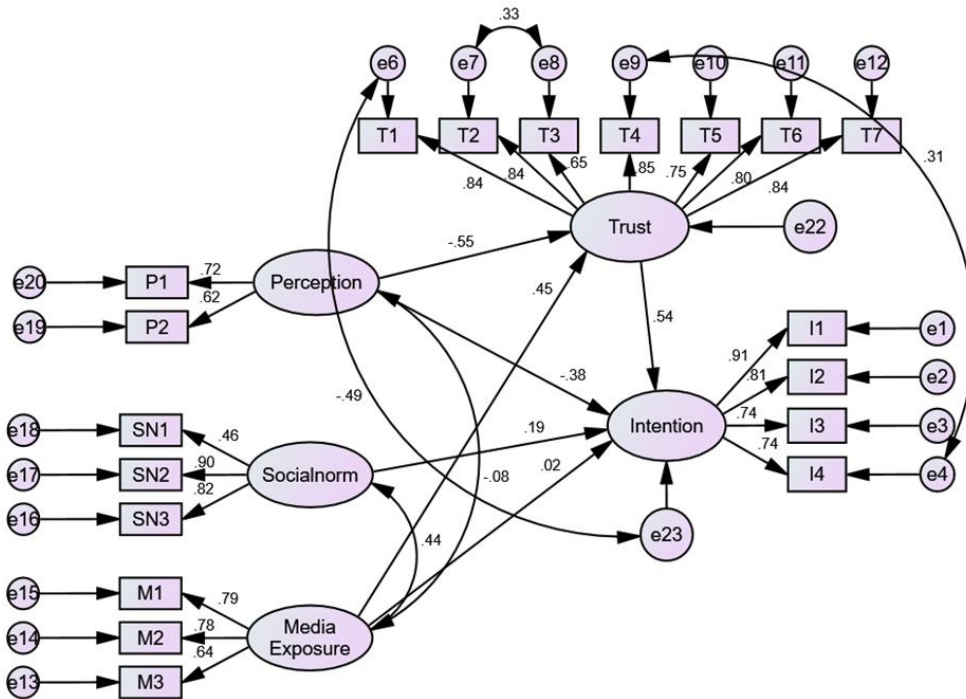


**FIGURE 2: MEASUREMENT MODEL**

Path analysis was used to perform hypothesis testing. The hypothesis results revealed that, the media exposure (β=0.506, t=4.366, p<0.001) and perception (β= -0.629, t=4.333, p<0.001) on COVID-19 vaccination on trust towards vaccination, the social norms on intention of getting COVID-19 vaccination (β=0.205, t=2.683, p<0.01), the trust towards the COVID-19 vaccination on intention of getting COVID-19 vaccination (β=0.655, t=4.199, p<0.001), and the perception on COVID-19 vaccination on intention of getting COVID-19 vaccination (β= -0.518, t= -2.972, p<0.01) were significant. Therefore, the hypothesis H1, H2, H3, H4 and H5 were well supported. However, the media exposure about the COVID-19 vaccination on intention of getting COVID-19 vaccination (β= 0.023, t= 0.180, p>0.05) were not significant, therefore, hypothesis H6 was not supported and expressed in Table 05. According to Hair et al. [53], the fit indices indicate a good model fit. Therefore, the researcher can argue that intention toward COVID-19 vaccination of Sri Lankan population can be enhanced by promoting through these indicators (Table 5) included under each Construct.

According to these research findings social norms had a significant impact on the intention towards the COVID-19 vaccine acceptance. The social norm was measured by using two indicator statements that asked about family and the important people to the respondent influencing in the decision making, have an effect on the intention on

COVID-19 vaccine acceptance. Further, literature review also revealed that the social norms have an influence on the intention on the COVID-19 vaccine uptake [56]. The participants are willing to receive the COVID-19 vaccines when the trust towards the vaccine had higher. The trust was measured with seven indicator statements regarding the trust towards the vaccines. Latkin et al. [57] also found that trust had a significant effect on the COVID-19 intention of vaccination.

The perception on the COVID-19 vaccination had negative impact on the intention of vaccinations. The perception was assessed by the indicator statements such as COVID-19 vaccines had side effects and insufficient trials. Zeballos et al. [58] also found that risk perception had a significant effect on the COVID-19 vaccination. The media exposure about COVID-19 vaccine had insignificant relationship with intention of the COVID-19 vaccination. The media exposure was studied using indicator statements which were influences on provision of information by the government and the received information from social and mass media. The literature study also revealed the same result obtained by Mir et al. [5]. The perception and the media exposure had substantial link with the trust towards the COVID-19 vaccines. Szilagyi et al. [59] also reported that trust towards the COVID-19 vaccines had a relationship with the source of information.

## CONCLUSION

Against the backdrop of this project, it is possible to concluded that relevant government bodies can develop action plans and campaigns to promote the vaccine acceptance among the people by considering variables such as trust, social norms, media exposure and perception.

Providing reliable information regarding the vaccines, implementing awareness programmes among the public, utilization of media to disseminate the information regarding the vaccine and providing information about the importance of herd immunity could be tackle the hesitancy towards the COVID-19 vaccinations by considering these factors to develop the action plans.

This research had certain limitations including constraints in the theoretical model and limited number of constructs to explain the vaccine uptake behavior of Sri Lankan people. Despite the limitations, the findings of this research study had a number of significances for the human health-related campaigns and informative initiatives targeted at increasing the intention of COVID-19 vaccination.

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# APPENDIX 1

| Construct | Variable name | Items |
|---|---|---|
| Trust | T1 | I believe that vaccination is a successful strategy to reduce COVID-19 spread |
| | T2 | I trust that vaccines for COVID-19 will reduce likelihood of getting the infection. |
| | T3 | I believe that COVID-19 vaccination will be successful in COVID-19 disease prevention |
| | T4 | I trust that vaccines for COVID-19 will aid our community to controlling the COVID-19 disease. |
| | T5 | I have faith that COVID-19 vaccines are effective against the COVID-19 virus. |
| | T6 | I believe that COVID-19 vaccines are a viable option for treating and preventing the COVID-19 pandemic.. |
| | T7 | I trust COVID-19 vaccines as medical specialists and government agencies have recommended and authorized it. . |
| Media exposure | M1 | I believe the government makes pertinent information regarding COVID-19 vaccines available. |
| | M2 | I believe that social media has influenced my decision to get the COVID-19 vaccination. |
| | M3 | I believe that the detailed information on COVID-19 vaccinations that I found on media was beneficial. |
| Social norms | SN1 | My family advises that I get the COVID-19 vaccination. |
| | SN2 | People who matter to me have an impact on my decision to get the COVID-19 vaccination. |
| | SN3 | My decision to get COVID-19 vaccinations was influenced by my friends and coworkers. |
| Perception | P1 | I feel that COVID-19 vaccinations are likely to produce negative side effects |
| | P2 | I'm concerned that after receiving COVID-19 vaccinations, I'll be vulnerable to infectious illnesses. |
| | P3 | I'm hesitant to use COVID-19 vaccinations since they haven't gone through enough testing. |
| Intention | I1 | I have positive mind in relation to receiving COVID-19 vaccines. |
| | I2 | I believe that COVID-19 vaccinations should be given to all members of my family. |
| | I3 | I plan to get the COVID-19 vaccination since it strengthens my immune system. |
| | I4 | I feel that COVID-19 vaccines are a mandatory to everyone. |
| | I5 | I will recommend COVID-19 vaccine to everyone |

# STRATEGIES IN PREVENTING THE TRANSMISSION OF COVID-19 A QUARANTINE, ISOLATION, LOCKDOWN, TRACING, TESTING AND TREATMENT (3T) : LITERATURE REVIEW

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## ABSTRACT

SARS -Cov-2 is the seventh member of the coronavirus family that can infect humans after the emergence of severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). This disease first occurred in Wuhan, a province in Hubei China. The virus is endemic throughout the world and was categorized as a pandemic by the World Health Organization (WHO). This virus can spread through direct contact, droplets due to coughing or sneezing, and even through air or airborne spreading according to the latest findings.

The purpose of this literature review was to conduct a review about the government strategy of various countries in dealing with COVID-19. The method used was a search using PubMed, Science Direct, ProQuest databases with the PICO search question development technique based on the " COVID-19" and "Pandemic" and "lockdown" keywords. The results of the literature search found five publications between the years 2010 to 2020 that provided, full text and open access, in addition the results of the literature review confirmed various efforts have been made by the governments in various countries considering the increasing number of sufferers. These could include social distancing and physical distancing, in which some countries even implemented lockdown to prevent the second waves of COVID-19, and specifically in Indonesia which implemented the large-scale social restrictions (LSSR). Based on this literature review findings.

This virus can be prevented by regular hand washing, wearing of personal protective equipment (PPE) such as masks and gloves, avoid shaking hands and staying at home.

### KEYWORDS

Covid-19, Quarantine, Tracing, Literature Review

## INTRODUCTION

Wuhan City, Hubei Province, China is the origin of novel coronavirus 2019 (2019-nCov) or respiratory syndrome coronavirus 2(SARS-Cov-2) [1],

Corona Virus 2 (Sars-Cov-2) it is quickly and spread evenly almost throughout the world resulting in the World Health

Organization (WHO) classifying it as a catastrophic pandemic [2]. This WHO decision is very relevant to the latest WHO data reported on November 5, 2020, which revealed that corona virus had infected 47,362,304 people and resulted in 1,211,986 deaths. In this case, the country with the highest number of patients was in the United States with 9.193.765 people and 229,948 deaths [3].

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This pandemic disaster raises significant acute damage, complying with health procedures such as quarantine, contact tracing, and early isolation which are considered appropriate initial strategies in handling the virus spread [2]. Quarantine includes a restriction at homes, regions, hospitals and involves large-scale quarantines [4], while contact tracing is a process for identifying, assessing and managing people who are in close contact with confirmed/probable cases to prevent further transmission [5].

The whole world responds to the spread of this virus in various ways, however, the most appropriate strategy is currently to take early prevention by complying with health protocols and following government recommendations [6]. The virus is spread by droplets when sneezing or coughing and enters through the eyes, nose, mouth, and saliva [7]. Each individual should have the recommended personal protective equipment (PPE) because it is valuable in protecting against viral infections [8]. The findings in the field discovered many evidence issues that triggered the spread of the virus in health facilities due to non-compliance with the health officer's direction in wearing PPE properly and poor hand hygiene [9].

## RESEARCH METHOD

The method used in the current research was a literature review, where the research articles were filtered based on inclusion and exclusion criteria and displayed in a flow diagram. In this study, the Inclusion criteria included the articles that were published in the last two years, which is from 2019 to 2020, written in English, original research and full text. Exclusion criteria were for article and those who have double publication, example published in these two databases.

The literature search used multiple databases including PubMed, Science Direct, and ProQuest. In the case of searching in PubMed database, the used keywords were COVID-19 [MeSH] and quarantine [MeSH] or Isolation [MeSH] and tracing [MeSH] and testing [MeSH] and treatment by filtering the articles that were published in the last five years and in full text form, which resulted in 3,006 articles from this database. Meanwhile, searching in the ScienceDirect database used keywords of COVID-19 and isolation or quarantine and tracing or testing and treatment by filtering the articles which were published in the last five years, resulted in 216 articles. Furthermore, searching using the ProQuest database used keywords COVID-19 and isolation or quarantine and tracing or testing and treatment, discovered 219,093 articles. Based on this search strategy, 222.315 articles were found from all databases. The search results of the articles were filtered according to the inclusion and exclusion criteria, had full text format, open access publication, eligible, finally five articles were obtained for review.
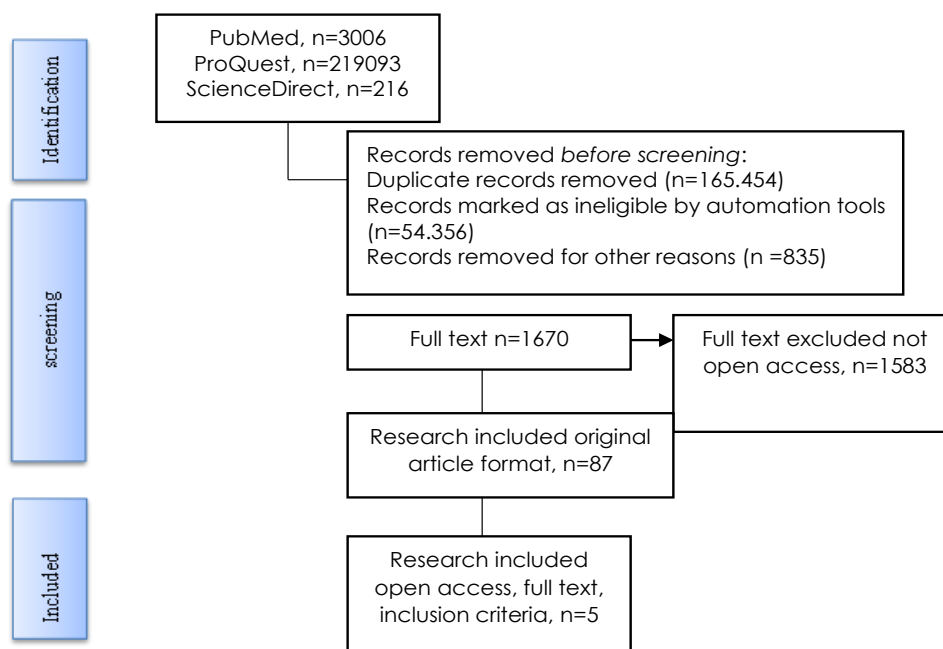
Records removed before screening:
Duplicate records removed (n=165.454)
Records marked as ineligible by automation tools (n=54.356)
Records removed for other reasons (n =835)

**FIGURE 1. FLOWCHART PRISMA DIAGRAM**

| Author | Title | Methods | The Population | Result and Conclusion |
|---|---|---|---|---|
| Hallewell, [10] | Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts | Stochastic transmission model for tracing contacts and cases and model structure | people with case isolation | isolation cannot control the spread of the virus for a long time, isolation can be applied if the number of cases is small |
| Verma, [11] | Global lockdown: An effective safeguard in responding to the threat of COVID-19 | Bayesian inference techniques were used to observe and observe changes in the 6 countries with the largest case infection | 6 countries with most cases (American, Italian, English, French, India and Russia) | To control the spread of COVID-19, like other national and international laws, lockdowns must be implemented and enforced. It is recommended that the implementation of a timely or adequate lockdown is a step towards social distancing and to control the spread of this pandemic. |
| Meo, [12] | Impact of lockdown on COVID-19 prevalence and mortality during 2020 pandemic: observational analysis of 27 country | Random sampling method from different continents | 27 countries in the world | The findings showed that 15 days after the lockdown there is a trend of decline, but there was no significant decrease |
| Purnama & Susanna [13] | Attitude to COVID-19 Prevention With Large-Scale Social Restrictions (PSBB) in Indonesia: Partial Least Squares Structural Equation Modelling | cross-sectional research using partial least squares and structural equation model (PLS-SEM) | 856 respondents | more than 50% showed the attitude due to PSBB dependent on benefits, as well as related threats covid-19 and then the community needs to support these policies by wearing a mask, keeping a safe distance and staying at home |
| Park [14] | Application of Testing-Tracing Treatment Strategy in Response to the COVID-19 Outbreak in Seoul, Korea | Descriptive and explanatory analysis | 637 Respondents | 3T effectively flattens the curve so that it drops the R value below 1 in Seoul |

## RESULTS AND DISCUSSIONS

Based on the literature search results five articles were obtained accordance with the inclusion and exclusion criteria for this study.

Hallewell's research [10] revealed that contact tracing and isolation of cases could be alternatives in preventing the spread of the virus. In addition, the findings of the researchers concluded that case isolation could not be for three months, so that the reduction of the cases could be significant if isolation and tracing were carried out effectively [10].

Another research work was conducted in six countries, including America, Russia, England, France, Italy, and India,

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this research illustrates lockdown effectiveness in these countries, but in general, this work suggested that the government should consider implementing lockdown to be effectively in order to reduce the spread of the virus. In this case timely implementation of lockdown will make a positive contribution to outbreak control [11].

Another research was also carried out by Meo [12], revealing the effectiveness of reducing cases after 15 days after the lockdown, however, it specifically it also found other facts that mortality after 15 days of lockdown does not show a positive trend [12]. Furthermore, research was also conducted in Indonesia involving 868 respondents, this research determined the effective implementation of PSBB / Large-Scale Social Restriction, this policy can reduce the risk of COVID-19 spread, yet community involvement through improved disciplinary health protocols is critical as well [13].

Korea implemented preventive measures such as testing, tracing, and treatment (3T), in another study, based on the study, it was that 3T technique in the first 100 days of the initial wave of the pandemic in effective as seen from the decrease of R Value (t) curve below 1 in Seoul [14].

## ISOLATION

Isolation is the implementation of healthcare delivery in preventing infectious diseases between groups and individuals [15]. Isolation in practice separates sick people from healthy or not infected people with a virus [16]. The isolation process could be conducted in a hospital by applying negative pressure. Self-isolation or isolation undertaken with family is proven to reduce the spread of the virus [17]. However, Smith's research denied this, stating that isolation was not optimal for infectious diseases because in asymptomatic cases or pre-infection symptoms were confirmed to cause transmission as well [[18]. Hallewell also supports this research, stating that isolation and contact tracing cannot be applied to prevent transmission of the virus, but it is recommended and effective only at the beginning of the control scenario. This research introduces other strategies in dealing with virus dissemination in the long run [10]. The negative impact of isolation on mental health has worsened the situation. Hossain's research has reviewed several scientific articles and found that isolation has led to psychological distress, stress, stigmatization, low self-esteem, and other mental disorders. [19].

## LOCKDOWN AND QUARANTINE

Most countries have chosen to implement lockdown policies in preventing the uncontrolled spread of the virus COVID-19 virus. The first implementation of lockdown was in Hubei, China, around January 2020. It is a case management strategy for COVID-19. Lockdown has impacted the travel restrictions for all Hubei citizens, the cancellation of the meeting, and the closing of public places such as schools and universities [20]. Lockdown is also enforced in some countries including India, Russia, France, Italy, and the UK. Lockdown policy in these five countries has had a positive impact in reducing the spread rate of the virus, in contrast with the United States that did not implement it [11]. Other studies reinforce these findings from 27 countries that experienced a decline in the average prevalence of mortality in a last 15-day period compared to the 15 days before the lockdown [12]. Lockdown is considered a good strategy reducing contact by 81% and the rate of the spread of this virus. The research work of Domenico's [20] warned a second wave would occur if the lockdown status were revoked [21]. Besides reducing the spread of disease, lockdown led to a decrease in air pollution. Lian's research results showed air quality in Hubei and Wuhan increased after lockdown [22]. This research result is supported by Singh and Chahan in India that lockdown also resulted in better India's air quality to be better [23].

## TERRITORIAL QUARANTINE

Territorial quarantine is almost the same as lockdown, but quarantine only covers a narrower area. Barbara Streit's research concluded quarantine is more cost-effective in preventing the spread of the virus if it is done quickly at the beginning of deployment [24]. Especially in Indonesia that implemented a Large-Scale Social Restriction (PSBB) policy, where the PSBB policy was devolved in April 2020. PSBB in Indonesia proved to be effective in suppressing the transmission of the R-value from 2.2 to 1.2 in April to June 2020 [25]. PSBB requires the active involvement of the public to stay at home. Generally, PSBB can reduce contact but may harm some traders and construction workers who lost income and thus impacted their economies. PSBB also has an impact on the mental health conditions, including the incidence of anxiety, depression (16-28%), and stress (8%) [26]. PSBB success rate is very dependent on the community's behaviour in staying at home, keep a safe distance from others, and always wearing a mask [13].

Lockdown and territorial quarantine are obligation and moral burden that must be carried out by residents of states, in addition government must also prepare to meet mandatory basic needs of citizens affected by the quarantine [27].

## TESTING, TRACING AND TREATMENT

Testing. Tracing and Treatment (3T) are also strategies to control the spread of the virus that have been tested in Korea by implementing the strategy of preventive testing and also in the provisions of a call center for the prevention of transmission of COVID-19, The results further showed a flat curve of the transmission case [14]. When prevention of the virus is approached simply by testing, it will not be efficient because it is only part of the strategy. Hence, The World Health Organization (WHO) highly recommends a combination of 3T [28]. It combines isolation of cases, tracing, and more effectively reduces the spread compared to only perform self-isolation [29].

Tracking systems-based applications has been developed. Altman's research even found that tracing in the application form showed to reduce and press the number of spread of the virus [30][31].

## CONCLUSION

Transmission of COVID-19 can be prevented through territorial quarantine, and lockdown which have been proven to reduce the spread of this virus but must be done promptly. Indonesia carried out PSBB. A policy is similar to territorial quarantine, but on a large scale. This policy also can reduce the spread of the virus.

Government policies related to the quarantine area and 3T should receive maximum support from the community as an objective and participants who are involvement in complying with a government's protocols and appeals that affect the success of countermeasures of COVID-19virus.

This research can be used as an early step in the future to significantly reduce the spread of the disease and it is best if original research is needed to test the reliability of these reported treatments.

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# INTEGRATING TELEPSYCHIATRY BASED CARE IN RURAL ACUTE COMMUNITY MENTAL HEALTH SERVICES? A SYSTEMATIC LITERATURE REVIEW

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## ABSTRACT

### BACKGROUND:

There is limited local literature specific to emergency department assessment and subsequent telepsychiatry follow up in the community and most literature on telepsychiatry does not cover the case of urgent assessment and crisis follow up in the community.

### AIM:

This literature review explores the use of videoconferencing technology to overcome the burden of distance and access to tertiary mental health services in regional and remote areas of Australia.

### METHODS:

A systematic search in Medline, CINAHL, Psychiatry Online, Google Scholar, and the NSW Health Clinical Info Access Program (CIAP) was conducted. A combination of key terms: "Telepsychiatry" OR "Mental Health Telemedicine" OR "Telemedicine" OR "Telehealth" OR "Videoconferencing" OR "Mental Health Videoconferencing" OR "Telepsychiatry Ethics" AND "Acute Community" AND "Emergency Assessment" were used. Based on the screening and eligibility criteria, 21 peer-reviewed articles published in English between 2005 and 2020 were included in the review.

### RESULTS:

Key themes were found which support the use of remote telepsychiatry. Common in the literature were themes of equivalence to in-person review, as well as themes of convenience, overcoming remoteness and timely access to specialist assessment. Ethical and technical considerations was also commonly cited. The literature search found no direct examples of an acute psychiatric assessment in the emergency department with a subsequent follow-up in the community using videoconferencing technology.

### CONCLUSION:

Telepsychiatry in both the home and emergency department areas had merit and equivalence to face to face review, with the added benefit of wider access and timeliness to specialist assessment and treatment.

### KEYWORDS

Telepsychiatry, Mental health, Rural, Videoconferencing

**Integrating Telepsychiatry Based Care in Rural Acute Community Mental Health Services? A systematic literature review**

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## INTRODUCTION

It is frequently cited that living in rural and remote areas is a contributing factor to poor health outcomes. The causes of this are multiple, despite higher rates of hospital admissions, health outcomes are poorer and access to basic primary care is limited compared to metropolitan areas. Social determinants of health such as education level, income and employment are also poor, compared to metropolitan Australia [1]. Other barriers to health care are logistical, lacking a critical population mass, access to specialty services and specialists is limited. Geographical barriers limit access to specialties worsened by poor public transport. For those suffering from mental health concerns these barriers are enhanced through the symptoms of mental illness, stigma and inability so seek help [2].

This literature review will explore the use of videoconferencing technology to overcome the burden of distance and access to tertiary mental health services in regional and remote areas of Australia. New technology and methods of communication, can be unfamiliar and challenging especially where such change moves ahead of established professional culture, ethics and practices [3]. Videoconferencing or telepsychiatry is an emerging technology which influences practice and can be fully integrated into contemporary rural health services. There is also emerging evidence that telepsychiatry can treat higher risk consumers with severe and enduring mental illness in the community [4,5].

During initial scoping for this topic, it was found that there is some localised use of telepsychiatry in remote emergency departments (ED) in NSW for initial psychiatric assessment and planning [6,7]. As an extension of this, is the concept of having an integrated telepsychiatry service where timely specialist emergency assessment can be accessed in more remote or regional areas where there is not 24-hour cover. After this initial assessment, follow up in the community using the same or similar technology to compliment current treatment services.

On an initial scoping review, it was found that there was limited local literature specific to emergency department assessment and subsequent telepsychiatry follow up in the community and most literature on telepsychiatry does not cover the case of urgent assessment and crisis follow up in the community [8]. This is an important topic, as technology improves in everyday communication, it is important to

then seize those opportunities to improve access for mental health care [9]. Therefore, the question informing this literature review, is specialist mental health videoconferencing within the home and emergency department a viable and practical alternative to current practises in rural acute community mental health services?

Although the literature in this review predates the beginning of the COVID-19 public health crisis. In the first quarter of 2020, there has been a rapid escalation in planning and activity in countries which are affected by the virus and having to adapt to conditions where direct patient contact is substantially restricted. Consequently, health services must provide alternatives, including the implementation of home videoconferencing consultations [10]. This is in addition to the expected burden on mental health services through trauma and isolation and vicarious or direct trauma of staff [10]. Enhancements to assertive community support via telehealth have already been implemented by Australian Government bodies, through Medicare, Non-government funding and state government funding [11,12]. This adds to the importance of understanding this subject to prevent iatrogenic harm through unplanned implementation.

There is varied terminology in the literature that is synonymous, that is, the same concept in terms of purpose and technology but it is useful to set them out for clarity, although there is no broad agreement on terms. For this literature review the term 'telepsychiatry' will describe the interaction between a clinician and a consumer via a remote video internet-based system [13]. This interface can be centre based, where the consumer is on campus, such as an emergency department and home based telepsychiatry is where the consumer is at home and the clinician is on campus or elsewhere [14].

## METHODS

This study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.

### SEARCH STRATEGY

A search was undertaken of the major literature search data bases including Medline, Cumulative index of nursing and allied health literature (CINAHL), Psychiatry online, Google scholar, and the NSW health Clinical Info Access Program (CIAP). The Cochrane library for systematic reviews was also searched for recent systematic reviews,

these reviews were harvested for original research relevant to the topic.

Given the varied nomenclature to describe similar videoconferencing technology, several search terms were placed in quotation marks, including: telepsychiatry OR mental health telemedicine OR telemedicine OR telehealth OR videoconferencing OR mental health videoconferencing OR telepsychiatry ethics AND acute community AND emergency assessment. In addition, Boolean operators were used in combination with the above base search terms. A search in Google scholar was conducted in addition to a manual hand search of the reference lists of the included studies to identify additional relevant studies not captured in the Medline and CINAHL by using the same terminologies.

The search resulted in a high yield of non-mental health material and telehealth which did not use live video, which was excluded. Non-English articles were excluded. The search was limited to retrieve articles published between 2010 to 2020 only. However, given the limited results directly related to the area of interest, a further search was undertaken back to 2005, although this did not yield any suitable results. All the articles used for background and tentatively included in the literature review had their reference lists searched, which was effective and yielded more original research. See Figure 1 for PRISMA search strategy.

**FIGURE 1: PRISMA FLOW DIAGRAM OF INCLUDED STUDIES**
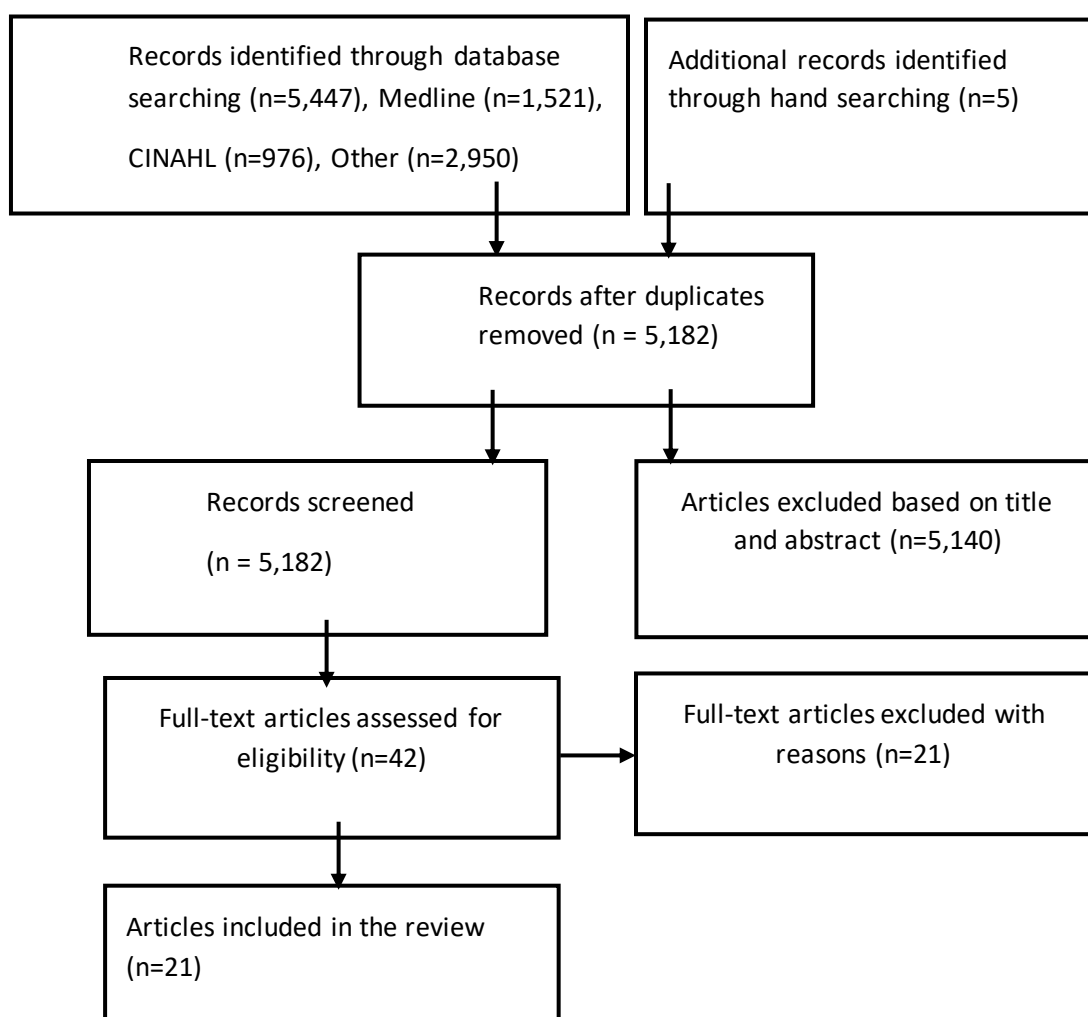


## SEARCH OUTCOMES

Figure 1 summarises PRISMA search strategy. A total of 5452 records were identified. Out of the total records, 330 duplicates were removed. The title and abstract of the remaining records were then screened (n=5182) and 5140 studies excluded after applying eligibility criteria. Forty-two full-text studies were then obtained to be further assessed for eligibility. An additional twenty-one studies which did not support the use of remote telepsychiatry were excluded after the full-text screening. Twenty-one studies were identified and included in the final synthesis.

## DATA EXTRACTION

The extraction form was developed using Joanna Briggs Institute and Cochrane manuals. This form was created to document consistent data from each of the articles. Based on the individual study findings, a coding framework was developed to identify common themes among the selected studies. A mixed-methods synthesis approached was developed aggregating findings to summarise both quantitative and qualitative data. There was sufficient original material on the topic of home based telepsychiatry and emergency based telepsychiatry, although not exactly matching the preferred phase of care in acute community home treatment. As a result, specialist intervention research via telepsychiatry were included which were similar in context and able to inform this review.

The data extraction form was grouped into three sections. The first section was related to the characteristics of the included studies such as the authors, year of publication and the country in which the study was conducted. The second section documented information related to the study methods and designs. The third section was related to the key findings of the studies. The first author extracted data from the included studies and the third author confirmed the extracted information.

## ETHICAL AND METHODOLOGICAL LIMITATIONS

Ethical approval was not sought for this literature review. A Human Research Ethics Committee (HREC) approval was not necessary, as this review only utilised previously collected data and published studies.

There are some inherent methodological limitations in this review. For instance, the present review did not include reports, grey literature and textbook which could provide additional information. In addition, this review included articles published in English language in the period 2005 to 2020 which could have missed some additional results.

## RESULTS

From the literature search, there were key themes found which support the use of remote telepsychiatry. Common in the literature were themes of equivalence to in-person review in addition to themes of convenience, overcoming remoteness and timely access to specialist assessment, even in more remote areas. Ethical and technical considerations was also commonly cited. These core themes and sub-themes were presented in the Table 1 and Table 2.

**TABLE 2: THEMES AND SUB-THEMES**

| Themes | Sub-themes |
|---|---|
| Emergency department telepsychiatry is effective | • urgent psychiatric assessment in emergency departments<br>• a telepsychiatry option for paediatric emergency departments<br>• reduced length of stay and reduced cost<br>• the geographical challenges<br>• immediate assessment by a specialist clinician |
| Home based telepsychiatry is less common but effective | • home based telepsychiatry treatment method<br>• low technological literacy, isolation, complexity, stigma and challenging behaviour preclude home based treatment by telepsychiatry<br>• patients feel safer in their home environment |
| Ethical consideration in telepsychiatry | • isolation and unsatisfactory access to the internet<br>• ethical breaches through unsecure internet connections |
| Technical barriers and consideration for access | • access to right equipment and bandwidth is a limiting factor in the use of telepsychiatry<br>• technical factors around home base video conferencing<br>• national broadband network (NBN) connections and mobile technology<br>• impediment using proprietary software to access in urgent clinical situations |

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## EMERGENCY DEPARTMENT TELEPSYCHIATRY IS EFFECTIVE

In this review articles were selected which focussed on telepsychiatry used for urgent psychiatric assessment in emergency departments. Most of the quality peer reviewed literature was from the US and Norway with some Australian research based in NSW. Clinician and consumer perspectives were found and all age groups were included. In addition to general emergency areas, paediatric emergency departments were included and yielded research relevant to the aims of the literature review.

In a group of paediatric emergency departments in Denver, although metropolitan, did not have on site specialist mental health staff. Previously, children requiring psychiatric assessment were transported to a specialist centre. However, a telepsychiatry option was put in place. In this group, Thomas audited 494 psychiatric assessments where one group were assessed on site and the other were transported to the specialist facility. Key performance data was analysed related to disposition, cost, admission rate and readmission [15]. The telepsychiatry group rated better in all domains and in a consumer feedback survey also rated highly in consumer satisfaction. Also, in the paediatric emergency area, Reilford and Adebanjo analysed the performance data of a New York children's hospital which commenced on site telepsychiatry assessment, instead of calling in specialist clinicians [16]. They found there was significant improvement in key performance data with reduced length of stay and reduced cost. However, where an admission was required, there was no difference in length of stay, also, in this study service user perspectives were not sought.

In a Norwegian study, Tronsden et al. conducted interviews with service users and staff to describe their experience with a rural urgent telepsychiatry assessment [17]. The service users and staff describe the geographical challenges of providing specialist urgent psychiatric assessment in semi-remote areas. They found there are four pragmatic drivers which are common to the success of remote telepsychiatry, that is, telepsychiatry allows for close to, immediate assessment by a specialist clinician.

Related to this is the work of Saurman et al. who found that the attitudes of staff towards emergency telepsychiatry was based on preconceived ideas and prejudices of video conferencing service to be inferior to a traditional interface

[6]. Acceptance of this was in two stages, firstly when a service gap was filed by the ED telepsychiatry service and second, when there was better awareness and familiarity with the service. Awareness in this context is understanding the service, how to access and facilitate access for consumers.

The largest research study found, conducted by Narasimhan et al. which compared 7261 telepsychiatry episodes in the emergency department with an equal number of encounters that did not use the telepsychiatry service [18]. The results from this study found clear advantages in the telepsychiatry group in terms of less cost, less wait time, fewer representations to the emergency department and improved post discharge engagement with follow up services. The authors also describe the drivers to the implementation of the telepsychiatry service, which are a lack of psychiatric specialists in rural areas and associated challenges in attracting staff to those areas.

This is comparable to an Australian context and outlined by Saurman et al. [7] who also document the same drivers as Narasimhan et al. [18]. Saurman et al. reviewed the non-admitted patient performance data for eight remote NSW health districts for a total of 1487 clinical services episodes [7]. However, the Australian study results were less clear for the telepsychiatry advantages compared to the other overseas studies. Remote NSW was found to be different in that there are remote regional hospitals and then a category of 'very' remote hospitals. The very remote centres had a higher rate of admission after a telepsychiatry assessment compared to usual practice.

## HOME BASED TELEPSYCHIATRY IS LESS COMMON BUT EFFECTIVE

Overall, there was little original research in the effectiveness of home based telepsychiatry in the acute stage of treatment and intervention, no Australian based studies were found. However, there are examples of home based telepsychiatry which focussed on specific psychiatric illnesses and populations [19]. The common thread in all the articles was the use of telepsychiatry in the home environment.

A collection of case studies by Hogan et al. explores five cases which used a home based telepsychiatry treatment method [20]. The five cases are presented as a counterpoint to perceived bias that telepsychiatry is unsuitable for certain psychiatric conditions or demographic. The authors provide examples that

challenge the perception that low technological literacy, isolation, complexity, stigma and challenging behaviour preclude home based treatment by telepsychiatry. Case studies can be useful to direct future study. However, some caution is required as most case studies are open to different interpretation with no methodological clarity [21].

In the search for original research in the application of home based telepsychiatry, one cohort was more prominent in the literature, which was veterans in the USA and treatment of trauma related illness. In the US, this is the most widely studied application of home based telepsychiatry [22]. Those suffering from trauma related illness tend to experience barriers to usual centre-based treatment through self-isolation, stigma, and living remotely [23]. In this randomised controlled trial, 52 participants were split into two groups, control and telehealth. Result was equally split between the two groups, both treatment mediums were equally effective. This research is further supported by Strachen et al. who enlisted a much larger cohort (n=227) for their randomised controlled trial which also found parity between the telepsychiatry and control group in effectiveness, with the addition of seeking qualitative feedback from consumers and concluded that widespread use of home based teleconferencing is inevitable as consumers "appear to like it, want I and more importantly, need it" (p. 408) [24].

A later randomised study by Gros et al. again to treat Post Traumatic Stress Disorder (PTSD) in a group of veterans [25]. This study also measured treatment response which also found no difference between home based telepsychiatry and centre-based treatment in terms of treatment response. This is also supported by Wagner et al. who had a similar result treating depression in terms of patient satisfaction and symptom improvement as equal to face to face treatment [26].

Outside of the US based trauma studies, a small Italian based study which describes and attempts to categorise videoconferencing in the psychotherapy treatment process. Cipolletta et al. seek to find if aspects of videoconferencing are disruptive to the therapy process, such as technical disruptions, environmental disruptions and privacy [27]. The sessions were recorded and then reviewed for content analysis. They found no disadvantage to home based videoconferencing treatment and in some clinical cases there were advantages in patients feeling safer in their own environment and in terms of convenience. The sample size in this analysis was small and

is useful as background but the authors did not rationalise how representative their sample is which would need further confirmation [28,29].

## ETHICAL CONSIDERATION IN TELEPSYCHIATRY

Within some of the chosen articles there was mention of ethical considerations in the research articles. Within the US based veteran telepsychiatry research, across that research resources and access to technology was not noted as an ethical concern as this was financially covered by the relevant repatriation funding body. Despite this, some participants had to be excluded due to isolation and unsatisfactory access to the internet [23]. Lai et al. noted concerns from participants around protection of privacy and recording of conversations [30]. Within emergency department based urgent telepsychiatry, there was discussion and mitigation of potential breaches of privacy through use of in house secure telemedicine systems or proprietary secure platforms [7,16].

Gamble et al. argue that with the increasing use of internet-based communication and its clear potential to extend the reach of service, with this, comes risk of ethical breaches through unsecure internet connections, from both clinician and service user [3]. Also, mitigating risk in terms of knowing the location of the service user if they engage in self harm or other risky behaviour, this is more difficult to mitigate in telepsychiatry [31].

Additionally, in the time of the current COVID-19 public health crisis there are other ethical considerations based on the principle that all public policy to manage infectious disease is a compromise between values such as privacy, liberty and protection of the public [32]. An example of this in the current crisis is where individual health districts within NSW have adopted less secure video conferencing platforms such as Zoom, to facilitate home based treatment.

## TECHNICAL BARRIERS AND CONSIDERATION FOR ACCESS

The technical aspect of access was split between the emergency department based and home based telepsychiatry systems. Emergency department based telepsychiatry, there is no requirement of the consumer to provide any equipment or bandwidth. Of the literature reviewed from an emergency department assessment perspective, services had put in place suitable, fit for purpose equipment. For example, Saurman et al. reported the equipment used was linked to the NSW

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videoconferencing system which they note, was of a high standard [7]. In home based telepsychiatry, access to right equipment and bandwidth is a limiting factor in the use of telepsychiatry in addition to the inconsistent quality of commonly used videoconferencing tools such as Skype [3]. Within the US based veteran telepsychiatry this was less of a concern as equipment and software was provided in some studies [29].

The only original study included which explored the technical performance and satisfaction with videoconferencing was Taylor et al. which was Australian based research that explored technical factors around home base video conferencing, where consumer satisfaction and call dropout rate was measured [33]. The results were that fixed, national broadband network (NBN) connections were superior to mobile technology at the time and satisfaction levels were high. However, the research was conducted using proprietary software. This may be an impediment to access as in urgent clinical situations, the more commonly available software is more realistic and available in term of ready access [34,35].

## DISCUSSION

In addressing the question of the viability and practicality of creating an integrated telepsychiatry service which commences upon initial assessment in the emergency department and then continues onto treatment in the community, the findings of this literature review provide some confidence that this is a viable alternative to current service provision. This result is supported by relatively recent systematic reviews in the literature by Lawes-Wickwar et al. [5] and Reinhardt et al. [8] Assessments which are conducted by telepsychiatry in the emergency department were found to be equal to face to face assessment with the added advantage of providing specialist, timely assessment on site.

Evidence for home based telepsychiatry was less clear, with no true, home based telepsychiatry services found in the literature within Australia. Several overseas examples were found which were specialist services with specific treatments, such as treatment for PTSD, depression and first episode psychosis [24,30]. This does not directly answer the literature review question in comparative terms. However, there is enough evidence found in closely related work to support more broad use of home based telepsychiatry.

In assessing the evidence for the use of telepsychiatry, this literature review has found that telepsychiatry can be a potential solution to providing acute mental health care in more remote areas or as a means of concentrating more resources into a treatment episode. In terms of population health, the more resources that can be assigned to an individual, the better the outcome. However, this concentration of resources comes at the expense of treatment reach potential. Telepsychiatry is a means of overcoming this, both spreading and concentrating resources.

Alternatives to inpatient hospital care to assess and treat mental health conditions and situational crisis, at home, are long established and come under many different names which describe the same fundamental function [8]. Metropolitan Victoria have Crisis Assessment Teams (CAT) and other jurisdictions have various names for services with the similar functions. Common to these teams are the functions of initial triage, rapid assessment and short-term treatment in the home environment. These services usually operate in a multidisciplinary environment and work closely with primary care providers, such as general practitioners and other private or nongovernment providers [36,37]. Within the metropolitan setting this type of assessment is usually undertaken in person by a specialist mental health clinician based at the emergency department and staffed all hours [36]. Outside of the metropolitan area there is no consistent resourcing, some remote emergency departments are using on site telepsychiatry. However, this is not widespread and is a significant service gap [6].

### STRENGTH AND LIMITATIONS

The chosen research was from several different countries giving some scope and range. In much of the research found, there were consistent research questions, aims and methods with similar and consistent findings. This repeatability adds to the reliability and validity of the research [20]. Direct applicability to Australia and the Australian health care system for home based telepsychiatry in the acute phase was limited due to a lack of local research and overall lack of research worldwide [8]. Home treatment by telepsychiatry is extensively used in other jurisdictions for certain conditions such as PTSD funded by veteran services [23]. However, while there is compatibility, it is not directly known if that success can be duplicated in a general community mental health setting. Given the lack of local data, further local research is required for home based telepsychiatry. However, based on the strength of overseas services, it is recommended to

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move to implementation of local trials and expansion of current emergency department telepsychiatry sites in NSW. The findings of the present review support continued efforts to triage, assess and plan follow up using the principles of least restrictive care and safe referral out of the emergency department.

# CONCLUSION

This literature review has explored the feasibility of acute psychiatric assessment in the emergency department and subsequent follow up in the community using videoconferencing technology to create a true integrated telepsychiatry service.

The literature search found no direct examples of this proposed model. However, when the service location and components were split into emergency department assessment and home based telepsychiatry it was found that telepsychiatry in both those areas had merit and equivalence to face to face review with the added benefit of wider access and timeliness to specialist assessment and treatment. However, in the case of home based telepsychiatry there are more complexities and obstacles which need further consideration such as safety, fair access and technical limitations. Additionally, in recent weeks there has been the catalyst of the COVID-19 crisis where there is a rapid transition to remote videoconferencing care, from circumstantial necessity, this may yield more useful data but also has the risk of wasted opportunity if the previous literature is not considered.

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## APPENDIX

### TABLE OF THE SEARCH TERMS AND RESULTS USING MEDLINE DATABASE

| Searches | Results | Types |
|---|---|---|
| telepsychiatry OR mental health telemedicine OR telemedicine OR telehealth OR videoconferencing OR mental health videoconferencing OR telepsychiatry ethics AND acute community AND emergency assessment | 9547 | Advanced |
| English language and yr="2005-2020 | 1521 | Advanced |

### TABLE OF THE SEARCH TERMS AND RESULTS USING CINAHL DATABASE

| Searches | Results | Types |
|---|---|---|
| telepsychiatry OR mental health telemedicine OR telemedicine OR telehealth OR videoconferencing OR mental health videoconferencing OR telepsychiatry ethics AND acute community AND emergency assessment | 5124 | Advanced |
| English language and yr="2005-2020 | 976 | Advanced |

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# TABLE 1: SUMMARY OF THE KEY FINDINGS FROM THE STUDIES INCLUDED IN THE REVIEW

| Author(s) / Year of Publication/Country | Study Method/Design | Key Findings of the Study |
|---|---|---|
| Bolle et al., 2018. Norway | Qualitative design, video conference between on-call psychiatrists based at home with remote emergency centres. Follow up semi structured interview with participating staff, n = 24 | Clinician perceptions who received clinical assistance in emergency centres from mental health clinicians. Found telepsychiatry to be supportive in reducing uncertainty in planning, assessing severity of presentation and resolving disagreement between clinicians. |
| Narasimhand et al., 2015. USA | ED based. Study over four years, n = 7261 telepsychiatry interventions which were compared to a matched control group using regression analysis | In the telepsychiatry group, admission rate was lower, overall treatment cost was lower and follow up rates were higher. Authors hypothesise that rapid access to expert mental health personnel drives the improvement rather than telepsychiatry in itself. |
| Reilford and Adebanjo, 2019. USA | Data analysis of presentations to a paediatric ED that required a MH assessment, explored length of stay and on call staff satisfaction | Found direct reduction in length of stay to ED where TP was used. Increased on call staff satisfaction. |
| Saurman et al., 2015. Australia | 12 participants from across NSW, semi-structured interviews of ED staff and one GP on perceptions of telepsychiatry in the ED across several NSW local health districts | Interview based on the "six concepts of access" summarised as right care from the right service at the right time. Positive reception to service as filling an unmet gap. |
| Saurman et al., 2014. Australia | Patterns of use in ED telepsychiatry between remote health districts. Quantitative data. 1487 clinical encounters | Compared remote and very remote telepsychiatry assessments and disposition outcomes. Very remote EDs had a higher rate of admission post assessment. However, those admissions were found suitable for local admission rather than transferring the patient out to a regional centre. |
| Thomas et al., 2018. USA | Children's hospital ED. 493 post discharge surveys split into two groups receiving telepsychiatry and usual care. Measurement of discharge disposition, length of stay in ED, cost and staff carer satisfaction | Telepsychiatry had a 5% higher return visit rate, significant lower cost, less time in the ED, less requirement for transfer to another facility for specialist assessment, Carer satisfaction was high comparatively, staff satisfaction less so with telepsychiatry. |

| Tronsden et al., 2018. Norway | Thematic study, 29 semi structured interviews with consumers and clinicians | Found four pragmatic contributions to the positive findings for TP. 1. Immediacy of assessment. 2. Open transparency during assessment and planning. 3. Access to specialist clinician. 4. Promotes consumer involvement in decision making |
|---|---|---|
| Cipolletta et al., 2018. Italy | Two psychotherapists and five clients, conversation analysis | Videoconference therapy sessions were recorded and content analysed for differences in therapeutic relationship compared to face to face. Found no great difference with online sessions. |
| Gamble et al., 2015. Australia | Application of current ethical standards in psychology to telepsychiatry | The original article identifies current ethical expectations and applies to telepsychiatry as it emerges as a more popular medium and highlights privacy, data storage and maintaining regulatory standards. |
| Gros et al. 2018. USA | Randomised controlled study, PTSD treatment for veterans (n=67) via home based telepsychiatry | Study focussed on patient perceptions and subjective experience. No difference found in perception of quality. |
| Gilmore and Ward-Ciesielski, 2019. USA | Perceived risks of telepsychiatry in higher risk cases via online questionnaire of 52 therapists | Concerns were less patient control, perception of missing key information. However, younger therapists were more comfortable with video assessment |
| Hogan et al., 2019. USA | Case Studies (n=5) in home telepsychiatry | Presentation of five case studies that successfully used home telepsychiatry in more challenging and higher risk clinical presentations. |
| Hungerbuehler et al. 2017. Brazil | Randomised controlled trial, 107 participants, effectiveness of home based telepsychiatry (n=53) vs centre based (n=57) for outpatient follow up | Participants recovery was rated by treating psychiatrist and self-assessed with a questionnaire. Study found no difference between telepsychiatry of clinic based treatment. |
| Lai et al., 2020. The Netherlands | Perspective of young consumers with first episode psychosis of home based telepsychiatry. 51 participants, Likert scale satisfaction survey | Themes, loss of human contact, fear will replace all direct contact, fear conversation will be recorded and confidentiality. |
| Strachan et al., 2012. USA | Randomised controlled study. Treatment of PTSD in veterans, larger cohort (n=227) | Study over four years, no difference in outcome from telepsychiatry vs clinic based treatment. Also, qualitative reporting of high degree of patient satisfaction and convenience from home based telepsychiatry. |
| Sabin and Skimming, 2015. USA | Review and discussion paper on a telepsychiatry ethics framework, peer reviewed | Addresses the common concerns as cited in other literature such as informed consent, safety, privacy and confidentiality. However, they discuss equity of access as being a strong ethical consideration. |

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| | | |
|---|---|---|
| Shulman et al., 2017. USA | Pilot study over six months, 22 participants split into two groups, one assigned to teleconference follow up, the other via a clinic | Study was to measure appointment adherence to the planned videoconference sessions, they found that videoconferencing verses clinic based review made little difference in appointment attendance rate, both had good adherence. |
| Taylor et al., 2015. Australia | Perception of technical quality of home videoconferencing quality n=1020 sessions | 91% of the teleconferencing sessions were successful from a technical quality over 3G connection. |
| Thompson et al., 2012. EU | Review and discussion paper in older cohort for home based videoconferencing | Defines consent in the telehealth area and ethical considerations for an aging population and technical literacy, variable access to the internet can lead to inequality. |
| Wagner et al., 2013. Switzerland. | Randomised controlled trial with 62 participants for treatment of depression | Two groups, telepsychiatry and clinic based. No difference found between the groups initially. However, telepsychiatry group had maintained improvement at three-month review, more so than the clinic group. |
| Yuen et al., 2015. USA | Randomised controlled study. Treatment of PTSD in veterans (n=52) | Found no statistical difference in outcome from telepsychiatry or clinic-based assessment. Both facilitated recovery. |

# COVID-19 AND ITS DERIVATIVES: A RELATION WITH LIGHT FOR HEALTH

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## ABSTRACT

Light now has many applications in life and plays a vital role in therapeutic and protective fields. In the recent era, many light sources are considered for prevention, sterilization, and curing, especially with artificial lamps. Since the coronavirus pandemic appeared in 2019, the world has been interested in sterilization by light rays from a physical and applied point of view. In this work, the authors focus on definite spectral bands and their direct effects on the current COVID-19 pandemic for a prevention spreading purpose.

According to the light use results, until now, the most useful method for decontamination against COVID-19 is ultraviolet C. The other spectral bands like UVA, UVB, and violet-blue show that they have a more negligible effect on the deactivation of the COVID-19 virus. The UVA and UVB help increase vitamin D in the human body, reflecting positively on the immunity system and increasing the recovery rate. The violet-blue band is helpful in decontamination against bacteria microorganisms. As for the IR band, the studies are still recent, and until now, there is no recommendation to use this band in sterilization against this pandemic. Studies continued on UV utilization because the world urgently needs industrial and domestic disinfection systems and sterilization. The other bands have another substantial practical effect on health improvement so any people can survive and overcome different diseases.

## KEYWORDS

UVC disinfection, blue light, disinfection devices, environmental UV bands, prevention from COVID-19

## INTRODUCTION

COVID-19, the pandemic that started in 2019, told us dramatically how our health is so important and the many benefits of the use of light. As for knowledge, and according to the World Health Organization (WHO), Coronavirus disease is an infectious disease caused by the SARS-CoV-2 virus. The recent pandemic (COVID-19) was first reported in Wuhan, China, in 2019 and subsequently spread globally to become the fifth documented pandemic since the 1918 influenza pandemic [1] [2] [3]. By

2022, about two and half years from the day COVID-19 was first detected, over 4.6 million people worldwide have lost their lives because of the disease spread. The best way to prevent and slow down transmission is to be well informed about the disease and how the virus spreads.

The more the pandemic increases, the more interest is in how to protect and disinfect. This article focuses on the multiple uses of light in many fields during the last two years and significantly, the relationship benefits for health (cure

and disinfection). These studies show us how much some spectral light bands have, their benefits and how they can be used.

## UVC BAND AND DECONTAMINATION

Researchers have discovered that viruses have been sensitive to heat radiation and UV light from the early nineteenth century until now. COVID-19 is considered to belong to the SARS Coronavirus family; moreover, researchers have indicated that ultraviolet light (UVC) has the capability to destroy viruses and can be effective for sterilizing device surfaces or human clothes (Figure 1) that may contaminate with the SARS-CoV-2 virus [4]. UVC radiation inactivates microbes by damaging their DNA. Unfortunately, severe eye and skin injuries can result if UVC lamps are misused or if the skin is irradiated accidentally. Besides, some materials may indicate degradation after prolonged exposure to UV light. Researchers and recommendations of healthcare committees prove that over 90% of bacteria, and viruses on the body surface, and clothes were utterly removed after examining the body disinfection chamber [5] [6].

In the last two years, many researchers worked hard to measure and determine an approximate effective disinfection dose for the Coronavirus. These measurements were performed at various distances from sources with different intensities. The results concluded that the approximate disinfection dose using an ultraviolet source (UVC) was around 60 mJ/cm2 considering the distance between the source and the irradiated area [7] [8] [9] [10]. On the other hand, according to the International Ultraviolet Association, it is generally accepted that a dose of 40 mJ/cm$^2$ of 254 nm light kills at least 99.99% of "any pathogenic microorganism". Therefore, UVC light is just novel to SARS-CoV2 [11].

Concerning the disinfection process, one of the famous tools used is the UV chambers. The uniformity of the irradiation must be considered to ensure that all samples along the irradiated area will be uniformly exposed to the disinfection dose. Therefore, several types of research focused on this matter by using different techniques; some are simple while others are complicated to achieve the best uniformity [12] [13] [14]. Faramawy and Reda [15] illustrated how to enhance the uniformity by applying a simple and applicable technique to their designed and manufactured UV exposure cabinet stabilized at the

radiometry lab, National Institute of Standards (NIS), Egypt. In the presence of the COVID-19 pandemic and the need for sterilization of devices or even workers to avoid the spread of diseases and to ensure safety and protection, the authors depended on the enhancement uniformity results and hence irradiance levels increment for the next step, how such UV exposing cabinets help in the COVID-19 epidemic. This method was applied to COVID-19 samples extracted from patients as an experimental study to chase the effect of an enhanced dose and uniformity on inhibition of the virus in the samples. The results were promising, and the inhibition of the virus increased uniformly along with the sample's irradiated area with lower exposure time.

FIGURE 1. DIFFERENT TOOLS USED FOR THE DISINFECTION PROCESS.
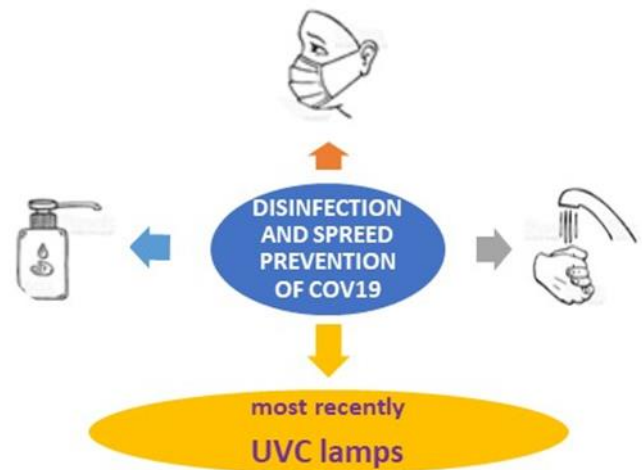


Another vital research project was about masks that became a mandatory tool for humans to avoid Infectious diseases as one of the most effective COVID-19 prevention measures [16]. Although this article may not relate to the role of the light band in the COVID 19 disinfection, it is directly related to the spread prevention of the diseases. Juri Taborri et al. [16] are interested in measuring and evaluating the breathability of each mask for each manufacturer. The authors tested about 300 commercially available masks from different companies to evaluate the reproducibility and uncertainty in the breathability measurement. The results indicated that most commercial companies' mask samples did not meet the acceptability threshold and did not satisfy standard requirements for breathability per each mask. In their conclusion the authors recommended that the measurement reproducibility parameter should be introduced into standards to reduce misclassifications related to the breathability compliance of surgical masks.

## VARIETY IN THE RECENT DISINFECTION DEVICES

Since the spread of the COVID-19 pandemic, the world has been fascinated to produce devices and tools used for air sterilization to limit the spread of this disease, and of course, the sources used in such devices are UVC (Figure 2). This article highlights some devices that achieve the disinfection purpose. Xenex company, U.S., produced a Light Strike Robot for this purpose, to deactivate the COVID-19 virus in the air within 2 Minutes [17]. The Xenex Robot helps decontaminate many surfaces in hospitals, medical office buildings, hotels, offices, gyms, airplanes, and other spaces to save many people's healthcare. This device's

disinfection dose of UVC radiation is about 40 mJ/cm$^2$ at 1 m.

Hamzavi et al [18], on the other hand, produced their research on a prototype model using Ultraviolet germicidal irradiation (UVGI) as a method for disinfection to facilitate the reuse of dwindling supplies. The irradiation area is approximately 38 cm × 114 cm, allowing for the treatment of around 18 to 27 masks (2 minutes per side). The distance between the lamp and the table surface is approximately 14 cm, with an incident dose of about 400 mJ/cm$^2$. It is important to note that delivering a sufficient dose depends on the irradiance level; hence, it can be longer or shorter depending on its capabilities.

FIGURE 2. DIFFERENT EXAMPLES OF UVC AIR DISINFECTION APPLICATIONS



Sterilization gates and devices recently appeared in conjunction with the COVID-19 pandemic and attracted the author's attention. This rectangular equipment also uses UVC lamps and disinfection spray on both sides with maximum ozone to disinfect the air and humans. This cabinet is manufactured according to safety standards such as BS EN 60598 (EN 62471:2008), EN 60598-1:2015/A1:2018, and EN 14255-1:2005. UVC gates are suggested to be used in many places because they are designed to ensure safe air decontamination and free of potential viral hazards keeping people safe from the infection as much as possible. They produce doses of around 1.2 to 1.7 mJ/cm$^2$ of far UVC light (222 nm) within less than 30 seconds, which is efficient enough to kill 99.9% of airborne coronaviruses carried by aerosols.

Is it safe to use a UVC lamp for disinfection purposes at home? An essential question that has lately shown up around the world as a reason of interesting in sterilization of inner houses air. UVC lamps used for disinfection purposes may pose potential health and safety risks depending on the UVC wavelength, dose, and duration of radiation exposure. The risk may increase if untrained individuals use these units. Several manufacturing companies have worked hard to avoid direct exposure hazards to the UVC by producing a unique household tool provided with a timing controller side by side with a possible sensor to sense any body movement. The disinfection coverage area is up to 2-3 m depending on the room area or the office; on the other hand, the movement sensors enable the device to stop operating if any moving body passes through.

Biological safety cabinets are used for Polymerase Chain Reaction (PCR) purposes, general tools decontamination and irradiated areas, or even samples disinfection for research. These devices need a mandatory performance test to ensure the disinfection doses occur all the time. The NSF/ANSI 49-2020 and related test standards focus more on how High-Efficiency Particulate Air (HEPA)-filtered effectiveness is than the performance of UVC lamps inside the cabinet. While some other research still is concerning the dose mechanism measurements and ensuring the proper disinfection dose and verifying the effective parameters on irradiation from the UVC sources. Therefore, it is recommended that these test standards are more interested in mentioning how to perform a practical dose test for these cabinets.

## UVA, UVB, VITAMIN D, AND CORONAVIRUS INACTIVATION

It is well known that sunlight contains a spectrum of UVA, UVB, and UVC, with wavelengths ranging from 320–400 nm, 260–320 nm, and 200–260 nm, respectively (Figure 3). Sunlight that reaches the earth's surface contains only UVA and a small amount of UVB since UVC is absorbed by atmospheric ozone. The UVC can inactivate COVID19, while vitamin D synthesis is closely associated with UVB radiation exposure.

**FIGURE 3. THE ULTRAVIOLET SPECTRUM FROM THE SUN AND THE ALLOWED SPECTRUM TO PENETRATE THE EARTH**
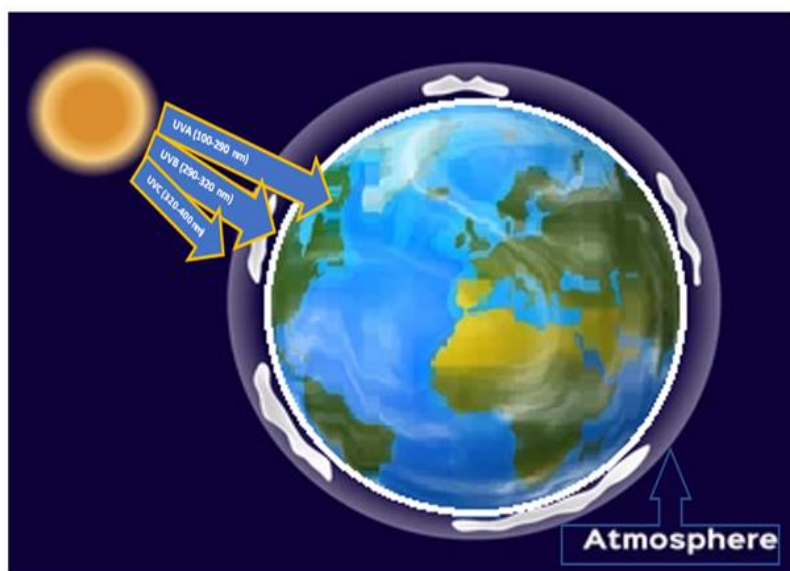


Until now, it is well known that the recently emerged SARS-CoV-2 are inherently sensitive to UVC, while UVA and UVB lack virucidal deactivation. However, very recent research; [19] [20] [21] discusses the probable effect of UVA and UVB on disinfection purposes. Successful decontamination using other wavebands requires higher dosages and longer administration times.

Many reports have also identified an association between COVID-19 fatalities and latitude. One of these articles has analyzed the impact of sunlight on reducing SARS-CoV-2 transmissibility, morbidity, and mortality [19]. The intensity of sunlight is highest in areas close to the equator, and consequently, the populations in these regions with an increase of regular exposure to sunlight, are less at risk of vitamin D deficiency, based on the data obtained from the USA [19]. Studies in Jakarta, Indonesia, showed that a higher duration of sunlight exposure was associated with a rise in the recovery rate among patients [20]. That is because the direct exposure of the skin to the sunlight promotes producing an essential vitamin D component that directly regulates the immune system, and hence the Vitamin D can lower the potential risk of respiratory tract infections, including COVID-19.

Another relationship was found for the link between COVID-19 and local environmental conditions [21]. The findings indicate that the lower temperature regions were associated with a rapid increase in the COVID-19 cases compared to the countries in warmer regions. Similar studies were held on the relation between the winter and summer to how much the COVID-19 can spread [22]. Temperature may play a significant role in viral transmissibility. Therefore, we can find an interesting link between sunlight exposure, latitude, and vitamin D status with COVID-19 incidence, fatality, and recovery rates from these interesting research studies.

Focusing on the UVB (290–315 nm) in sunlight, fascinating papers discussed the use of this band in the deactivation of COVID 19 on surfaces and air, resulting in reducing infected people's death [20] [21]. Recent direct measurements of UVB sunlight showed shorter inactivation times, less than approximately 10 minutes, depending on latitude, season, and hour [21]. The calculation estimations were held near noon, with clear-sky direct sunlight for mid-latitude sites between March and September. The inactivation times in these months give values of the time for 90% inactivation (T90) < 90 min and less than 60 minutes for many equatorial sites for 12 months of the year. In conclusion, UVB sunlight's direct measurements inactivation effect on the COVID-19 shows a shorter T90 time depending on latitude, season, and hour. Another research study was interested in finding evidence of UVB radiation's protective role in reducing COVID-19 deaths [21]. These authors discussed an increment in a permanent unit in Ultraviolet Index (UVI), which is associated with around a 1% point decline in daily growth rates of COVID-19 deaths. By the end of the research, they concluded they found a significant negative association between UVI and COVID-19 deaths, showing evidence of the protective role of UVB in mitigating COVID-19 deaths. In addition, if it is confirmed via clinical studies, then the possibility of mitigating COVID-19 deaths via sensible sunlight exposure or vitamin D intervention would be attractive.

Faramawy and Reda [15] focused their research to study using UVB and UVA lamps on COVID-19 samples to study the inactivation effect. The results indicated that they have the disinfection effects, but the exposure dose and exposure time results were much higher, approximately three to four times than UVC's results. Thus, for the primary sterilization of devices, tools, and even humans, a much shorter time is needed for exposure, so the UVC lamps still have the priority.

## VIOLET-BLUE LIGHT AND CORONAVIRUS, DISINFECTION SUPPOSES

Blue band phototherapy is a well-known method for neonate jaundice, but it can be used for disinfection purposes; and it is one of the exciting experiments that have been taken into account in recent times. Processes such as disinfection, photocatalytic cleaning, plant growth, and wound healing can be triggered with the help of blue light LED systems. Consequently, violet-blue light with a 405 nm wavelength is the most useful antimicrobial disinfection

tool, so it can be recommended to continuously decontaminate surfaces and the environment [23] [24]. LEDs with an emission maximum in this range and a narrow spectral width of about 10 nm represent an attractive light source for disinfection applications.

Disinfection processes using blue LEDs are currently attracting increasing attention. This is due to the excellent tolerability of the light and its antimicrobial effect without the addition of exogenous photosensitizers [25]. However, even though LEDs have become more powerful in the past decade, LEDs in the UVC range are not a perfect disinfection technique compared to UVC radiation. They still have low energy efficiencies of 10 % or less [26].

On the other hand, although blue light is far less harmful to humans and materials, it can pass through the cornea and lens to the retina and may cause diseases such as dry eye, cataracts, and macular degeneration. It even stimulates the brain, inhibits melatonin secretion, and enhances hormone production, affecting sleep quality in the long run. Therefore, blue LEDs require a precise analysis of their emissions and a classification according to the risk groups defined in the international standard IEC 62471 to ensure safe operation. Single blue high-power LEDs without diffusers typically belong to risk group one or two [27]. They do not represent a photobiological danger as long as people do not stare into the light. Eye-protectors are necessary when high-energy blue LEDs are used. Unfortunately, another disadvantage of blue light technology is that viruses cannot be deactivated [27] [28]. Even though the blue light may not be used as a disinfection tool for COVID-19, it helps prevent a surface from bacteria infection. Therefore, the author mentions the importance of this band for disinfection purposes.

## INFRARED BANDS AND DRY HEAT, TRIALS FOR COVID-19 DISINFECTION

Few researchers in recent years have studied how much Infrared radiation can affect or deactivate viruses, especially during the current pandemic. Infrared (IR) heating has many benefits over traditional heating. Thermal processing is an essential method of inactivating foodborne viruses [29]. This study shows that the heating or treating with IR radiation wavelengths technique effectively decontaminates some human viruses with temperatures from 600C - 900C with suitable exposure time for each suggested temperature. One of the other vital

studies was the first case treated with near-infrared light [30]. The study used NIR light therapy to use a device containing light-emitting diodes (LEDs) at a wavelength, which can penetrate the skull to stimulate and heal underlying tissue. The results were auspicious for treating cortical hypos-perfusion brought on by COVID-19 infection, which means this technique cures the pandemic symptoms but does not yet affect the COVID-19 virus itself. Studies also discuss the possibility of red and infrared phototherapy to reduce the impact of the respiratory complications of coronavirus diseases [31]. The studies and results show that infrared light can reduce some of the critical complications of coronavirus infections, i.e., pulmonary inflammation and lung fibrosis.

The direct effect of infrared on COVID-19 decontamination is still being studied. One of these recent surveys concluded that IR radiation might have a virucidal effect on healthcare, in decontaminating sensitive instruments, and high-efficiency particulate air (HEPA) filters to reduce transmission and save lives [32]. The advantages of IR decontamination include uniform heating, low energy consumption, and short cycle times, but there are currently no approved IR decontamination systems for all events.

# CONCLUSION

The electromagnetic radiation delivered to the earth from the sun is divided into definite spectra; UVB, UVA, visible light, and IR. Since the COVID-19 pandemic started, the urgent necessity for continuous sterilization and the possibility of light therapy appears as important. The recent studies focused on sterilization by using artificial UV sources, especially the UVC lamps, set in different devices. Ultraviolet radiation is most effective and probably saves radiation under many decontaminated surfaces precautions. This is available using devices such as biological safety cabinets or any other UV chambers and a proper disinfection dose and distance. Air decontamination requirements appeared as important as well, and hence, other devices like sterilization gates, UV robots, and household UV lights have presented as possible options. These devices have unique designs with proper disinfection doses that sterilize the air without harming untrained people in houses, offices, and airplanes. Warnings and precautionary instructions are considered as the UVC sources are used to reach the desired prevention and decontamination disposal goals. Other research has been directed to study the effect of environmental UVB

and UVA on reducing the spread of COVID-19. Many exciting links are found between sunlight exposures, latitude, the autumn and summer seasons, and vitamin D status with COVID-19 incidence, fatality, and recovery rates. On the other hand, blue light is known for jaundice therapy but a trend to use it in the sterilization field has recently appeared. The findings concluded that this spectrum band might not be used as a disinfection tool for COVID-19, but the blue light helps more in disinfection for bacteria on the surface.

Therefore, as long as we live with periodical seasonal pandemics, we cannot give up using light sources to support good health, earning a superior ability to survive and overcome different diseases.

## DECLARATIONS

**Ethics Approval:** The study has no work on human patients or animals.

**Authors' Contribution:** Prof. S. Reda and Dr. S. Faramawy made all the contributions to the ideation and design of the article, performed the literature search, and manuscript drafting, and revised the work.

**Competing Interests:** The authors have no competing interests to declare relevant to this article's content.

**Consent to participate**: Not applicable Consent for publication Not applicable.

**Availability of Data and Materials:** Data and materials are available on demand by asking the corresponding author.

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# THE ETHICAL CONCERNS OF A PANDEMIC: A CRITICAL ANALYSIS AND OPINIONS OF THE INDIAN SITUATION IN COVID ERA

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## ABSTRACT

COVID-19 brought havoc in the world with its high infectivity and virulence. Many countries were caught unprepared in public health capacity and socio-economic parameters. In this trying time, public health ethics remain an unanswered question on many fronts of treatment and control of novel coronavirus. The objective of the paper is to analyse the significant ethical challenges faced during the COVID-19 pandemic. The pre-defined thematic areas based on critical issues are identified to understand the ethical concerns of prevention and control of COVID-19. Secondary sources of literature have been consulted, and pieces of evidence gathered to strengthen the arguments. The article also provides a recommendation on ethical measures for the preservation of human dignity and ethical practices. The human rights aspects of regulations during the pandemic of the coronavirus are discussed to understand various nuances of justice and liberty.

## KEYWORDS

## INTRODUCTION

The world has seen and faced many epidemics in the history of humanity. To name a few, plague, Spanish flu, chickenpox, smallpox, measles, polio, and many more, where human life had been threatened with massive mortality and morbidity. The recent flu-like epidemics like Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), which belongs to the coronavirus family, took heavy tolls on human life. The novel coronavirus (COVID-19) is believed to have originated in the Wuhan city of the Hubei province of China. [1] The coronavirus is named according to the outer fringe that seems to be the shape of a crown, which is a family of RNA viruses. [2,3] The epidemic of China in late December 2019, reached India into the southern state of Kerala in the last week of January 2020. The pandemic forced India into total lockdown from the third week of March 2020. [4] The second wave of COVID-19 was found to be much more serious and engulfed both rural and urban areas with mayhem. India failed to match with the requirement of resources, where the public health challenges are many for such a gigantic epidemic of the highest order in recent times with multiple waves.

The World Health Organization (WHO) also declared this a Public Health Emergency of International Concern (PHEIC)

and later on as a "pandemic" to mobilize technical support and resource to fight the nano-unit measurable virus. [4,5,6] India invoke the Epidemic Act 1897 and Disaster Management Act 2005, in which the life and liberty of the people protected under the constitution were compromised.

The coronavirus is so much more virulent and infective that the entire globe is under threat, and the economic downturn happens with millions of lives in danger. [3] This is also referred to as the corona era by many media houses and opinion makers in India due to its protracted influence on humanity. The medical professionals, health care workers, police, and administrative personnel are also at the receiving end due to their direct involvement in the fight against the deadly virus. The lack of Personal Protective Equipment (PPE) and medication to fight against corona make the situation worse. The corona era knocks down every ethical standard set by the associations, professional bodies, governments, and multilateral organizations. Even new moral were norms drafted to combat the situation.

The objective of the paper is to discover and analyse the significant ethical challenges faced during the COVID-19 pandemic. Various predefined thematic areas are identified to understand the ethical concerns. For which authoritative sources were consulted, and evidence was gathered to strengthen the arguments. The literature search is done by using highly relevant keywords in trusted databases like PubMed, Scopus, Web of Sciences, and JSTOR. The thematic areas are discussed in the subsequent sections.

## LOCKDOWN AND PUBLIC HEALTH ETHICS

Lockdown opens a pandora box of public health preparedness in India in recent times. Due to poor management of lockdown the existing health care network is nearly non-functional, causing inconvenience to pregnancy care, cancer care, dialysis, emergency care, and many more. Although the government blows the trumpet about providing emergency medical services even during the lockdown period, there is still no transportation and availability of medical services in many parts of India, as reported by ground-level media and research personnel. This defeats the cause of continuums of care in primary health care services, which is the cornerstone of health care.[7]

There is rampant panic buying of the essential stuff by the citizens in the lockdown situation. There is also less socialization and more self-medication, which is dangerous for the people during the lockdown. The behavioural concepts like isolation, social distancing, and self-quarantine are detrimental to mental health conditions. [7] Although quarantine has a good effect on the health of the community, there are still personal sacrifices making the situation ethically challenging. During the swine flu epidemic, similar features were lockdown observed, which resulted in sheer anxiety among the people.[8] Many times online mental health counselling helped in coping with the situation and proved to be effective. [9]

The lockdown effect was found to result in gender inequality. The burden of care of the family, especially children and the elderly, was very adversely affected as well as the well-being of women. [10] In rural and urban areas, women are at the receiving end suffering from unattended health issues and domestic violence. One of the most significant public health concerns during the previous SARS and MERS experience is deteriorating mental health conditions among the victims.[11] Chinese researchers provided details about online counselling for health workers and those undergoing quarantine. Despite initial dissatisfaction with the government, the workers found a better work environment and emotional satisfaction after the provision of sufficient psychological support. [12] The nature of an unprecedented COVID-19 forced lockdown in various parts of the world which necessitates many immediate steps. In the first instance, to address a pandemic of unknown nature, few protocols were available on lockdown management. Whatever guidelines were available were those to address the situations of a terror attack or siege of a city in extraordinary condition. However, in a pandemic situation, the lockdown can be avoided by creating and enabling the citizens to adopt cautious behaviors in daily activities. This does not guarantee to contain the situation of an airborne or droplet infectious disease. Alternative methods of lockdown could have been used by following ethical norms in any outbreak of diseases.

## ECONOMIC CONCERNS OF COVID-19

On the economic front, the world was threatened to a great extent because many marked blue-chip companies come to stand still in their business. The revenues of government weathered out, which results in the

unavailability of public services during the crisis time. Developing countries like India have more problems in augmenting medical services and feeding the underprivileged people for a longer period due to lockdown. The Strategic Preparedness and Response Plan (SPRP) was implemented for the protection of relatively weak states with a poor health system. The sole objectives of WHO and the government are to reduce transmission, provision of care, and augment communication networks to tackle the social and economic concerns. [5]

The Indian government asked the people to forget about their economic wellbeing and focus on their overall health of people. The poor in India does not have sufficient income to sustain their family. India is not self-reliant in many aspects of the economy and hugely depends on China and the European market to keep the economy operational. The breach in the global supply chain affects almost all economies. [13] The essential ingredients of various manufacturing plants in the pharmaceutical, engineering, automobiles, and aviation sectors usually come from China. Evidence has been found that the lockdown as a strict procedure in public health measures is in question, which is shown by the Indian Council of Medical Research (ICMR) study. [14] Researchers also confirm that people are much less likely to obey the rules and regulations of shutdown for more extended periods. [15]

In terms of psychosocial and economic aspects, the efforts of voluntary groups and voluntary organizations in providing food and other help to needy people are really notable. These organizations helped a lot to ensure the casualty is minimum. It has been seen that death due to COVID-19 took heavy tolls among the people serving on behave of voluntary organizations in India. Despite economic concerns in the society a section of the community helped out in these situations.

## PROVISION OF MEDICAL SERVICES

The provision of medical services in hospitals, irrespective of being public and private, are compromised to a great extent. The treatment of COVID-19 patients is in dismal conditions. The existing communicable and non-communicable diseases are not attended to in the hospitals due to fear of infections. Neither the patient nor the doctors and paramedic staff were ready to provide the services with utmost eagerness and compassion. Hence,

many of the hospitals even closed their emergency services in the corona era. Instances also found that if one staff ember mgets affected by COVID-19, the entire hospital was closed in the initial phase of pandemic, which resulted in the reduction of hospital services. Telemedicine provided at this time is just solving a minuscule of the mammoth problem on healthcare. The mode of transmission and herd immunity have to be understood to achieve success in the treatment process. [16, 17] Various mathematical models are used for the critical analysis of the situation of the diseases. Further assessment of the epidemiological process and immunological aspects need to be understood for successful treatment. [18]

There are models of epidemic disease dynamics working in many parts of the world. Accurate analysis is undertaken and treatment procedures are followed to achieve the desired result of treatment. Evidence found the effect of confounding variables like lockdown has a tremendous impact on the calculation of disease dynamics, and its influence still prevails. Further, adherence to social distancing norms in India has a significant effect on the control of COVID-19 initially. [19] Actualy, many of the factors are ignored while calculating these estimates. Ultimately healthcare is not available to the needy, which poses ethical challenges (10). There is a daunting challenge for clinicians and the Food and Drug Administration (FDA) to select the right type of drugs to treat the patients. The limited observational and anecdotal evidence does not help much in the treatment of COVID-19. [20] Even the US Centres for Disease Control and Prevention (CDC) advocates for the use of some drugs in America, which were later on removed from the website. [21] The vetting of drugs with rigorous premarketing evaluation for safety is required for the approval of drugs. Further, adequate randomized control trials, which are used as a primary tool for the protection of the public are paramount in public health practice and ethics.

## PUBLIC HEALTH PREPAREDNESS AND ETHICS

India shows a massive preparation for the new public health challenges of COVID-19. All people have to be treated equally. There must not be any deviation from the principles of the constitution in implementing healthcare programs. Health awareness, preventive measures, and treatment have to be provided within the ethical values and constitutional obligations. Irrespective of the socio-economic group, religion, gender, and ethnicity, everyone

has to be protected with the utmost care. However, reports mention there is some degree of discrimination in providing services to the people based on some attributes which are unethical.

In India, there are many unique features of cultural, demographic, epidemiological, and risk factor profiling that need to be addressed while forecasting and taking steps for preparedness and treatment. [19] Public health preparedness is in jeopardy due to a lack of water and sanitation, along with a lack of minimal resources in rural areas. Mere guidelines for the control of disease would not work rather, effort should be there for yielding results in the implementation. [22]

## THE STIGMA ASSOCIATED WITH COVID-19

The most devastating nature of the corona era is the spread of misinformation, confusion, mental anxiety, and fear among the citizens. [5] The stigma must be avoided for effective treatment and control of the disease because people may conceal the virus to get rid of the stigma. The WHO has expert guidance, which helps people manage fear, stigma, and discrimination. [5] The WHO focuses more on myth busting and authentic information to help people in an ethical manner. [5] Anxiety affects many in society, which leads to stigma. Evidence found that isolated individuals in quarantine have shown fear, anger, and confusion. [23, 24] All these factors originated from the stigma associated with the disease.

In public health emergencies, there are many diseases that have stigma associated with AIDS, tuberculosis, cancer, and many infectious diseases. But, in a short period, the coronavirus affects many people in the grip of stigma. [7] The doctors, paramedics, and other essential care services providers are seen with huge suspicion in the community. It is challenging for them to stay in their locality with dignity. Many of the brothers and sisters of the north-eastern states of India are also treated badly due to their ethnic resemblance with Chinese people, the country where coronavirus is supposed to be mutated and originated. The migrant workers coming back to their native land are also maltreated despite their chance of infecting the community being dramatically low.

There is a subtle difference between social stigma and precautionary distancing in the context of COVID-19. Literature review has found that the notion of social stigma

carries the feeling of shame and embarrassment, which lasts for a more extended period, as we have seen in the case of HIV/AIDS and mental illness. However, during the pandemic of COVID-19, people maintained safe distancing, and such distancing was reduced in subsequent waves of COVID-19. The stigma is more dangerous for the dignity and life of any individual. Social distancing primarily focuses on the condition of concerned citizens with a degree of science and evidence. Hence, in an ethical and caring society, there must be awareness so as to avoid any social stigma. If it arises in a pandemic situation then civil society must act to remove the stigma.

## HUMAN RIGHTS ASPECTS OF GOVERNMENT ACTIONS

India is a heterogeneous country due to its vast geography and diversity in culture, socio-economics, religion, ethnicity, language, and social groups. That is why the forefathers of India made a federal structure where provinces were given the power to plan and execute according to their necessity. During the corona era, the central government is found to be significantly powerful, and all the health and administrative regulations are applied throughout the country uniformly. Human rights are also blatantly violated by invoking the epidemic and disaster management Acts in India. People suffer from health emergencies and are not able to attend care facilities despite their ability to pay for healthcare services. The human rights aspects like protection of life and limb by the state are ignored to a great extent due to severe curtailing of the freedom of movement though with precautions. The police and the judiciary are not in a position to protect the right of the citizens.

Arguments have been by experts that the communication gap hampers the effort of government, especially in rural areas, grassroot levels, and religious circles. [25] The human rights issues are not highlighted by the current media due to various reasons such as focus in coverage of corona news, cozy with the current government, and their poor financial condition due to lack of profitable business. International bodies like The World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), USA, and Public Health England emphasize the human right issues such as dignified disposal of bodies and respect for the cultural and religious traditions of the victims. [26,27,28] In many cultures, people have their way of following different rituals of marriage, funeral, and cultural practices,

which is affected by social distancing and other public health norms suddenly. Migrant workers suffer from the abuse of human rights due to a lack of work and basic minimum amenities. Various horrifying stories of hunger, the aggression of police, atrocities at quarantine centres, and lack of medical care are reported often in India by media houses and human rights watch.

Rights of marginalized groups and ethics during epidemics and public health issues such as access to care, nutrition, and sanitation remain unaddressed for the vulnerable sections of Indian society. Nutrition is a basic need for the maintenance of health. Public health ethics have to be there to protect migrant workers, landless labourers, unorganized workers, and women workers. The well-to-do families in India have a fair amount of access to the basics of sanitation whereas the poor and marginalized population struggles to maintain basic sanitation and hygiene. Arguments are found that in this pandemic, the dalits, tribals, women, migrants, and Muslims are affected more than other people, especially in terms of loss of livelihood and income, and access to health services. As the majority of the marginalized people are landless and suffer from social and economic deprivation, the situation is worse. [22] The vulnerable sections of society suffer from depression and many other mental health challenges while coping with the situation.

In terms of ethics and vulnerable groups, the Honourable Supreme Court's instructions help in improving the situation of commercial sex workers during COVID-19. The honourable court intervenes in the provision of basic food supplies and medications to the vulnerable group without any discrimination by the government. In the early phase of the pandemic, they faced a shortage of many amenities which comes to the forefront, and subsequent with the help of state and central government the issues were resolved to a certain extent.

## RIGHTS OF ANIMALS DURING THE CORONA ERA

The COVID-19 era put animals on the receiving end of care need, irrespective of domestic, stray, and wild animals. The care of animals, both for veterinary services and general care, is severely curtailed during the epidemic period. Myths and misconceptions are not just believed but also practiced by the less informed citizens of the nation. Many animals, including pets, are kept outside the house and abandoned due to fear of infections. Despite no evidence of transmission from animal to human for the coronavirus, there is misinformation about zoonotic transmission in India. All of a sudden, the city dwellers, as well as rural people, try to keep themselves away from animals. Moreover, stray animals depend on the leftover food of society and act as scavengers in the community. Many people get mutual love from the animals by feeding them and playing with them. Stray animals are also part of our society with mutual benefits. The pets usually do not know to hunt for their food and beverage, and it is also not easy to develop such skills in a short period. If those pet animals are abandoned suddenly, it is challenging for them to sustain their life. Otherwise, it can be seen that the situation is about cruelty against animals endangering their lives and liberty. Animal ethics are compromised. With the world moving toward the "one health" concept, there is no scope for the violation of the public health ethics of t animals.

## COMPLIANCE WITH RESEARCH ETHICS

Most of the research reported during the pandemic is done in a fast-track mode to yield the result and use the findings for the prevention and control of COVID-19. This is a commendable step by governments for providing resources to conduct meaningful research. The research community is doing a job of creating new technology and knowledge by working tirelessly. Many of the investigations do not address ethical concerns due to a shortage of time and difficult circumstances.

Further, the experimentation on a human being for the quest of a cure has been reported in some places, which is difficult to accept with the existing protocol and guidelines. Many times, the protocols for research are also highly criticized due to its difficult nature. The ethics of triage also comes under the scanner in European countries where the decision to put patientson ventilation depends on certain algorithms based on age, severity, and survival chances.

The vaccine research helped in the prevention of COVID-19, which is high in demand. There should be clarity by the research community about the beneficiary of research work. They should also understand the use of research in the implementation process in the informed policy-making within a time frame.[29] A consortium of working groups for the development of research network with ethical values is needed.

**International law and public health ethics during epidemics**

International laws can give a free hand to the scientists to control the epidemics. Even bodies like WHO and multilateral agencies have some obligation in controlling the epidemic. However, the trade and commerce laws ofte play as an obstacle to the control of the outbreak. In the COVID-19 era medical supplies are inadequate in some parts of India, especially the import of vaccines and lifesaving medicines. If there is a supply ban by some country, then India may not get the required supplies. The same also happens if the Indian government banned the export of a particular medical supply, then the ordering country would face difficulties. In the COVID-19 era, this is common reporting in national and international media where everybody fights for scarce resources. There is absolutely no international cooperation regarding the rationing of medical supplies. Some countries just stockpile to use equipment and medicines for years to come, and others run out of stock within months. In general, the public health laws of a country prevail over international trade laws.

# COOPERATION AMONG COUNTRIES AND ETHICS

The cooperation needed amongst countries to fight pandemics is beyond trade, commerce, socio-economic, and cultural exchanges. Indian state always provides support to disadvantaged countries during this pandemic. There is always a strong need for the development of cooperation in technology transfer for vaccines and the production of medical equipment. However, this should be driven by organic cooperation rather than mere control of diseases in the short run. By fostering scientific cooperation, we can create value in data sharing, cross-cultural trials of vaccines, and innovative treatment procedures. The decoding of the genome of the corona virus, the discovery of vaccines, and drugs to fight the disease is always more paramount than the business value. The regional cooperation among the South Asian Association for Regional Cooperation (SAARC) countries is one of the critical components developed by the current Indian government. [4,5] However, modern technology, for faster tackling of the issues, is available in the western world, which needs close involvement with other nations for the control of the pandemic.

The world cooperation for noble causes, like treatment and control of outbreaks, is also an ethical issue that needs to be pursued by officials of not bellow the rank of head of the states. Then, scientists and health professionals should join in the front line to combat diseases. Non-cooperation will see and ensure the diseases keep winning, and humanity would bleed and lost. Hence, all requirements such as availability of resources, technical expertise, laboratory facilities, and administration come under the ethics of international cooperation.

The Indian government has found to learn a lot of things in the first wave of the pandemic and applied them in managing the subsequent waves both in technical and ethical concerns. The regional and global cooperation of the exchange of technology in covid management and social outreach in the process of containing the virus was at the help of the affairs, especially in the second and third waves.

**Post epidemics construction**

In hoping for the best, let epidemics be like SARS, MERS, and many other epidemics that come and go in the history of humanity and medicine. But the preparedness before, during, and after epidemics need to be strengthened. We cannot stop a pandemic completely, but we can be prepared actively to combat the situation in conceding minimal damages. Similarly, the post-pandemic construction can be done with efficiency. The scientific and medical fraternity must overcome the COVID-19 era, which is like a black hole in the history of medical sciences. The ethics in post-construction work must be aligned with human rights. The resource allocation must be judicious for addressing the ethical challenges of equitable distribution of medical resources and livelihood concerns. [4] Every disaster in India is followed by corruption and mismanagement of existing resources, which need to be minimized. Evidence shows that health education and awareness help in controlling the epidemic and post-construction work by preventing diseases. [30]

The role of the Indian government in providing help to neighbouring countries (Pakistan and Afghanistan), despite having strained relations with them, is also notable in a pandemic era situation. India also provides help to Srilanka and Maldives, whose development indicators are better than India. India being an information and pharmaceutical hub especially supported by private sector multinational companies had sufficient resources to share with the world. In the future, irrespective of economic conditions, the countries must align with the ethics and principles of sharing resources in case of need and insufficiencies. Hence in the

## CONCLUSION

An integrated model with a sustainable strategy is needed in India to address the myriads of problems the COVID-19 era poses in the Indian civilization. Addressing ethical issues is not a matter of quick services; rather, this needs a critical review of activities in the process of treatment of coronavirus. The dignity of every individual should be given importance while addressing the distal and proximal issues of the COVID-19 era. The implementation of programs, making operational guidelines, and protocols have to be in sync with the ethical value of society.

In a globalized era, the COVID-19 management strategy of the Indian government is influenced by foreign countries and vice-versa. The exchange of knowledge on the management of pandemic was seamless across countries except for very few aspects of having competing interests. Ethical concerns were also attempted to be addressed in a situation of chaos. In this context, the world must be a learning hot spot for future pandemics as well.

## DECLARATIONS

- Ethics approval and consent to participate- This is policy review paper in which ethical clearance is not required. No human subjects are interviewed, or any intervention is not done. Authoritative sources have been consulted for which due references were given in the article.

- Consent for publication- Yes, as an academic institute the scholars were encouraged to publish in journals having international audience.

- Availability of data and materials- yes, most of the data were explained in the article

- Competing interests- There is no competing interest

- Funding- University Grants Commission, India, and IOE, University of Hyderabad, India. However, the funding agencies have no role in designing and conducting the study. IOE, University of Hyderabad, India provide partly the logistic support for conducting the study

- The Funding agencies have only supported in the logistic and financial support the researcher.

- Authors' contributions- The paper has only one author RKD. So, the author has done literature review, design, and analysing the data for the manuscript. The author approved the submitted version for review.

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- Authors' information (optional)- Not Applicable

## CONFLICT OF INTEREST:

The author declares no competing or conflicting interests

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## CONFERENCE ARTICLES

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# EFFECT OF LEADERSHIP STYLE ON EMPLOYEE PERFORMANCE IN HEALTH CARE INDUSTRY IN INDIA

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## ABSTRACT

Leadership is a vital component in increasing employee performance in business. Under leadership, personnel are led, inspired, assigned, and assisted in carrying out tasks efficiently. The present study aimed at examining the function and influence of leadership style on employee performance in the health care business in India.

The researchers employed a questionnaire to collect primary data using a simple random sampling approach to fulfil the study objectives. The data demonstrated that transactional leadership, transformational leadership, and delegating leadership styles had a substantial influence on the employee performance in the health care business at ($\beta$= 0.42 p<0.005, $\beta$= 0.36 p<0.005, $\beta$= 0.38, p<0.005) accepting the hypothesis H1 (The effect of transformational leadership is positive on employee performance in health care institutions.), H2 (The effect of transactional leadership is positive on employee performance), and H5 (The effect of delegating leadership is positive on employee performance).

## KEYWORDS

Transformational, Transactional, Autocratic, Democratic, Performance

## INTRODUCTION

The health care industry in India is one of the highest revenue and employment generators, with a CAGR of 22%. According to research by IBEF [1], revenue for FY2022 is predicted to reach $349 billion, up from $110 billion in 2016. According to official estimates for 2021, this industry employs more than 4.7 million people and includes hospitals, medical device and equipment centres, clinics, and telemedicine facilities. The Ministry of Health and Family Welfare (MoHFW), in collaboration with the Government of India, is working to improve the country's healthcare infrastructure. To make the country healthy, Prime Minister Mr. Narendra Modi is personally carrying the

baton and serving the people with a charismatic leadership style [6].

In an organization, the manager plays the role of a leader and holds accountability for achieving goals. Also, a leader faces several problems, ranging from a decreased rate of personnel turnover to ineffective coordination and communication and conflict that jeopardizes organizational objectives. Leaders will undoubtedly play a critical role in managing activities and people to improve performance and productivity. To deal with the circumstances, the leader adopts a new leadership style in accomplishing objectives [1][3].

From a literature review [25]-[28], five major leadership styles were identified that significantly affected employee performance in different sectors and industries. But there hasn't been enough research undertaken in the health sector. Hence, there is a need to understand which leadership style significantly affects employee performance in the health care industry.

## OBJECTIVES OF THE STUDY:

The objective of this study is to -

- Analyze the effect of leadership style on employee performance.
- To suggest the optimal leadership style to health care institutions for adopting and formulating strategies in dealing with employees.

## LITERATURE REVIEW

The Indian health care industry is in a stage of transition due to several factors such as government policy, consumer preferences, and technological change. Hence, to sustain in the telehealth industry, we need to understand what leadership is. A common definition of leadership is 'the ability to influence people or group's [31p163]. Besides influence, leadership has been defined in terms of group processes, personality, compliance, persuasion, power, goal, particular behaviour, role differentiation, initiation of structure, and a combination of these. There are vastly differing opinions on the nature and scope of this influence, but implicit in the above general definition includes the following assumptions: There must be a group to have leadership, leadership directs the group to some destination or goal, and leadership lends itself to a hierarchy of importance.[32]

To meet the goals of our study, articles and research papers that dealt with leadership style in the context of India were chosen. We needed to be able to comprehend the notion of leadership style and establish the leadership framework.

To comprehend the concepts of leadership and its impact on employee performance articles, journals, reports, and research papers were reviewed to understand the type of leadership style widely practiced in the service industry. Table1 shows a thorough overview of the findings of the selected research publications.

## TABLE1: AUTHOR AND RESULT ON EMPLOYEE PERFORMANCE

| Authors | Description |
|---------|-------------|
| [2][3] | Leadership is the method and skill of a leader to influence his followers to achieve a goal. Also, it is the management quality that increases employee performance |
| [4] | According to the author, leadership has four elements that affect employee performance. The manager and leaders in the organization must focus on idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. |
| [5] | The author, in their research, observed that the managers or leaders in the business must allow flexibility to their sub-ordinates to make choices so that they learn and enhance performance |
| [6] | According to the author, laissez-faire leadership refers to a leader's traits allowing subordinates to assume responsibility for tasks and make necessary decisions. |

| [7][8] | The author observed that employee performance is directly tied to an individual's competency and potential to achieve autonomous goals. Others feel that the devotion of personnel to the task at hand increases individual performance. |
|---|---|
| [9] | According to the author, employee performance has two-dimension, task performance, and contextual performance. Task performance is one where the employee must know to execute the task, whereas contextual performance is one where the employee must have interpersonal skills to handle the social environment. |
| [10][11] | The author sets out transactional leadership uses reward or punishment to enhance the performance of the employee, but others feel that transactional leadership relies on the interchange process of leader and follower. |
| [12][13] | According to the author of the study, employees in the banking business are more motivated under transactional leadership, and transactional leadership has a beneficial influence on employee performance. Similarly, another study discovered that transaction leadership had a more significant influence on SMEs than transformative leadership. |
| [14][15][16] | Many scholars on autocratic leadership have discovered that they largely control the manager or leader's decisions in the organization since they like exercising their authority. Few authors feel that these types of leaders are task-oriented and want their followers to obey their orders to attain their objectives. In their research, a few writers found that workers dislike some managers or leaders and are uncomfortable working with them in many sectors and businesses. Employee performance suffers because of this leadership style. According to some authors, leaders set milestones, and the staff is obligated to achieve them without fail. |
| [17][18][19] [20] [21][22] | According to the authors, democratic leaders solicit feedback from employees, encourage them to engage, and maintain positive relationships with them. Few writers believe that democratic leadership improves employee performance, whereas just a few studies have indicated that it improves staff morale. Some writers also feel that including employees in decision-making would increase their confidence in achieving personal and departmental objectives. |

Source: Authors Compilation of literature

From the preceding discussion, it is apparent that workers pay attention to leadership style and are most likely to be impacted by the leadership type. Based on the previous studies and investigation, a conceptual framework is constructed to examine the hypothesis.

**Hypothesis:** In the light of the literature review, the following Hypotheses are framed for testing:

**H1:** The effect of transformational leadership is positive on employee performance in health care institutions.

**H2.** The effect of transactional leadership is positive on employee performance.

**H3.** The effect of autocratic leadership is positive on employee performance.

**H4.** The effect of democratic leadership is positive on employee performance.

**H5.** The effect of delegating leadership is positive on employee performance.

## RESEARCH METHODOLOGY

The efficacy of leadership style on employee performance was determined for the current study using a survey approach.

### SAMPLING UNIT, SAMPLING PROCEDURE, DATA COLLECTION METHOD, MEASUREMENT SCALE EMPLOYED

The sample is representative of a sizable portion of the population. The majority of survey participants were respondents from Delhi-NCR. The sample unit consisted of respondents who work in the telehealth industry. Senior

administrators helped with the questionnaire preparation, and a pilot study on 30 responses was completed to evaluate the questions' clarity. The questions which were difficult to comprehend were changed later. Also, the questions which were difficult to understand were changed.

Sample selection was made to guarantee the results' validity and universal applicability. A convenient sample strategy was used to gather data because the respondents were primarily from the telehealth industry.

The current study is built on a descriptive research approach. A well-structured questionnaire was prepared to collect data by studying literature and getting feedback from senior managers and administrators. Employees of telehealth services were sent a total of 400 surveys. Fifteen hospitals and eight clinics were chosen for the data collection in the Delhi-NCR region, and the questionnaire was distributed personally as well as online using a Google form, which the respondents were asked to complete. A total of 353 valid responses representing an 88% response rate—were received and reviewed.

To analyze the significant style of leadership on employee performance, our study used a scale using a five-point Likert scale ranging from "Strongly Disagree" valued as "1" to Strongly Agree" value as "5". This enabled the respondents to utilize and express feelings and opinion about leadership style and its effect on the employee performance.

To test the hypotheses and determine which leadership style has a substantial influence on employee performance, we used descriptive analysis, confirmatory factor analysis utilizing a measurement model, and regression analysis with structural equation modelling (SEM). The results of the study will help in understanding the type of leadership style that might have a greater influence on improving employee performance in the healthcare sector.

There are multiple leadership styles that influence employee performance in various sectors and businesses, according to the literature review from [2] to [22]. According to our research, the present study focuses on the impact of several leadership philosophies on worker performance, including transformational, transactional, authoritarian, democratic, and free rein.

The requirements for ethics clearance for this research were waived (CU/USB/COMMERCE/2022/07/06) by the Ethical Committee of Chandigarh University, India.

## DATA ANALYSIS

**TABLE2: DEMOGRAPHIC CHARACTERISTICS**

| Demographic Characteristics | Group | Frequency | Percentage |
|---|---|---|---|
| Age | <30 | 97 | 27.48 |
| | 31-45 | 123 | 34.84 |
| | 45-60 | 131 | 37.11 |
| Gender | Male | 223 | 63.17 |
| | Female | 130 | 36.83 |
| Education | Graduate | 187 | 52.97 |
| | Postgraduate | 166 | 47.03 |
| Years of Work Experience | <3 years | 78 | 22.10 |
| | 3-5 years | 93 | 26.35 |
| | 5-10 years | 91 | 25.78 |
| | >10years | 91 | 25.78 |
| Position of Employee | Senior Level | 81 | 22.95 |
| | Middle Level | 130 | 36.83 |
| | Low Level | 142 | 40.23 |

## 1. DEMOGRAPHIC ANALYSIS:

Table 2: Demographic Characteristics
To understand the characteristics of the population analyzed, demographic analysis was completed. The study determined that 63% of the respondents were male, and 37% were female. The investigation highlighted that most respondents (67%) had minimal graduate degrees, and few (19%) had technical credentials. Forty percent of the respondents were low-level management personnel, and the rest (60%) belonged to middle- and senior-level management. Hence, all these individuals work under a supervisor or a manager in a hierarchical organizational structure. Sixty-three percent of the respondents were less than 40 years of age, and the remainder (37%) were above 40 years of age.

## 2. RELIABILITY ANALYSIS:

To analyze the data, the first thing that must be reviewed and validated is the data's internal consistency and reliability. For this purpose, Cronbach's alpha and factor loading values for all constructions were calculated. The factor loading values for all items studied were more than 0.7 [23}.

The items considered for the investigation are listed in Table 1, with their factor loading, construct reliability, and average variance extracted. Table 2 shows the correlation cross-loading values for all of the constructs examined.

The correlation values of the current study are shown in Table 2. Each constructs' correlation values were higher than those of other constructs. This means the correlation values between the investigated constructs were positive and strong. R2 was determined to have a predictive value of 0.714 for the model studies, showing a robust 71.4% predictive power on employee performance.

## 3. STRUCTURAL MODEL ANALYSIS:

A path analysis was used to test the hypothesis using SEM. It was found that all the established constructs impacted an individual's performance in the health industry. Based on the analysis, it was found that the hypothesis H1 ($\beta$=0.46, p=0.003). H2 at ($\beta$ =0.42, p=0.003), & H5 ($\beta$=0.38, P=0.002), were supported and were found to be significant. As a result, the hypotheses H1, H2, and H5 are fully supported, whereas H3 and H4 are partially supported.

**TABLE 1: LEADERSHIP STYLE, DESCRIPTION, FACTOR LOADING, CONSTRUCT RELIABILITY, AND AVERAGE VARIANCE EXTRACTED, ASSURING ACCEPTABLE VALUES [RIGHT CLICK > SLIDE OBJECT > OPEN TO EDIT]**

| Leadership Style | Items | Description | Source | Factor Loading | Cronbach alpha | CR | AVE |
|---|---|---|---|---|---|---|---|
| Transformational Leadership | TL1 | Leaders foster intrinsic motivation to improve employee performance | [24] | 0.84 | 0.81 | 0.87 | 0.68 |
| | TL2 | Leaders improve awareness about the requirement and support in enhancing performance | | 0.79 | | | |
| | TL3 | Leaders help sub-ordinate in adapting new systems leading to improvements in performance | | 0.86 | | | |
| Transactional Leadership | TS1 | Leaders use exchange concept to make people work and increase performance | [25] | 0.92 | 0.79 | 0.89 | 0.73 |
| | TS2 | Leaders use rewards or punishment to improve employee performance | | 0.87 | | | |
| | TS3 | A leader uses a clear-cut chain of command to improve the productivity of an employee | | 0.78 | | | |

| Autocratic leadership | AL1 | Leaders decide the individual level, and it affect employee performance | [26] | 0.82 | 0.73 | 0.86 | 0.67 |
| | AL2 | Leaders following directing style affect my input to the system | | 0.88 | | | |
| | AL3 | Leaders use positional power to dominate the situation affects employee performance | | 0.76 | | | |
| Democratic Leadership | DL1 | Leaders take opinion of other people to take decision | [27] | 0.69 | 0.82 | 0.84 | 0.65 |
| | DL2 | Managers encourage an employee to participate in decision making | | 0.87 | | | |
| | DL3 | Managers reach out to employees and ensure that all employees are included in the decision-making process | | 0.85 | | | |
| Delegating | DG1 | Leaders give freedom to subordinate to complete the task | [28] | 0.83 | 0.82 | 0.87 | 0.68 |
| | DG2 | Leaders believe in the competency of the employee to execute the task | | 0.82 | | | |
| | DG3 | Leaders give authority and delegate a task to sub-ordinate to do the task affect employee performance | | 0.84 | | | |
| Employee Performance | EP1 | Leader assesses planning and organizing of work for measuring employee performance | [29] | 0.75 | 0.85 | 0.91 | 0.73 |
| | EP2 | Knowledge and problem-solving skills are assessed to evaluate employee performance | | 0.86 | | | |
| | EP3 | Quality of service rendered to the patients is an indicator of assessing employee performance | | 0.89 | | | |
| | EP4 | Enthusiasm and commitment level is a crucial indicator for evaluating employee performance | | 0.91 | | | |

Source: Authors compilation of result

**TABLE 2: CORRELATION OF THE STUDIED CONSTRUCT AND DIVERGENT VALIDITY**

| Leadership Style | TL | TS | AL | DL | DG | Emp Perf |
|---|---|---|---|---|---|---|
| Transformational Leadership | **0.824** | | | | | |
| Transactional Leadership | 0.23 | **0.85** | | | | |
| Autocratic Leadership | 0.34 | 0.43 | **0.818** | | | |
| Democratic Leadership | 0.31 | 0.34 | 0.35 | **0.806** | | |
| Delegating Leadership | 0.22 | 0.26 | 0.12 | 0.32 | **0.824** | |
| Employee Performance | 0.45 | 0.56 | 0.46 | 0.38 | 0.29 | **0.854** |

Source: Authors compilation of result.

**TABLE3: RESULT OF THE STUDIED MODEL**

| H | Relationship | Path | p-value | Direction | Decision |
|---|---|---|---|---|---|
| H1 | Transformational Leadership------>Emp. Performance | 0.36 | 0.003 | Positive | Supported |
| H2 | Transactional Leadership ---------->Emp Performance | 0.42 | 0.003 | Positive | Supported |
| H3 | Autocratic Leadership ------------>Emp. Performance | 0.05 | 0.001 | Positive | Partially Supported |
| H4 | Democratic Leadership ---------->Emp Performance | 0.03 | 0.001 | Positive | Partially Supported |
| H5 | Delegating Leadership ------------> Emp performance | 0.38 | 0.002 | Positive | Supported |

Source: Authors compilation of result

## FINDINGS, DISCUSSION, AND CONCLUSION

Table 4 displays the relative relevance of the researched component. The result from the Table 4 suggests that employees working in health care sector have given more priority to transformational, transactional leadership styles and delegating styles; however, the autocratic leadership style is being ranked the least desired style in health care industry

**TABLE 4: MEAN AND STANDARD DEVIATION OF LEADERSHIP STYLE**

| Factors | N | Mean | Std. Deviation | Ranks |
|---|---|---|---|---|
| Transformational Leadership | 252 | 3.64 | 0.91 | 1 |
| Transactional Leadership | 252 | 3.53 | 0.85 | 2 |
| Autocratic Leadership | 252 | 2.99 | 0.78 | 3 |
| Democratic Leadership | 252 | 3.11 | 0.76 | 4 |
| Delegating Leadership Style | 252 | 3.38 | 0.84 | 5 |

Source: Authors compilation of result

This finding implies that when a leader inspires and motivates others, employee performance is extraordinarily high. It also says that in specific circumstances, employee performance is extremely high when given tasks and the freedom to fulfil them.

This study verified the first hypothesis by finding that there is a link between transformational leadership and employee performance (β=0.46, p=0.003). The above finding matches with the findings of Khan et al [29], who found that raising an employee's intrinsic drive enhances performance, supports this conclusion.

Similarly, the researchers investigated the effects of transactional leadership on employee performance and discovered that it had a beneficial impact on an employee's performance at H2 (β=0.42, p=0.003). This is in line with Seibert et al [11] and Gordon [15]. As a result, hypothesis H2 has been accepted. At (β=0.38, P=0.002), a delegating or free-rein leadership style benefits staff performance. The hypothesis H5 is supported and agrees with Chaudhary and Javed [5]. The route coefficient value for hypotheses H3 and H4 is relatively small. Hence, we infer that the hypothesis is partially accepted. This could be because, in today's healthcare environment, employees do not believe in the concepts of autocracy or democracy as much as in other leadership styles. This is because most employees believe that most managers make decisions in the name of democracy, which has no bearing on an individual's performance in the organization.

Correlation analysis revealed a connection between leadership style and employee performance. According to this research, workers in the healthcare industry believe that managers that deploy transformational, transactional, and free-reign leadership styles may see an improvement in their performance. The model's R2 score was 0.714, which predicted 71.4 percent in employee performance. Because of the findings, it can be inferred that the study can positively impact India's healthcare business. To boost employee performance in the business, it is also advised that senior level managers and executives use transformational, transactional, and free-rein leadership styles.

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# A PROFILE VIEW OF HEALTHCARE SERVICE SECTOR ORGANIZATIONS THROUGH INTEGRATION WITH ORGANIZATIONAL CULTURE AND SUBCULTURE

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## ABSTRACT

### PURPOSE:

This paper aims to identify the fundamental features of culture within an organization and thereafter examines the subculture, which is imminent in relation to the attributes of employees.

### METHODOLOGY:

This research was carried out by involving 22 prominent healthcare service sector organizations, which were selected randomly from three major districts in Odisha state, India. The study is based on 358 selected sample responses from front-line employees of these selected healthcare service sector organizations. The statistical techniques that were used on data derived in this study were analysis of variance, descriptive statistics, and t-tests.

### FINDINGS:

It was found that employees of the healthcare service sector organizations involved considered cultural characteristics such as outcome, team orientation, and attention to detail to be the least prevailing in their organizations. The study revealed significant differentiation of the perception of the organizational culture prevailing within the organization, through post facto analysis of verification for variation potentials, for tenure in a specific position, age, and job position. Thus, this study argues that based on occupation, employment relationship type, and gender, an insignificant influence was displayed on the employees' perception of the prevailing organizational culture.

### PRACTICAL IMPLICATIONS:

The development of a superior culture that promotes service quality enhancement maximizes patient satisfaction. To achieve successful proliferation and quintessential existence of the organization, it is cardinal that all the personnel within the organization have a firm grasp of the main operating culture and the intrinsic subculture. This study highlights the impact of organizational culture and subcultures within various organizations catering to the healthcare service sector of Odisha.

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### KEYWORDS

Organizational Culture, Subculture, Employees' Perception, Healthcare sector

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## INTRODUCTION

The term organizational culture defines the overall comprehension of all the organization's personnel regarding its fundamental ideals' beliefs and general environment, which continuously operates in their subconscious or unconscious mind [1]. For this reason, healthcare service sector organizations worldwide have made many efforts to improve business management, accounting systems, wholesale quality management, business services, business plan rehabilitation, and patient-centred care [2]. Primarily this research focuses on the in-depth understanding of the Organizational Culture within the health care service sector organizations. Secondly, this research aims to bring into the limelight the subculture groups which are operating within the dominant organizational culture. Thus, the aims of this this study are to identify and elucidate subcultures within the healthcare service industry organizations operating in Odisha, India which supports certain important aspects related to employees such as job tenure, position, type of employment relationship, occupation, age, and gender.

## LITERATURE REVIEW

### ORGANIZATIONAL CULTURE

Recent studies have elucidated that for the effective improvement of the performance of the employees operating in the healthcare service sector leading to a better quality of service provided to the patients, along with their overall occupational health, organizational culture plays a crucial role [3], [4], [5]. Studies have shown that a positive organizational culture is one of the key elements which promote not only satisfaction as well as the overall well-being of the employees while enhancing their performance. It also leads to desirable positive outcomes of healthcare service provided to patients in terms of the overall experience, satisfaction and sense of security of the patients [6], [7]. It is considered that the healthcare service sector organizations that have a well-established organizational culture provide a better working environment to the employees, which in turn leads to a better quality of healthcare delivered to the patients [8], [9]. The present study considers culture as a compilation of values and assumptions common to employees, creating a corporate event that is at least somewhat changeable and conducive to managerial intervention. The objective of this current research is to identify the organizational culture that operates inside the healthcare service sector

organizations of Odisha and to examine how high-quality healthcare service is provided.

### SUBCULTURES

In addition to an integrated view of organizational culture, there is a consensus at the organizational level that emphasizes clarity and consistency, and a differentiated approach focuses on the presence of multiple subcultures within an organization [10]. The term subcultures is used to expound subgroups of organizational members interacting with each other, identifying themselves as a distinct group within the organization, sharing the same issues, and acting commonly [11]. What is essential, however, is that although subcultures are cohesive, stable, and consistent, they do not fit into the core organizational culture because though the subculture groups might have certain values common with the dominant organizational culture, but major core values and preferences may differ from the dominant organizational culture [12]. Subsequently, it has been suggested that prospective researchers might focus on the contribution of organizational subcultures to provide elucidation to facilitate a better comprehension of the causality that a few change attempts prevail while the remaining fail to succeed. In a study, it was elucidated that subcultures operating within the dominant organizational culture of the healthcare service sector organization contain different sets of values and beliefs, which generally are in contrast with the common "shared values" of the dominant organizational culture, this, in turn, may lead to conflicts among the different subculture groups [13]. Studies have also shown that in the case of healthcare service sector organizations, subculture groups have a significant influence over leadership, commitment, and overall satisfaction of the employees [14], [15].As a result, this study aims to shed light on the importance of organizational culture along with its co-existing subculture groups on staff values of employees working in the healthcare service sector organization of Odisha and to provide recommendations for improving service quality.

## METHODOLOGY

### DATA COLLECTION AND SAMPLE DESIGN

For data collection, the sampling techniques used were a combination of simple random sampling and convenience sampling, keeping in mind the prevailing scenario. The data was collected from nursing homes, hospitals, and testing laboratories operating in the selected places for this study in Cuttack, Bhubaneswar, and Puri (from three

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significant districts of Odisha state, India - Cuttack, Khorda & Puri). For this study, 500 questionnaires were distributed, out of which 358 usable responses were received and used for analysis. The questionnaires were circulated for data collection using Google forms. Out of the initially 58 shortlisted healthcare service sector organizations, only 34 agreed to provide the data required for this study, out of which usable data could be sourced from 22 organizations; this created a limitation for this study as the other targeted organizations' data could not be taken into account as the information provided in the questionnaires was incomplete or not properly provided.

Clearance of the Ethical Committee of Kalinga Institute of Industrial Technology, India (KIIT-DU/IRSFH/22/161) was waived as this research did not necessitate that.

### MEASURES

For the measurement of organizational culture, "Organizational Culture Inventory" (OCI) [16], "Competing Values Model" [17] and "Organizational Culture Profile" (OCP) [18] are the most widely known measurement tools. Nevertheless, its elevated volume (including 120 elements) was an obstacle to the present research. However, for this study, the OCP is not only relatively small, but its dimensions reflect employee congruence as well as its influence on patients' satisfaction with the healthcare service provided (emphasis on reward, decisiveness, supportiveness, team orientation, innovation, attention to detail, aggressiveness, and outcome orientation). OCP constituted of 54 questions, which necessitated a response from the employees to what extent emphasis is given on particular

norms and values in the organization in which they are presently working [19], [20]. For instance, elements considered for inclusion are fairness, team orientation, social responsibility, competitiveness, praise for good performance, flexibility, and initiative. The structured questionnaire used to collect data consisted of modified questions from the original OCP questionnaire deemed relevant for this study. Content validity was carried out, following which only suitable questions which remained relevant in line with recent studies conducted using the OCI and OCP models were selected. Cronbach's alpha, in this case, was 0.94.

## DATA ANALYSIS AND INTERPRETATION

The objective of this study is to identify the culture within an organization as well as the impact of the subcultures concerning the attribute of employees. Understanding the relationship between descriptive statistics of the respondents upon the organizational culture in the health care sector is considered and presented in Table 1. Likewise, the viewpoints of the culture among the sub-cultural group within the organization are considered and presented in Table 2 by considering various managerial and non-managerial employees of the organization. Lastly, to have a detailed clarification on the significant differential perspective on cultural and sub-cultural dimensions among the employees, a study of ANOVA is conducted and presented in Table 3 that states how far an employee's age group and the tenure of experiences within the organization bring such a different perspective.

**TABLE 1: CULTURAL DIMENSION AND ITS DESCRIPTIVE STATISTICS**

| Dimensions | SD | Mean |
|---|---|---|
| Aggressiveness | 0.89 | 3.22 |
| Attention to detail | 1.12 | 3.01 |
| Decisiveness | 0.88 | 2.88 |
| Emphasis on reward | 0.83 | 3.12 |
| Innovativeness | 0.91 | 2.98 |
| Outcome orientation | 0.91 | 3.01 |
| Supportiveness | 0.87 | 3.31 |
| Team orientation | 0.92 | 2.69 |

**TABLE 2: MANAGERIAL AND NON MANAGERIAL EMPLOYEES CULTURAL VIEW A T-TEST**

| Dimensions | Departmental Position | Sig. | t | SD | Mean |
|---|---|---|---|---|---|
| Aggressiveness | Management | 0.022 | 2.336 | 0.88 | 3.11 |
| | Non-Management | | | 0.88 | 2.99 |
| Attention to detail | Management | 0.007 | 2.839 | 0.99 | 3.32 |
| | Non-Management | | | 0.99 | 3.01 |
| Innovativeness | Management | 0.003 | 3.266 | 0.72 | 3.36 |
| | Non-Management | | | 0.72 | 3.08 |

**TABLE 3: UNDERSTANDING CULTURAL DIMENSION THROUGH EMPLOYEE'S AGE AND EMPLOYEE TENURE THROUGH AN ANOVA TEST**

| | Dimensions | Groups in f test | Sum of Squares | df | Sig | f | Mean Squared |
|---|---|---|---|---|---|---|---|
| EMPLOYEE'S AGE | Aggressiveness | Total | 646.82 | 358 | 0 | 5.88 | |
| | | within | 632.21 | 355 | | | 0.962 |
| | | Between | 14.61 | 3 | | | 5.124 |
| | Attention to detail | Total | 745.27 | 358 | 0.002 | 4.338 | |
| | | within | 732.58 | 355 | | | 1.101 |
| | | Between | 12.69 | 3 | | | 4.332 |
| | Decisiveness | Total | 603.64 | 357 | 0.002 | 5.396 | |
| | | within | 587.32 | 354 | | | 0.813 |
| | | Between | 16.32 | 3 | | | 4.602 |
| | Innovativeness | Total | 506.656 | 358 | 0 | 8.632 | |
| | | within | 492.334 | 355 | | | 0.561 |
| | | Between | 14.322 | 3 | | | 4.993 |
| | Outcome orientation | Total | 470.036 | 358 | 0 | 6.992 | |
| | | within | 459.64 | 355 | | | 0.593 |
| | | Between | 10.396 | 3 | | | 3.361 |
| | Supportiveness | Total | 660.93 | 358 | 0.024 | 3.236 | |
| | | within | 652.14 | 355 | | | 0.912 |
| | | Between | 8.79 | 3 | | | 3.062 |
| EMPLOYEE TENURE | Attention to detail | Total | 745.27 | 358 | 0.009 | 2.913 | |
| | | within | 733.88 | 352 | | | 0.993 |
| | | Between | 11.39 | 6 | | | 3.227 |
| | Decisiveness | Total | 603.64 | 357 | 0.007 | 2.761 | |
| | | within | 589.29 | 351 | | | 0.637 |
| | | Between | 14.35 | 6 | | | 2.323 |
| | Innovativeness | Total | 506.656 | 358 | 0.004 | 3.662 | |
| | | within | 492.766 | 352 | | | 0.572 |
| | | Between | 13.89 | 6 | | | 1.835 |
| | Outcome orientation | Total | 470.036 | 358 | 0.003 | 2.996 | |
| | | within | 458.356 | 352 | | | 0.737 |
| | | Between | 11.68 | 6 | | | 1.694 |

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## RESULTS AND DISCUSSION

The OCP factor analysis accepts eight dimensions by excluding five due to multiple existences in other factors. The Cronbach's alpha result clearly defines the factors - aggressive as 0.88, attention to detail as 0.71, decisiveness with 0.77 scores, emphasis on reward as 0.69, innovativeness as 0.81, outcome orientation as 0.71, supportiveness with the scores as 0.81 and team orientation as 0.73. Table 1 represents the descriptive output that suggests that the highest characteristics are supportiveness and aggression, and the lowest are team orientation and decisiveness. On average, all the employees are competent in the cultural dimensions, ranging from 3.22 to 2.69.

The next action is to segregate the variables in to different demographic categories i.e. job position (management and non-management), gender (male and female), age (20-25, 26-30, 31-35, 36-40, 41-45 and 45+), job profile ( administration, nurses and doctors), job tenure ( > 1 year, 1-3 years, 5-10 years, 10-20 years and 20+ years).The analysis was conducted to understand the cultural factors based on establishing the relationship between job, gender, and departmental position. The t-Test is used, and the f-Test, i.e., ANOVA, is a tool that is considered for evaluating the variations in the tenure, age, and job profile. The result depicts a significant output that conveys no significant association among the employment type, gender, and occupation. However, a significant difference is observed in the departmental position, tenure, and age. Table 2 shows that management is more concerned with innovation, detail to attention, and aggressiveness. The resulting output of Table 3 shows the significant variances among age and aggressiveness, attention to detail, decisiveness, innovativeness, outcome orientation, and supportiveness. A similar output is also observed in the tenure of the job as a prospective of cultural dimensions. Table 3 shows attention to detail, decisiveness, innovativeness, and outcome orientation. As per the Tukey post hoc test, the agreeableness of decisiveness, innovativeness, and outcome orientation is the conception for those who have served more than 20 years. Adding to it the concept of more attention to detail is the agreeableness in case of 20 years + employees compared to those whose contribution is between 1 to 3 years.

As reported in the responses of the employees of the organization regarding the cultural perceptions within their organization it showcased that team orientation, decisiveness and attention to detail weren't regarded to be one of the most influential features of the healthcare service sector organizations operating in Odisha. This was so observed because not all healthcare service staffs could execute similar levels of service quality that would enhance patient satisfaction. The experienced staffs or the front-line employees could step-up to not only provide superior quality of service but also assist the less experienced ones.

Finally, given the complexity of the human system and the demand to supply of the specialized healthcare services which are provided by some healthcare service organizations, it is crucial to give proper attention to details. Giving proper attention to details is crucial for patient's satisfaction which directly leads to enhanced market reputation of the organization as well as gaining competitive advantage over its market competitors in the stringent competitive market. In view of these conditions, quality enhancement steering councils, working groups, ad hoc working groups, and committees should be formed and encouraged. No differences were revealed based on occupation, employment relationships, and gender, as opposed to tenure, management status, and age. The formation of a subculture could be based on employment status, tenure and age, which are somewhat interrelated factors. In the healthcare service sector organizations of Odisha, employees who hold executive positions believe that their organizations should be aggressive and innovative, paying more attention to details than those who hold non-executive positions. Thus, employees belonging from different subculture groups have different views on goals based on identifying organizational traits and their features. As a result, corporate agencies need to take action based on the ideologies of every group. As far as attention to detail is concerned, this can be improved by establishing an efficient control system. Lastly, innovativeness increases when more space is left for the initiative.

## CONCLUSION

As organizational culture is contemplated to be essential for successful implementation of healthcare service quality stratagem [2], this research conveys the operational culture to suggest changes in the organization that facilitate improvement in healthcare service quality that is delivered to the patients. Based on the study's findings, it is revealed that the culture in healthcare service sector

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organizations of Odisha was not that profound. Moreover, in a healthcare service industry organization, ensuring the quality of services offered to the patients and achieving higher patient satisfaction is a definitive end goal because healthcare service-based industries are aiming for profit maximization compared to other financial institutions. However, this is in the case of private organizations of the healthcare sector as government/public sector hospitals were not taken into consideration in this study. From the deductions made from the findings of the study it can be safely stated that for getting desired outcomes. Human resource management practices and policies must be decentralized, thus facilitating incentives for top-level management of hospitals and controlling desired behaviours. Having a supportive organizational culture in the organization helps in maintaining a healthy working environment within the organization without getting any negative impacts from conflicting subculture groups which would vary from the dominant culture in terms differentiated core values. By doing so it ensures that the overall quality of healthcare services provided to the patients is enhanced along with the increase in satisfaction, commitment [21], reduces work-related stress which leads to employee turnover [22] and promotes organizational citizenship behaviour of the employees working in the healthcare service sector [23].In the post-COVID-19 pandemic environment, healthcare service sector employees are under pressure this can not only lead to the formation of a negative subculture work-group but also could have an adverse impact on both the image of the organization as well as the business, in the minds of their patients [24].

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**CONFERENCE ARTICLE**

# EFFECT OF PATIENTS' ATTITUDE ON THEIR SATISFACTION AND SWITCHING INTENTION IN GENERIC MEDICINE INDUSTRY: AN EMPIRICAL ANALYSIS IN INDIA

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## ABSTRACT

People are now more health-conscious to live safe and hazard-free lives in modern society. If people are affected by any disease, choosing doctor services and medicines involves many complex decisions. Generic drugs seem to be a significant and well-known source of competition for labelled drugs, but they can likewise be a major idea for lowering costs in the pharmaceutical industry. This might result in savings for either the government or the patients. Given this perspective, it is critical to understand a patient's preferences amongst both drug kinds (brand and generics) as well as to discover what are the attitudes of patients on those and whether this impacts the actual behaviour and purchases in future because of their satisfaction levels. In this context, this paper is an early effort to investigate patients' attitudes and their effect on their level of satisfaction and switching intention in the pharmaceutical industry (i.e., generic and brand choices).

Responses were collected from 537 patients residing in different cities of Odisha state of India by survey method and analysis. In line with the study's results, patient satisfaction and switching intentions were positively affected by their attitude. In addition to patient pleasure, introducing generic drugs creates competition, which is necessary for originator businesses to innovate. Because of their lower costs and the competition, they foster, generic medications contribute to constructing a more sustainable healthcare system.

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## KEYWORDS

Patient Attitude, Patient Satisfaction, Switching Intention, Generic Medicine, Indian Pharmacy

Effect of Patients' Attitude on their Satisfaction and Switching Intention in Generic Medicine Industry: An empirical analysis in India

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## INTRODUCTION

The age-old adage that "Health is Wealth" holds true even today. Many of humankind's efforts seek ways and means to preserve and maintain our health. Even after centuries of understanding and paying importance to health and well-being, the worrying fact here is that we still haven't been able to design a mechanism by which we can provide primary health care facilities to everyone across the world irrespective of whether they belong to an underdeveloped, developing, or developed country. We are still unable to provide "Health" as a fundamental right [1].

The provision of health care is closely linked to the pharmaceutical industry and its development. The research and development functions of the pharmaceutical industry is the backbone of health care and it has silently provided solutions to many health-related problems that lead to the industry's sustainability [2]. The role of the pharma industry is to deliver these solutions to the public and make them accessible so that diseases and sufferings can be prevented, and the life span can be increased. This is where marketing plays a significant role. Any pharma company's marketing department aims to identify the consumer's needs and provide the relevant solutions [3]. Anticipating the help of Internet of Things (IoT) and the use of Artificial Intelligence (AI), the future needs of health care services and medications can be tracked easily and maintain a sustainable process [4], [5].

Data needs to be collected from the physician about the gap in any treatment which can be filled using a drug that is not available on the market, and this needs to be developed into a product. After the Research & Development team designs the product, this news needs to reach the consumers through a multi-pronged promotional strategy [6]. Assessing the technology in the health care sector is a difficult task to deal with but spreading the awareness and monitoring the efficiencies in several services of health care activities, say consultations, medicines, etc., needs the help of AI, the Internet of things, blockchain technology [7]. In the COVID-19 pandemic, while people were struggling badly to sustain their lives, the medical practitioners took the undue advantage of the people in the state of caring, helping, and treating the patients [8]. This is due to the lack of awareness amongst consumers [9].

Physicians need to be aware of the drug, and this can be done through active participation of medical representatives. This simultaneously needs to be followed up with introducing the drug into the company's distribution system through wholesalers, retailers, etc. Once the drug is prescribed and used by patients and is found to be effective, it leads to a demand for a drug. Numerous studies have been conducted on the healthcare industry in India. The current research focusses on the generic medicine industry to determine their attitude towards the patient satisfaction analysis of India.

This study focused on this situation and this present paper aims to:

- study the effect of different purchasing decision factors on patients' attitudes towards the final purchase of Indian generic medicines.
- investigate the effect of patients' attitudes on their overall satisfaction level and switching intention.

## LITERATURE REVIEW

The affordability of pharmaceuticals is among the most worrying aspects of rising medical prices [10]. Several of the critical purposes of marketing a generic medicine is to provide considerable monetary benefits to sick people due to higher prescription prices. India has among the largest expenditures for medicines [11, 12], such generic pharmaceuticals may conserve a substantial quantity of wealth, which may be utilised to treat various medical challenges. Considering economic benefits, there seems to be considerable disagreement between patients and doctors regarding the use of generic medications concerning therapeutic results or security aspects [13]. Result to which, it is critical to understand how much individuals believe and what satisfies them towards the generic drugs.

Generic medicines experienced an international 8.7% compound annual growth in the last five years, in an industry controlled by numerous businesses such as Sun Pharmaceutical, Dr. Reddy, Novartis, and Teva, representing a market share according to the Global Generic Drugs Market (2020) [14]. Assessing customer attitudes and desire to buy medical drug items [15, 16] is critical for businesses [17] because this is meant for establishing national healthcare policies and measures [18].

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The medical recommendations, previous experiences, product qualities, and perceived quality can all impact one's decision to purchase generic medications [12]. Value propositions might influence attitude and satisfaction. In this light, we may infer that comprehending the user's experience in acquiring generic pharmaceuticals in terms of attitude and satisfaction has shown to be difficult in the research [19].

This is defined by Shikiar and Rentz [20] as the "patient's opinion of the drug accepting procedure as well as the drug's consequences." Medicine compliance is influenced by the satisfaction of the patients with the drug. Patients' compliance might suffer unless individuals feel dissatisfied with given prescriptions [21].

In the context of this research, researchers characterize the satisfaction of patients as "patient values derived from patient satisfaction with certain aspects of generic pharmaceutical therapy, including as side effects, efficacy, and administration difficulty." [22, p2] Because the level of satisfaction of the patients would be a subcategory of therapeutic satisfaction [23], a regularly used generic assessment of drug satisfaction, the Treatment Satisfaction Questionnaire for Medicine (TQSM) [24], may be considered in this research to evaluate patient satisfaction with generic drug. The TSQM addresses four elements of user care with their treatment: overall satisfaction, convenience, side effects, and efficacy. As per the new study, TSQM seems to be the only model that is employed in both disease-specific and generic situations [23, 25]. Therefore, the present research used the TSQM approach to measure the satisfaction of patients with generic medicine in a growing economy such as India.

Based on past literature reviewed, empirical research was undertaken in relation to the hypotheses established for this study. The study was conducted to test how far quality, efficacy, effectiveness, convenience, perceived risk, and side-effects of generic medicines significantly influence the patient's attitude towards generic medicine. Also examined was to what degree the patient's satisfaction and attitude toward generic medicine influence substantially their intention to switch from branded drugs to generic medicine. Lastly, this study tests how patients' attitude towards generic medicine significantly influences their satisfaction with it.

## RESEARCH METHODS AND DESIGN

The design of the current research study is purely survey-based and descriptive. In total, there were 537 numbers of patients whose responses were recorded after data validation out of 725 surveys which were collected through convenience and proliferation (Snowballsnow-ball) technique by visiting various medicine stores (Jan Ausadhi Medical Stores) situated in different major cities of Odisha state, India and through two social networks - LinkedInLinkedin and Facebook.

As this is social science research, about attitude and perceptions, the need of ethical clearance for this paper is waived by the Ethical Committee of Kalinga Institute of Industrial Technology, India and hence the research was continued.

The collection of primary data was done through a ready-made questionnaire referred to as Malhotra & Bricks [26] form that required to be coded to be analysed. All the responses were measured on a five-point Likert scale. The structural equation modelling method was adopted to test all formulated hypotheses through Amos-17. Some details of the factors extracted from the factor analysis: Factor analysis extracted various variables by using SPSS software like quality, efficacy, perceived risk, attitude, Switching intention, Effectiveness, Side effects, Convenience, and Overall satisfaction.

## RESULTS AND DISCUSSION

Reliability analysis, using Cronbach's alpha (a), was conducted to estimate the study variables' reliability.

The reliability coefficient (Cronbach's alpha) values for the nine dimensions were computed (Table 1) to be higher than the minimum recommended value of 0.70, which is generally considered to be the criterion for demonstrating the internal consistency of the scales. Verifying construct validity entails "assessing both discriminant and convergent validity" (27 [p 259]).

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**TABLE 1: CRONBACH'S ALPHA (A) SCORES OF RELIABILITY ANALYSIS**

| Study Variable | Alpha (a) | Study Variable | Alpha (a) | Study Variable | Alpha (a) | Study Variable | Alpha (a) |
|---|---|---|---|---|---|---|---|
| Quality | 0.954 | Efficacy | 0.918 | Perceived risk | 0.931 | Attitude | 0.867 |
| Study Variable | Alpha (a) | Study Variable | Alpha (a) | Study Variable | Alpha (a) | Study Variable | Alpha (a) |
| Switching intention | 0.881 | Effectiveness | 0.786 | Side effects | 0.765 | Convenience | 0.832 |
| Study Variable | Alpha (a) Score | | | | | | |
| Overall Satisfaction | 0.801 | | | | | | |

**TABLE 2: SCORES OF CONSTRUCT VALIDITY ANALYSIS**

| Study Variables | Discriminant validity | Convergent Validity | ASV | MSV | AVE | CR |
|---|---|---|---|---|---|---|
| Quality | * | * | 0.302 | 0.329 | 0.703 | 0.902 |
| Efficacy | * | * | 0.308 | 0.311 | 0.857 | 0.963 |
| Perceived risk | * | * | 0.329 | 0.317 | 0.673 | 0.869 |
| Attitude | * | * | 0.301 | 0.306 | 0.719 | 0.911 |
| Switching intention | * | * | 0.358 | 0.432 | 0.833 | 0.956 |
| Effectiveness | * | * | 0.327 | 0.325 | 0.601 | 0.894 |
| Side-effect | * | * | 0.353 | 0.314 | 0.546 | 0.801 |
| Convenience | * | * | 0.311 | 0.338 | 0.712 | 0.927 |
| Overall satisfaction | * | * | 0.324 | 0.313 | 0.575 | 0.910 |

* Yes, it exists.

Table 2 displays the result of "maximum shared variance (MSV), average variance explained (AVE), and average shared variance (ASV), composite reliability (CR)," (28, p 235) which will be referred to test the construct's convergent and discriminant validity. To achieve "convergent validity: CR > 0.7, CR > AVE, and AVE > 0.5 (28, p 237)," the following criterion must be met. CR estimates for all constructs were found to be more than 0.7. Similarly, the projected AVE value for each construct exceeded the cut-off value of 0.5. Furthermore, each individual construct's CR value is greater than its associated AVE value, and it clearly depicts that the instrument that is considered is validating with an existing set of instruments that specifies quality, efficacy, convenience, and side effects. Likewise, in this analysis, ASV and MSV scores for each concept were calculated and shown to be meaningful for validating the constructs' discriminant validity, meaning the new measures do not relate to selected measures. Structural equation modelling (SEM) was performed to test the connection among the constructs namely, quality, efficacy, manufacturing process, attitude, switching intention, effectiveness, side-effects, convenience, and overall satisfaction. Path coefficient in SEM signifies an association between the theoretical constructs. These arrows represent the causal relationship existing in the model. Statistically, these arrows represent the regression coefficients (Figure 1).

The standardised regression weights in terms of the beta coefficient of constructs are represented in Table 3

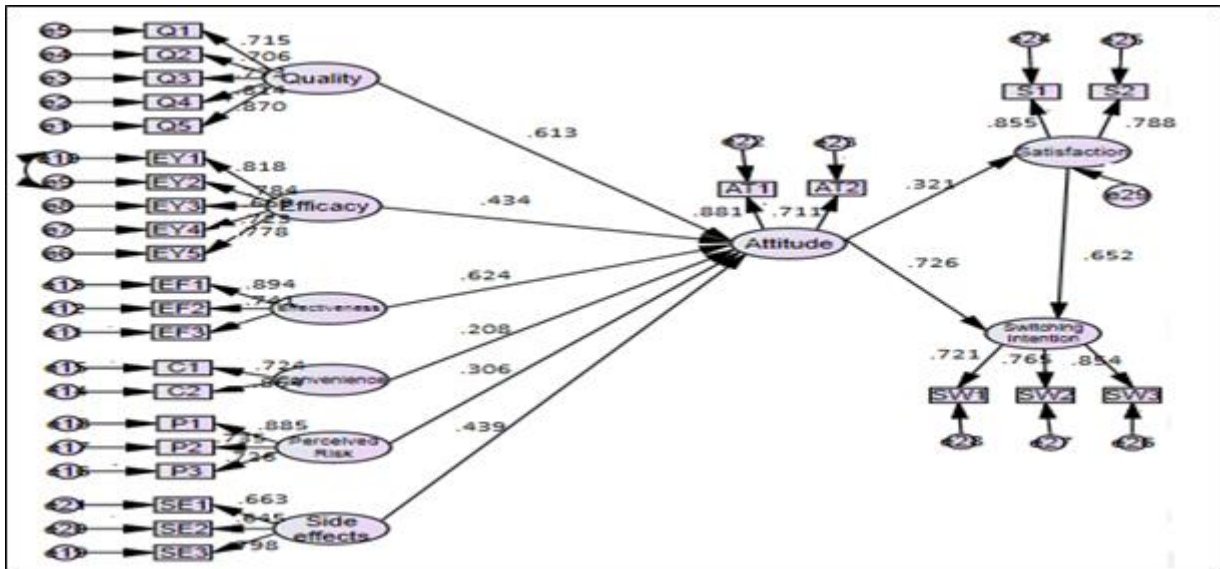Effect of Patients' Attitude on their Satisfaction and Switching Intention in Generic Medicine Industry: An empirical analysis in India    4

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**FIGURE 1: SEM (PATH DIAGRAM)**



**TABLE 3: SCORES OF STANDARDIZED REGRESSION WEIGHTS (HYPOTHESES TEST RESULTS)**

| Hypothesis | Path | P-Value | t-Statistics | Estimate | Remark |
|---|---|---|---|---|---|
| H1 | Quality → Attitude | 0.001 | 8.643 | 0.613 | * |
| H2 | Efficacy → Attitude | 0.001 | 7.614 | 0.434 | * |
| H3 | Effectiveness → Attitude | 0.001 | 3.342 | 0.624 | * |
| H4 | Convenience → Attitude | 0.072 | 1.643 | 0.208 | ** |
| H5 | Perceived risk → Attitude | 0.116 | 0.775 | 0.306 | ** |
| H6 | Side-effects → Attitude | 0.001 | 11.341 | 0.439 | * |
| H7 | Attitude → Satisfaction | 0.001 | 6.213 | 0.321 | * |
| H8 | Attitude → Switching intention | 0.001 | 5.003 | 0.726 | * |
| H9 | Satisfaction → Switching intention | 0.001 | 4.342 | 0.652 | * |
| $R^2$ Attitude=0.63; $R^2$ Satisfaction=0.43; $R^2$ Switching intention=0.47 | | | | | |
| * Supported, ** Not Supported | | | | | |

As the computed value of p is less than the significant alpha value of 0.05, H1, H2 and H3 are accepted, and it was concluded that product quality, efficacy, effectiveness, and side effects had a significant influence on attitude towards generic drugs.

Convenience and perceived risk are not significantly related to attitude toward generic drugs as the computed p-value is higher than the significant alpha value of 0.05 for this it can be said that patients accept that generic drugs also have a similar response to the branded medicines as the generic drugs are manufactured with utmost good quality and work exactly the same like the branded drugs with similar or no significant side effects. Similarly, it is also

observed that patients' attitude toward generic drugs is positively related to overall satisfaction and switching intention from branded to generic drugs statistically, as the p-value is less than 0.05.

Finally, overall patient satisfaction with generic drugs and switching intention from branded to generic drugs are also significantly related as the computed p-value of less than 0.05. Thus, it can be inferred from the above analysis that the entire hypotheses ranging from H1 to H9 are accepted except for H4 and H5, meaning patients also have a reverse attitude towards the risk and how far it is convenient to consume the generic drugs.

**TABLE 4: SEM FIT SUMMARY**

| Indices | Recommended value | Model Value |
|---|---|---|
| Absolute Fit Measures | | |
| $\chi^2$ | | 2204.051 |
| Df | | 932 |
| ($\chi^2$/df) | <3 | 2.366 |
| GFI | > 0.9 | 0.904 |
| AGFI | > 0.90 | 0.901 |
| NFI | > 0.90 | 0.923 |
| CFI | > 0.90 | 0.913 |
| IFI | > 0.90 | 0.910 |
| RMSEA | < 0.08 | 0.057 |

The confirmation of the model as to whether it is fitting well or not, the SEM model provides a summary, meaning the aggregate indications revealed that the model was well-fitting since the values obtained of the goodness fit index, and comparative fit index, normal fit index were all more than the cut-off value of 0.9. (Table 4). The root mean square of error approximation was less than 0.1, indicating that the measurements are robust because all the indicators fulfilled their respective thresholds.

## CONCLUSION

Doctors and pharmaceutical corporations must be aware of the attitude and satisfaction of patients with both types of the same formulary drugs. Within the framework of the generic drug, the construction of such a reliable and valid TSQM model for India and other emerging nations can act as a significant instrument for pharma businesses in boosting the satisfaction of patients, even also in maintaining the organization's ultimate sustainability. The present research offers persuasive support in favour of the TSQMs as a model for understanding the patient satisfaction and attitudes towards generic pharmaceutical companies in India, especially in Odisha. Furthermore, the study findings demonstrated a positive relationship between efficacy, the satisfaction of patients, and simplicity in using generic medicine.

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# TESTING THE RELATIONSHIP BETWEEN REFERRAL MARKETING, CONSUMER PERCEPTION AND BRAND LOYALTY IN AYURVEDIC PRODUCTS AMONGST WOMEN

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## ABSTRACT

Ayurveda is an ancient medical method that uses a variety of floras and herbs in preventing sickness and maintaining healthy lifestyle in the Indian Sub-continent. Women consumers in India prefer to use ayurvedic products to protect themselves against medical disorders, personal care and beauty products [1]. During the last decade, the demand for ayurvedic products have grown significantly and therefore every business organization in this sector is aspiring to increase market share by understanding the need of the consumer as well as changing consumer perception through referral marketing and brand preferences.

The purpose of this study is to identify links among referral marketing, customer perception, and brand loyalty in relation to ayurvedic products. A structured questionnaire was created for the purpose of survey, and a pilot study was conducted to ensure its validity. Working women and housewives, were the respondents from whom the data were collected. A total of 242 valid responses were collected from the respondents.

To examine the link between the latent constructs, structural equation modelling was devised for the constructs- referral marketing, consumer perception and brand loyalty.

The study found that referral marketing had positive effect on the perception of the consumer at $\beta = 0.36$, CR= 2.59, p=0.000, referral marketing on brand loyalty at $\beta = 0.41$, CR= 2.09, p<0.05, accepting the hypothesis H1(Referral marketing has a positive effect on consumer perception); and H2 ( Referral marketing has a positive effect on brand loyalty); Consumer perception affects brand loyalty at $\beta = 0.18$, CR= 1.95, p = 0.000, accepting this hypothesis H3.

## KEYWORDS

Ayurvedic products, Referral marketing, Consumer perception, and Brand loyalty

## INTRODUCTION

Introduction: Plant, root, stem, fruit, and struts-based medicinal therapies have been used in India for millennia, and the use of these herbal items as cosmetics, wellness, and medical goods have been passed down from generation to generation [1]. As ayurvedic medical treatment has been proven to be the finest preventative strategy of many diseases and helps in maintaining good health hence, for a long time families in India have been adopting it [10]. Increasing awareness of global warming has encouraged the growth of brands for different ayurvedic goods not only in India but also in other nations across the world. Ayurvedic health care products from India are gaining popularity across the world due to its numerous advantages with no adverse effects [2].

Ayurvedic products in India are used as food rather than medicine. Many medicinal herbs, its roots, stems, flowers, fruits, and other parts are utilised in Indian kitchens on a regular basis to prepare a variety of culinary dishes. Change in modern-day lifestyle patterns, and an increase in occupational disorders affecting the mind, body, and competence, have prompted many people to seek out ayurvedic healthcare solutions as an alternative to allopathic drugs. Consumer attitudes and preferences for ayurvedic healthcare goods have encouraged [3] many small and major medicine manufacturing enterprises to introduce herbal-based dietary supplements and health-care products in modern packaging, new inventive, and user-friendly formats that changed customer perceptions about ayurveda brands and affected consumer behaviour.

Consumer behaviour may be defined as the process of analysing, purchasing, utilising, and disposing of products and services, as well as the physical activity involved in doing so [4]. Marketers have long been fascinated by consumer behaviour. Knowledge of consumer behaviour aids marketers in comprehending how customers think, feel, and choose among alternatives such as goods, brands, and the like, as well as how consumers are impacted by their surroundings, reference groups, family, and salespeople, among other things. Demographic, economic, cultural, social, geographical, and psychological aspects all impact a customer's purchasing decision Kotler and Armstrong [5]. According to Kotler [6], marketing impacts the sale of ayurvedic products by increasing awareness about the brand, through commercials highlighting the usage and benefits, and changing perception about the brand by using referral marketing. Thus, referral marketing is the strategy of advertising items or services to new clients through recommendations, generally word of mouth, by the product's users. It's a complete approach for motivating loyal consumers and brand champions to refer their friends and family Madu & Madu [7]. As from Nicosia [8], consumers may be compelled to purchase ayurvedic products. As a result, referral marketing has a huge impact on modifying consumer perceptions as well as directing their usage and loyalty.

There is need to understand the link between the important aspects that influence customers in purchasing of ayurveda products because there has not been significant amount of study done in the ayurvedic business. Referral marketing, customer perception, and brand loyalty were employed as important elements influencing the purchase of ayurvedic goods in this study.

**OBJECTIVES OF THE STUDY:** The objective of this study is to:
- Analyse the role of referral marketing on consumer perception and brand loyalty
- To test the impact of consumer perception on brand loyalty.

## LITERATURE REVIEW

According to the literature, referral marketing, consumer perception, and brand loyalty are the elements important for any ayurvedic company. Ayurvedic product businesses must have a thorough understanding of each component. To establish link between these variables, this part covers all necessary information that got published in reputed periodicals and journals.

To comprehend the consumer perspective about referral marketing, consumer perception and brand loyalty on ayurvedic products, journals, reports, and research papers were reviewed to understand the factors affecting consumer to purchase ayurvedic products. Table1A shows a thorough overview of the findings of the selected research publications.

**TABLE 1A: AYURVEDIC PRODUCTS – DESCRIPTION & FINDINGS**

| Authors | Description of the findings |
|---|---|
| | |
| [9] | According to the authors, the demand for ayurveda beauty products is fast expanding in India, and people are more interested about ayurvedic beauty products since they are chemical-free and have less adverse effects on the body and skin. |
| [10] | The authors primarily examined the elements that impact purchasers' perceptions of ayurvedic goods in India. According to the study, ayurvedic products on the market are expensive but have no adverse effects. According to the survey, consumers consume various brands of herbal products based on their own interests and doctors' recommendations. |
| [11] | The authors found that 50% of consumers of all age group received information from close friends, relatives and family members regarding ayurvedic healthcare products while conducting the research in Noida. The researchers also discovered that the lack of adverse effects was their top priority for using Ayurvedic medications. |
| [12] | According to the authors, word-of-mouth (WOM) as referral marketing is an informal advice shared between customers that is generally participatory, quick, and free of commercial bias, and has a significant impact on consumer behaviour toward product purchases. |
| [13] | Negative word-of-mouth (NWOM) is a customer response to discontent. The consumer creates negative information on social media by sending messages to close friends and family, causing the company's brand image to suffer. Consumer perception and love for the brand changes as a result of the negative message about the brand and product. |
| [14] | The author investigated customer perceptions of marketers' use of social media to build brand loyalty. Businesses now have primary focus on social media to sell their products. Consultants, marketing professionals, and academics are all attempting to determine how a brand product may be used to attract customers through social media platforms. |
| [15] | Consumers receive information from social media—Facebook, YouTube, Snapchat, Google, Twitter—and personal referrals play the key role in persuading peers. Consumers are more likely to utilize items recommended by friends, and they become devoted to the brand. To stay up with the current social media trends and client interaction techniques, the marketing sector has had to reformulate marketing operations by adding social media. |
| [16] | Personal referrals are an effective communication tool for influencing customers, according to a study on the effects of referral groups on consumers. Customers can also be tapped through WOM activities such as personal referral programmers to spread the word about a product or brand. |
| [17] | The author conducted research on the benefits of ayurvedic products and discovered that most consumers who use them are satisfied with them, and that the majority of them believe that their health, personality, body weight balance, and inner strength of mind and body have improved as a result of using them. Due to this, they remain loyal to the brand and look forward to recommending it to their family members. |
| [18] | The idea of brand loyalty relates to a customer's tendency to purchase a company's product or service again rather than a similar alternative from a rival. Furthermore, an experience may serve as the foundation for further in-depth information processing |

| | |
|---|---|
| | and inference, resulting in brand-related connections. As a result, these relationships have an impact on loyalty. |
| [19] | Brand loyalty is something that every brand and corporation aims for and feels they can achieve, according to the authors. Brand loyalty is defined as a consumer's commitment to repurchase a brand, which may be exhibited via repeated purchases of the product or service, as well as other positive behaviors like word-of-mouth advocacy. |
| [20] | In Indore, the authors looked at consumer satisfaction and brand loyalty for Himalaya herbal goods. The survey inferred that the sample customers are happy with the higher quality, long-lasting impact, and use of fewer chemical substances in the products as well as increased product availability in the market, and successful outcomes provided by Himalaya herbal healthcare products. |
| [21] | In Pune, the authors assessed Patanjali customers' feelings of brand loyalty. Consumers in Pune are devoted to this brand, according to the survey. They are willing to buy it again in the future and recommend it to their family, friends, and others. |
| [22] | In Indore, Madhya Pradesh, the authors studied customer switching behaviour from one FMCG brand to Patanjali ayurvedic products. Customers were switching due to poor packaging quality, lack of innovative products, and lack of availability in rural areas. |

Source: Authors Compilation

**FIGURE1- CONCEPTUAL FRAMEWORK OF THE STUDY**
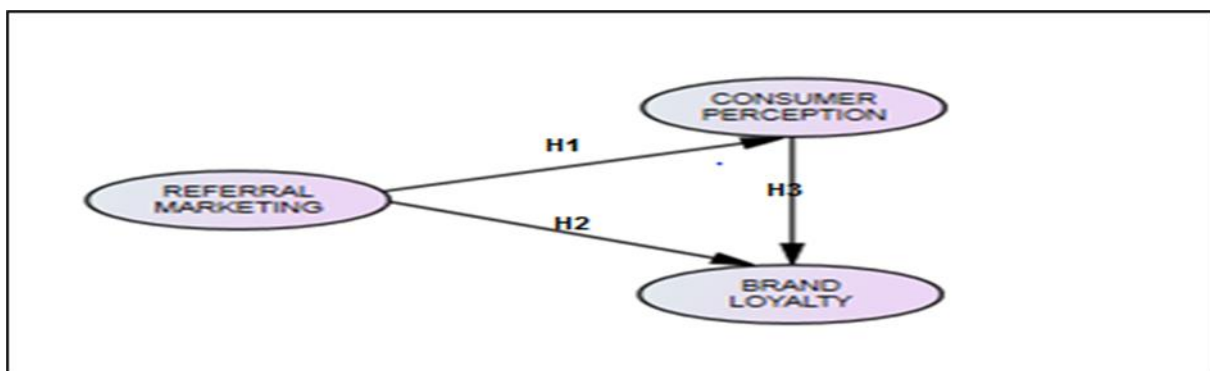


Source: Authors

To meet the goals of our study, research papers, articles that dealt with the factors that affect consumer purchase towards ayurvedic products were viewed. Furthermore, several researchers Kotler [6], Madu & Madu [7], East et al [12], Thomas [13], Uttera Choudhary et al [14] identified that referral marketing, customer perception, and brand loyalty are all linked in different sectors and businesses.

However, no specialised research on ayurvedic products have been conducted by researchers, leaving a gap in the literature. Figure 1 depicts a conceptual framework for testing the research variables using the following hypothesis.

**HYPOTHESES:** Based on the discussion, the following hypothesis are:

**H1:** Referral marketing has a positive effect on consumer perception.

**H2:** Referral marketing has a positive effect on brand loyalty.

**H3:** Consumer perception has a positive effect on brand loyalty.

## METHOD

The purpose of this study is to identify if there is a link between Ayurvedic product referral marketing, customer

perception, and brand loyalty in India. A structured questionnaire was developed with the help of a senior professor from the academia and a senior manager employed in the Ayurveda industry to conduct the survey. The respondents were chosen using a convenient sampling approach. There was no bias based on working or non-working women or based on age, educational qualification, or income. The population is very well depicted in the sample. For initial validity, pilot research was conducted with 25 respondents to assess respondents' understandability of the questions. The questionnaire was then distributed to 300 women through personal contacts, google forms, to the respondents residing in Delhi-NCR. A total of 242 correctly completed responses were chosen for the study, with an 80.6 % response rate. A closed-ended question on a five-point Likert scale with the following alternatives were constructed to analyse the factors that influence the purchase and use of Ayurvedic products: 1 signifies strongly disagree, 2 means disagree, 3 means neither agree nor disagree, 4 means agree, and 5 means highly agree.

To evaluate model fit, exploratory factor analysis, confirmatory factor analysis was performed first with SPSS and then using SEM. Using the work of earlier studies Orapin L [23] and Trusov et al [24], seven items were used to measure referral marketing. Eight elements were collected from the scale provided by Berger et al [25] for customer perception. Similarly, eight items from Chaudhuri & Holbrook [26] were chosen, to assess brand loyalty. The people that were researched were either working in the public or private sector, and few were housewives.

A waiver for any ethics clearance for this study was given by the Dean – Faculty of Management Studies at Amity University, India.

## DATA ANALYSIS

### 1.DEMOGRAPHIC CHARACTERISTICS

TABLE 1: DEMOGRAPHIC PROFILE AND PRODUCT RELATED ACTIVITIES

|  |  | Frequency | % |
|---|---|---|---|
| Occupation | Working Women (Office) | 147 | 60.74 |
|  | Housewife (Non-Working Women) | 95 | 39.26 |
| Age | <30 Years | 85 | 35.12 |
|  | 31-40 Years | 67 | 27.69 |
|  | 41-50 Years | 47 | 19.42 |
|  | 51-60 Years | 43 | 17.77 |
| Education | Graduate | 113 | 46.69 |
|  | Postgraduate | 81 | 33.47 |
|  | Professional Qualification /others | 48 | 19.83 |
| Income (Individual/ family) | <5 lacs per annum | 37 | 15.29 |
|  | 5-10 lacs per annum | 85 | 35.12 |
|  | 10-15 lacs per annum | 87 | 35.95 |
|  | >15 lacs per annum | 33 | 13.64 |
| Usage of Ayurvedic Products | < 6 months | 21 | 8.68 |
|  | 6 months -1 year | 84 | 34.71 |
|  | 1-2 years | 78 | 32.23 |
|  | more than 2 years | 59 | 24.38 |
| Most preferred reason for using Ayurvedic products | It is trustworthy as it doesn't have any side effects | 31 | 12.81 |
|  | Products are stress buster as it rejuvenates and revitalizes our body | 37 | 15.29 |
|  | Helps in maintaining body weight, balance & personal hygiene | 43 | 17.77 |
|  | Detoxify body with no side effects. | 52 | 21.49 |
|  | Cures my personal problems permanently | 34 | 14.05 |

**Testing The Relationship Between Referral Marketing, Consumer Perception and Brand Loyalty In Ayurvedic Products Amongst Women**    **5**

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| | | | |
|---|---|---|---|
| | For anti-ageing and skin problems | 45 | 18.60 |
| Most Preferred Brand | Dabur | 45 | 18.60 |
| | Baidyanath | 37 | 15.29 |
| | Hamdard | 37 | 15.29 |
| | Patanjali | 28 | 11.57 |
| | Himalaya | 31 | 12.81 |
| | Others | 19 | 7.85 |

Source: Authors Compilation

Understanding the demographic characteristics of respondents is essential for understanding the concepts of brand loyalty, perception, and referral marketing. According to the demographic profile of respondents in Table1, 60.74% of respondents are working, while the remaining 39.26% are non-working women. The majority of the respondents are under 40 years of age, with 46.66 percent having completed their degree. According to the data, 50.12% of respondents had an annual income of less than INR 10 lakhs, while the balance have an income of more than INR 10 lakhs. All the respondents have used ayurvedic products at least once, and the majority of them have been using the product for a long time and are satisfied with and loyal to the brand. As a result, this is an ideal demographic profile for analysing the objectives of our current study and may be used to replicate the study in other cities and states for further comprehension.

## 2 CONFIRMATORY FACTOR ANALYSIS (CFA)

For factor analysis, all 23 items were first processed through a reliability test. The Cronbach's alpha value for the variables analyzed was 0.78, which explained 78 percent of the variation. The KMO and Bartlett tests of sphericity were also used to determine the applicability of factor analysis. The items with a factor loading of less than 0.65 were removed from the research. For referral marketing, customer perception, and brand loyalty, the Kaiser-Meyer-Olkin (KMO) measure of adequacy was 0.84, 0.75, and 0.82, respectively, and the Bartlett test of sphericity for all three

constructs were significant (.000), as shown in table 2. As a result, the provided data meets the criteria and is appropriate for testing the hypothesis and model fit.

## 3 STRUCTURAL EQUATION MODELLING (SEM)

SEM was used to establish a link between the dependent and independent constructs or to quantify direct or indirect influence between constructs to evaluate the study's conceptual framework [27]. To acquire a model fit using SEM, there is a need to run a sequence of tests (theoretical model, parameter estimation, and final model), measurement model analysis, and structural model [28].

## 4 MEASUREMENT MODEL ANALYSIS

Measurement model analysis is used to create a connection between the observed items and the latent construct before assessing hypothesis and model fit using SEM. All the latent construct's items were in the 0.68-0.92 range (refer table 3). The items with factor loading less than 0.68 were deleted to establish the measurement model's internal consistency, reliability, and robustness [27].

## 5 MEASUREMENT MODEL AND MODEL FIT FOR REFERRAL MARKETING, CONSUMER PERCEPTION AND BRAND LOYALTY

To achieve model fit, all constructs are to be investigated and validated [25]. To establish a link between the analysed variables, 19 items were kept after 4 items with factor loading below the threshold limit were removed.

## TABLE 2: DIMENSIONS, VARIANCE, EIGENVALUE & SIGNIFICANCE

| Construct and dimension | Eigen Value | % Variance | KMO | Bartlett test (sig) |
|---|---|---|---|---|
| Referral Marketing | 3.14 | 71.23 | 0.84 | 0.000 |
| Consumer Perception | 2.94 | 71.64 | 0.75 | 0.000 |
| Brand Loyalty | 2.88 | 71.45 | 0.82 | 0.000 |

Source: Authors Data Analysis

**Testing The Relationship Between Referral Marketing, Consumer Perception and Brand Loyalty In Ayurvedic Products Amongst Women**        6

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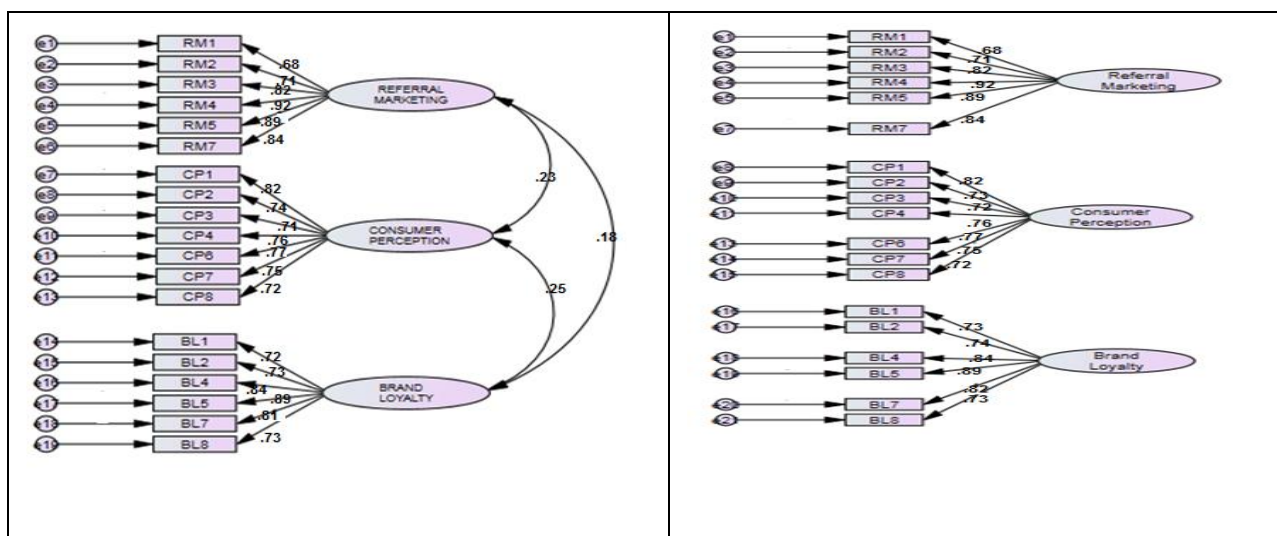**TABLE 3: FACTOR LOADING FOR REFERRAL MARKETING, CONSUMER PERCEPTION AND BRAND LOYALTY**

| Indicators | Items used for the study | Factor Loading | P-Value | References |
|---|---|---|---|---|
| RM1 | Recommend friends | 0.68 | *** | |
| RM2 | Product referred | 0.71 | *** | |
| RM3 | Family pressure | 0.82 | *** | |
| RM4 | Product referred via e-wom | 0.92 | *** | [24] [29] |
| RM5 | Referred by close associates change opinion about brands | 0.89 | *** | |
| RM7 | To support my belief, I take opinion from friends | 0.84 | *** | |
| CP1 | Good health | 0.82 | *** | |
| CP2 | Use and then form opinion | 0.73 | *** | |
| CP3 | Buy brands which is known | 0.72 | *** | |
| CP4 | Satisfaction and perception | 0.76 | *** | [30][31] |
| CP6 | Customer Review | 0.77 | *** | |
| CP7 | Ayurvedic helps in shading weights | 0.75 | *** | |
| CP8 | Customer review | 0.72 | *** | |
| BL1 | Continue buying same brand | 0.73 | *** | |
| BL2 | Next purchase will be the brand from which I was satisfied | 0.74 | *** | |
| BL4 | Favourite brand quality is higher | 0.84 | *** | [32] |
| BL5 | Non availability, will wait | 0.89 | *** | |
| BL7 | Willing to pay premium for brand | 0.82 | *** | |
| BL8 | Will continue buying favoured brand | 0.73 | *** | |

Source: Authors Compilation

**FIGURE 2: MEASUREMENT MODEL: REFERRAL MARKETING AND CONSUMER PERCEPTION**



Source: Authors Analysis

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Based on normalised residual covariance and modification indices, the initial confirmatory analysis revealed that one item is needed to be deleted from the items taken for referral marketing. The values analysed were CMIN/DF=3.19, GFI=0.85, CFI=0.82, and RMSEA=0.059 where the baseline values before the items were removed. The model fit was achieved after eliminating one component (RM6). Consumer perception was measured using 8 items, and the initial inclusive result of confirmatory analysis was CMIN/DF= 3.25, CFI=0.89, GFI=0.89, and RMSEA= 0.06, all of which were over the threshold limit [34]. As a result of monitoring the standardised residual covariance and modification indices, one item from consumer perception (CP5) is deleted, and model fit is achieved, as shown in Table 4.

The initial examined value of brand loyalty were CMIN/DF = 3.12, GFI0.9, CFI0.9, and RMSEA > 0.05 were found in the first study. Two items BL3 (I am not really committeed to favoured brand), BL6 (Even, I obtain negative information, I will still buy my favored brand) were deleted and a model fit was assessed based on residual covariances and modification indices. (CMIN/DF) = 2.89, GFI = 0.91, CFI=0.92, RMSEA = 0.044, In addition, the CFA of the first-order factor measurement model suggests that the items are not multicollinear. The average variance and composite reliability were examined. All three latent constructs had an average variance of 0.66 (RM), 0.56 (CP), and 0.63. (BL), >0.5). Similarly, the RM, CP, and BL for composite reliability were 0.92, 0.9, and 0.91 (>0.7) [35] [36], indicating convergent validity.

The degree to which one measure differs from another and does not connect with another concept is known as discriminant validity [34]. The diagonal values must be greater than the correlation between constructs to verify discriminant validity [36]. It is obvious from Table 6 that discriminant validity is proven.

Since the value of the AVE, construct reliability, convergent validity, and discriminant validity surpasses the fundamental criteria. As a result, the model fit is satisfactory [33][34]. The measurement model's result is shown in Table 6.

## STRUCTURAL MODEL AND TESTING OF HYPOTHESIS:

Because the measurement model has been met, the link between the latent construct will be examined using SEM and a path diagram [35]. The influence of one latent construct on the other latent construct is specified using a path diagram [37], and the final hypothesized model is tested. Table 7 shows the hypothesis findings for identifying the causal-effect link using the path coefficient and P-value.

From Table 7, it is clear that the referral marketing has positive effect on consumer perception at β = 0.36, CR= 2.58, p<0.05. Hence, the hypothesis H1 is accepted. Similarly, the effect of referral marketing on brand loyalty is positive at β = 0.41, CR= 2.09, p<0.05. Therefore, referral marketing makes the consumer loyal towards the brand and thus the hypothesis H2 is also accepted. Furthermore, the effect of consumer perception about ayurvedic products with brand loyalty too is positive at β = 0.18, CR= 1.95, p<0.05, hypothesis H3 is accepted. Figure 3 shows the results of SEM and the final path diagram.

**TABLE 4: MEASURE MODEL- REFERRAL MARKETING, CONSUMER PERCEPTION & BRAND LOYALTY**

| Item | CMIN/df | CFI | GFI | RMSEA |
|---|---|---|---|---|
| Referral Marketing | 3.23 | 0.87 | 0.87 | 0.05 |
| After Deleting (RM6) | 2.88 | 0.92 | 0.92 | 0.04 |
| Consumer Perception | 3.25 | 0.89 | 0.89 | 0.06 |
| After Deleting (CP5) | 2.88 | 0.91 | 0.91 | 0.04 |
| Brand Loyalty | 3.12 | 0.83 | 0.84 | 0.07 |
| After Removing (B3, B6) | 2.89 | 0.92 | 0.91 | 0.04 |

Source: Authors Elaboration

**TABLE 5: DISCRIMINANT VALIDITY**

| Construct | Referral Marketing | Consumer Perception | Brand Loyalty |
|---|---|---|---|

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| Referral Marketing | 0.95 | | |
|---|---|---|---|
| Consumer Perception | 0.32 | 0.94 | |
| Brand Loyalty | 0.56 | 0.65 | 0.95 |

Source: Authors Compilation

**TABLE 6: MODEL FIT**

| Construct | CMIN/DF | CFI | GFI | RMSEA |
|---|---|---|---|---|
| Referral Marketing | 2.88 | 0.92 | 0.92 | 0.04 |
| Consumer Perception | 2.89 | 0.91 | 0.91 | 0.04 |
| Brand Loyalty | 2.89 | 0.92 | 0.91 | 0.04 |

Source: Authors Compilation

**TABLE 7: HYPOTHESIS RESULT AND OUTCOME OF SEM**

| Regression Analysis and Hypothesis results | | | | | | |
|---|---|---|---|---|---|---|
| Hypothesis | Construct | Estimate | S.E | CR | P | Hypothesis results |
| H1 | RM------->CP | 0.176 | 0.068 | 2.58 | *** | Accepted |
| H2 | RM------> BL | 0.151 | 0.072 | 2.09 | *** | Accepted |
| H3 | CP ------> BL | 0.143 | 0.073 | 1.95 | *** | Accepted |

***(P <.05)

**FIG3: HYPOTHESIZED STRUCTURAL MODEL**
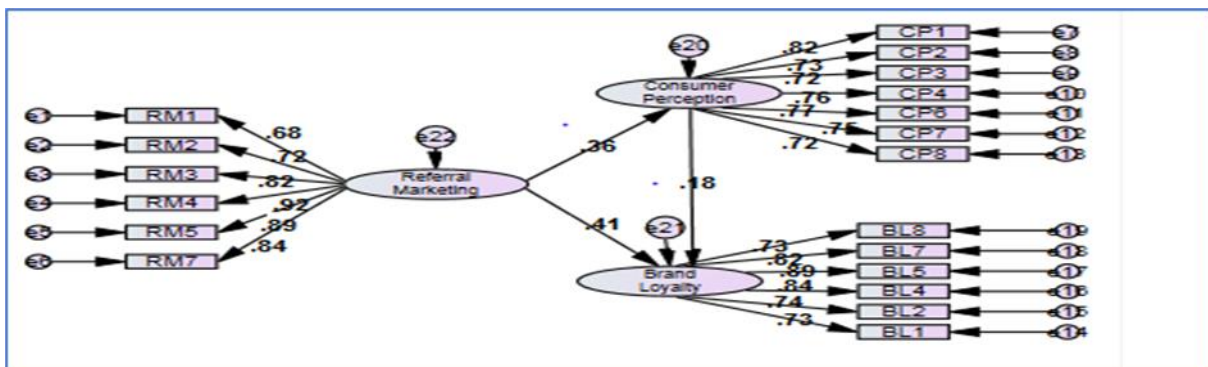


Source: Authors elaboration

# CONCLUSION

The purpose of the study was to establish links among referral marketing, consumer perception and brand loyalty.

Confirmatory factor analysis validates three dimensions that influence women to purchase ayurvedic products. Further, the findings set out that women consumers consider referral marketing to be an effective strategy for extracting information about a product or brand when they have little knowledge [40]. As a result, people utilize electronic communication to communicate with friends for obtaining information since, they feel safer and trust a known source more than an unknown. The data gathered by customers about ayurvedic products not only helps to increase sales of ayurvedic goods, but it also helps in changing customer perceptions about the brand. As a result, the H1 hypothesis is accepted. This matches with the findings of Masoumi et al [40], Devkant & Chaubey [41].

Furthermore, referral marketing has a considerable impact on customer loyalty, as demonstrated by β = 0.41, CR= 0.073, and P=0.05. It can be argued that referral marketing increases brand loyalty, and so hypothesis H2 is accepted. Similarly, at β = 0.18, CR= 0.074, P=0.05, hypothesis H3 is accepted. The output resembles the findings of Brown et al [39].

The foregoing data will aid ayurvedic product owners in analysing and comprehending the effect of referral marketing in affecting customer perception about the brand. As a result, WOM recommendations should be employed as a marketing tactic in businesses to retain clients. The afore-mentioned findings are consistent with those, who discovered that customers account for 90% of referral communication before purchase Keller et al [38].

## IMPLICATION FOR AYURVEDIC COMPANIES

The results support the understanding that managers must successfully utilise referral marketing in various forms of advertisement and communication to alter consumer perceptions and to share information about the benefits of ayurvedic goods to cultivate brand loyalty. Further, to raise awareness, changing perception, building brand image, and understanding about ayurveda products, it is recommended that ayurvedic companies provide more information through electronic communication and respond readily to client inquiries.

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# CRITICAL PERFORMANCE ANALYSIS OF THE HEALTH INSURANCE SECTOR IN INDIA DURING COVID-19 OUTBREAK

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## ABSTRACT

**INTRODUCTION**:

Health insurance is one of the main non-life insurance sectors, which contributes nearly 29% of general insurance premium income. Almost every industry in the world has been affected by the COVID-19 outbreak and its associated lockdowns, including the Indian insurance industry, which makes a significant contribution to a nation's Gross Domestic Product (GDP) and economic development.

**OBJECTIVES:**

This review of literature aims to critically evaluate the performance of Indian health insurance companies along with examining various opportunities and challenges during the time of COVID-19 pandemic.

**METHOD:**

The present study is a combination of both exploratory and descriptive literature review types and was entirely based on published secondary data. Literature searches were performed using Google Scholar, Research Gate, ProQuest, and Scopus databases for articles published between 2020 and 2022. The study also used various annual reports of the Insurance Regulatory and Development Authority of India (IRDAI), the internet, newspaper articles, and company websites for the study.

**RESULTS:**

Even though there was a lack of literature on this topic, 19 articles were identified for review based on the keyword search that most closely matched the topic of the study. The study assesses the effectiveness of various Indian health insurance companies using four key metrics: gross health premium income, incurred claim ratio, number of policies issued or covered and amount of claim paid. Results of the study have shown that as more people get health insurance during the COVID-19 pandemic, there is a notable growth seen in the overall performance of the health insurance business.

**CONCLUSION:**

Health insurers faced both opportunities and challenges as a result of the COVID-19 pandemic, including the imperative need to develop more customer-centric new products and services that enable them to provide a significant health insurance benefit to the large untapped population of the Indian market.

## INTRODUCTION

Health insurance is a mechanism that gives financial protection to the insured against sickness or injury. India has made remarkable progress in the health sector in the last few decades but the Indian health insurance system is still lagging behind that of many other developed and developing countries [1]. Health insurance covers partially or wholly against the risk of high medical expenses. In India, 59 insurance companies offer insurance, out of which 35 are non-life insurers, and health insurance is one of the major sectors in general insurance [2]. The front-line corona fighters, like as medical practitioners and doctors, are under great mental pressure as a result of the significant increase in hospitalisation and death rates [3]. The deadly spread of the COVID-19 pandemic and strict lockdowns enforced adverse effects on healthcare systems as well as the life and non-life insurance industries in India.

The present study is an attempt to critically assess the performance of the health insurance companies during the period of the COVID-19 outbreak. The Insurance Regulatory and Development Authority of India (IRDAI) developed two plans, "Corona Kavach" and "Corona Rakshak," to help people of India with high medical bills in the wake of this difficult crisis. People were forced to buy online health insurance due to the severity of the COVID-19 pandemic and the stringent lockdowns [4]. The presence of various private companies, rising household income, improved awareness of health insurance, all contributed to the health insurance growth [5].

The introduction of new policies, improvement of insurance, and more customised health insurance schemes are some of the innovative approaches by which the industry is shifting and matching its values with the changing needs of customers.

Therefore, the present work explores the changes made by health insurance companies and evaluates their performance during the period of the COVID-19 pandemic. We also discussed the opportunities as well as challenges open to health insurance companies.

## NEED AND SIGNIFICANCE OF THE STUDY

The Indian insurance sector contributes greatly to overall national economic growth. The insurance sector is crucial for economic growth since it protects lives, encourages investment and household savings, and gives mass employment to the people of India. The deregulation and privatisation of the insurance industry in 1999 broke down the monopoly and has resulted in double-digit growth in both the life and non-life sectors [6]. Health insurance is a part of the general non-life insurance industry. India is the second largest country in the world, and unfortunately, the percentage of people covered by health insurance benefits is very low or insignificant compared to other developed countries. The pandemic has pushed businesses across sectors, and it has been observed that more people have now started to invest in health plans. There has been a positive impact experienced in times of the COVID-19 Pandemic [7].

Health insurance in India has been an emerging insurance sector in the past few decades. The rise of the middle class, the mounting cost of hospitalisation, digitization, and more people's awareness towards insurance were some of the major drivers of the health insurance market's growth in India [8]. According to the India Brand Equity Foundation (IBEF) report 2020 [2]. he insurance and banking sectors account for 7% of the country's Gross Domestic Product (GDP) and various public, private, and standalone health insurers provide protection against medical risks and related financial needs [2]. With the rising number of Corona cases, people now realise the importance of health insurance in their lives and, therefore, a significant growth in demand for online health insurance has been observed that is up to 30% [8]. The insurance industry has a lot of potential to expand more by focusing on the vast untapped rural and urban populations.

The study was an attempt to comprehend India's health insurance as well as to critically analyse the performance of public, private and stand-alone health insurance companies during the period of the COVID-19 pandemic. It also aimed to outline the numerous opportunities and challenges that this industry is currently facing.

## LITERATURE REVIEW

In the last few years, the health insurance service sector has been expanding in India. The government and private sector firms offer health insurance in India. After deregulation, a large number of private insurance companies entered the market and now provides customers with a wide range of cutting-edge products. [9]. A lot of advancements have been made in the Indian healthcare industry in the last ten years [2]. The growth of the health insurance sector contributes nearly 29% of the total income of general insurance premiums, making it crucial from the perspective of the general insurance industry's overall growth [3]. The development of technology and the use of the internet are helping in the expansion of this sector especially in the rural areas where insurance penetration is quite low [3]. During the pandemic, the insurance industry experienced both a rise and a fall in business. There have been more claims in the health insurance sector, which has decreased cash flow, but there have also been more new insurance customers, which indicates company growth [4]. According to [5] a critical turning point in the insurance industry happened in 2020. Health insurance companies have evaluated their customers' needs and operating procedures in the wake of the COVID-19 outbreak. Many insurers experiment with new models or modify existing models, or develop new products in order to succeed in this uncertain environment. Technology can be used to bridge the gaps in service offering, improve service performance, ensure efficiency, and lower costs [6]. COVID-19 also provides insurers with the opportunity to bring insurance plans which are up to the requirements of people at large. In March and July 2020, many insurers issued COVID-19 insurance products [7]. India's healthcare system is undergoing a significant transition as a result of higher income levels, improved health awareness, pricing liberalisation, and the entry of private healthcare finance [8].

The key challenge is ensuring that the poor and the needy people get benefit from increased health insurance services at reasonable costs [2]. The performance of the insurance industry is measured on four main indicators - premium income, new policies issued, market share and claim settlement ratio. If the insurance industry is to continue to be cost-competitive, both life and non-life insurers must improve their distribution techniques and focus on developing products that positively influence consumer behaviour [4].

COVID-19 Special Health Insurance has been integrated into an insurer's basic policyholder health insurance. The popularity of health insurance policies has risen considerably in recent years as consumers have realized the need of acquiring sufficient coverage in the event of an outbreak. The Insurance Regulatory and Development Authority of India (IRDAI) made products of health insurance more customised and users oriented during the COVID-19 crisis, with the goal of getting as many people under the insurance umbrella as possible [9].

## METHODOLOGY

The present study is based on a narrative literature review which summarises and synthesises the available content pertaining to the topic or subject matter [10]. A review of the literature gives an important insight into a particular topic and compiles literature from different sources and also critically examines these sources [10].

The main aim of this review article was to carry out a critical performance analysis of Indian health insurance providers during the time of the COVID-19 pandemic. Publications for three years 2020 to 2022 were sourced from different databases such as Google Scholar, Scopus, and Web of Science, annual reports of IRDAI, newspaper articles and company websites were used that best matched with the study objective. From this literature search only 19 articles were cited for this study. The present study is both exploratory and descriptive in nature and was entirely based on secondary data. The relevant secondary data is comprised of research papers, newspaper articles, data from annual reports and literature available on the internet and company websites. The current research is exploratory and descriptive in nature and entirely supported by secondary data that was gathered from various annual reports of IRDA, insurance journals and literature available on the internet. The data gathered has been collected and examined in the form of bar charts. Secondary data includes all types such as from public, private and standalone health insurance companies.

### PERFORMANCE ANALYSIS OF HEALTH INSURANCE COMPANIES DURING COVID-19 OUTBREAK IN INDIA– LITERATURE REVIEW

The growth of the health insurance industry is important from the perspective of the general insurance market's overall development. With the deregulation of the insurance industry, many private players entered and have witnessed tremendous growth since then. The overall

performance of health insurance companies has been improved during COVID-19 pandemic times. The profit of health insurance companies depends on the amount of premium income received [4]. There are four key metrics to measure the performance of health insurance sector such as gross premium income, incurred claim ratio, number of policies and claim paid [4],[11],[12],[13].

In this research we have analyse the performance of various health insurance companies during the COVID-19 periods from 2019-2020 to 2020-2021, in terms of the overall changes in percentage that take place in health gross premium income, incurred claim ratio, claims paid, and number of policies issued.

**TABLE 1: HEALTH INSURANCE COMPANIES' PERFORMANCE DURING COVID-19 IN THE YEAR 2019-2020 & 2020-2021**

| Year/s | Type/s of Health Insurers | Gross Premium of Health Insurers (Crores) | Incurred Claim Ratio of Health Insurers (in percentage) | Health Insurance Business (Number of Policies covered) in lacs | Claims Paid during the period (in Rs. Crores) |
|---|---|---|---|---|---|
| 2019-2020 | Private<br>Growth %<br>Market share% | 16,426.08<br>16.00<br>28.89 | 72.55 | 1,263.91<br>(23.77%) | 41,977.62<br>(16.21%) |
| | Public<br>Growth %<br>Market share% | 25,966.16<br>2.55<br>45.66 | 102.91 | 733.50<br>(0.07%) | 56,887.50<br>(-1.09) |
| | Stand alone<br>Growth %<br>Market share% | 14,472.89<br>27.47<br>25.45 | 64.13 | 92.18<br>(16.63%) | 6,435.43<br>(35.47%) |
| | Total<br>Growth %<br>Market share% | 56,865.13<br>11.87<br>100 | 85.70 | 2,089.59 | 1,05,300.55 |
| 2020-2021 | Private<br>Growth %<br>Market share% | 19,095.07<br>16.25<br>29.95 | 78.44 | 1,259.72<br>(-0.33) | 42,984.80<br>(2.40) |
| | Public<br>Growth %<br>Market share% | 28,902.71<br>11.31<br>45.34 | 101.02 | 684.27<br>(-6.71%) | 54,604.65<br>(-4.01) |
| | Stand alone<br>Growth %<br>Market share% | 15,755.19<br>8.86<br>24.71 | 75.43 | 105.41<br>(14.34%) | 6,779.09<br>(5.34) |
| | Total<br>Growth %<br>Market share% | 63,752.97<br>12.11<br>100 | 89.51 | 2049.4 | 1,04,368.54 |

(Source: IRDA Annual Report 2020-2021, pp. 18-22) [11]

**GRAPH 1: GROSS PREMIUM INCOME OF THE HEALTH INSURANCE COMPANIES IN CRORES DURING THE YEAR 2019-2020 & 2020-2021**
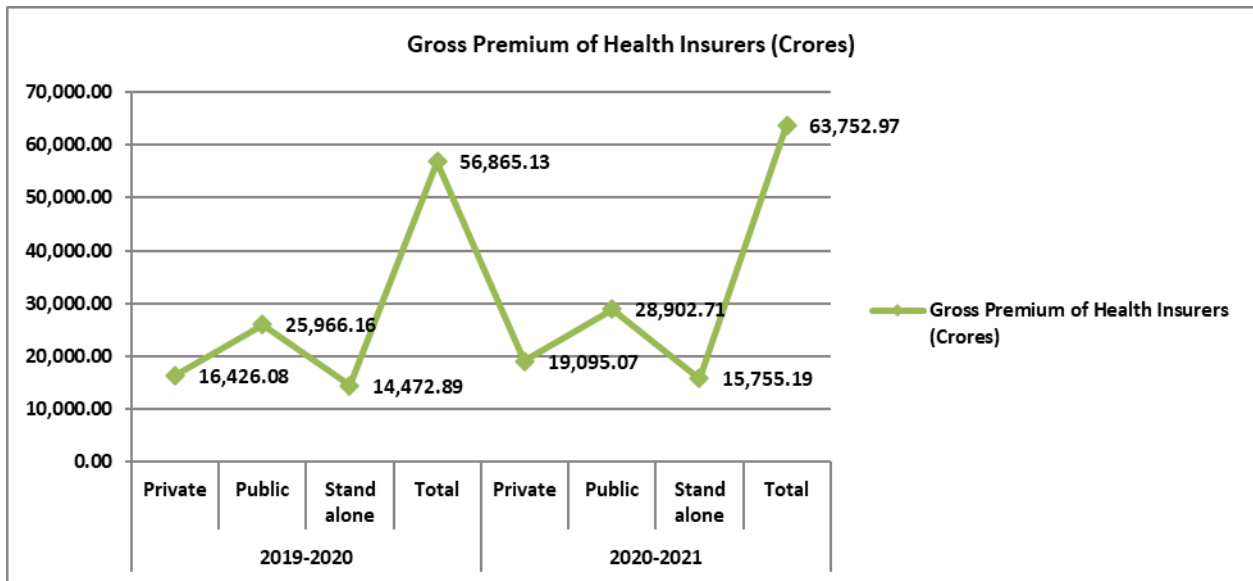


**1. Gross premium Income-** The total premium or amount paid by the policyholder is known as the "gross premium." Premium amounts depend on age, extent of coverage, type of policy etc. There is a total of 33 non-life or general insurance companies, including public, private, and stand-alone life insurance companies. There has been a significant increase in the amount of gross health insurance premium income recorded in the years 2020 and 2021.

**Interpretation:** It is inferred from Graph No. 1 that the total gross premium income was ₹ 56,856.13 crores in the year 2019 to 2020 as compared to ₹ 63,752.97 crores in the year 2020 to 2021, showing a growth of 12.11 percent. The premium income received by public general insurance

companies were comparatively higher than private and stand-alone companies, with a significant growth of 12.11% in the year 2020–2021 as against 2.55% in the previous year 2019–2020 [14].

**2. Incurred claim ratio-** The incurred claim ratio is critical for analysing the company's risk associated with the settlement of claims. The increased claim incurred ratio indicates the negative performance of health insurance companies. [3].

**3. Claim paid-** It refers to the total number of claims paid by various health insurers to the beneficiary. The claim settlement ratio is one of the important metrics for assessing the operational effectiveness of the insurance sector [12].

**GRAPH 2. INCURRED CLAIM RATIO OF HEALTH INSURERS IN PERCENTAGE DURING THE YEAR 2019-2020 & 2020-2021**
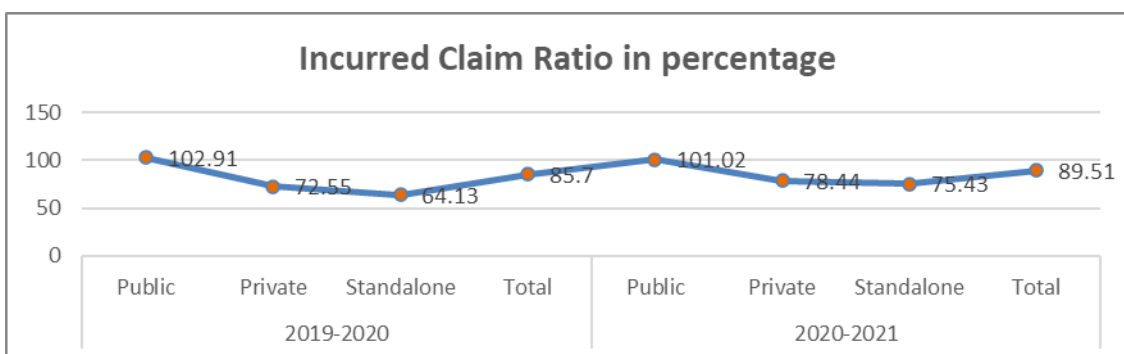


(Source: IRDA Annual Report 2020-2021, pp. 23)

**GRAPH 3. CLAIM PAID IN CRORES OF GENERAL AND HEALTH INSURERS IN PERCENTAGE DURING THE YEAR 2019-2020 & 2020-2021)**

**Claims Paid during the period (in Rs. Crores)**
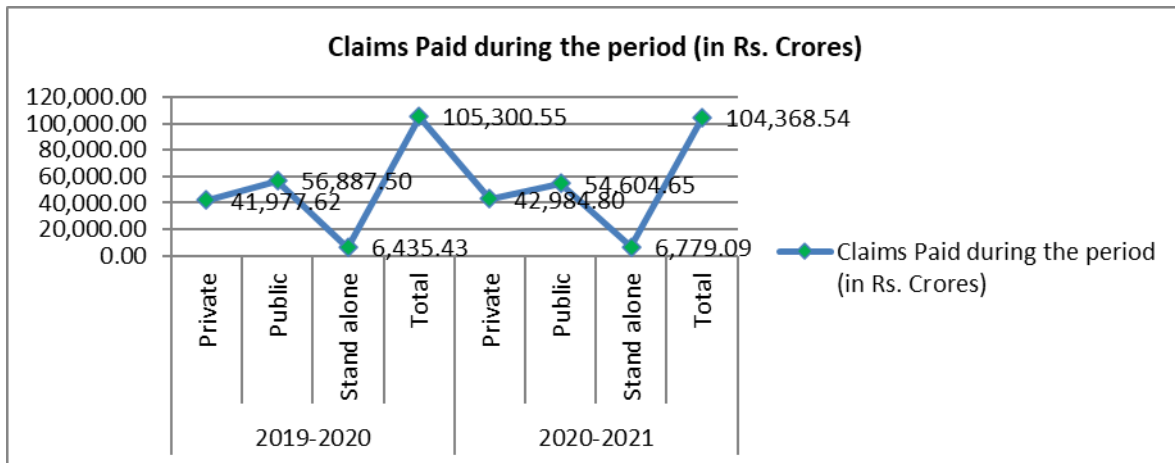


(Source: IRDA Annual Report 2020-2021, pp. 22)

**Interpretation:** According to Graphs 2 and 3, the health insurers' incurred claims ratio (net incurred claims to net earned premium) was 89.51 percent in 2020-21, up from 85.70 percent the previous year 2019-2020. In the year 2019-2020, the public sector incurred claims ratio was 102.91 percent, as against 101.03 percent in the year 2020–2021. Stand-alone health insurers accounted for 72.55 percent of private sector health insurers in 2019-2020, compared to 78.44 percent and 75.43 percent in 2020-2021. It is the net claims incurred divided by the net premiums collected [14]. When the ICR is between 50 to 100 per cent then it

indicates that the health insurance company is making a healthy profit [4],[15]. Among the various segments, Health segment had the highest claims ratio at 89.51 per cent against a claim ratio of 85.70 per cent of previous year (annual report 2020-2021). The amount of claims paid in 2019-2020 was 1, 05, 300.55 crores, compared to 1, 04,368.54 crores in 2020-2021.

**4. Number of Policies Issued** - The number of policies issued or covered shows the industry's potential to grow through attracting customers towards insurance products [12]. More number of policies means more premiums collected by companies.

**GRAPH 4. NUMBER OF HEALTH INSURANCE POLICIES ISSUED IN LAKHS DURING THE YEAR 2019-2020 & 2020-2021**
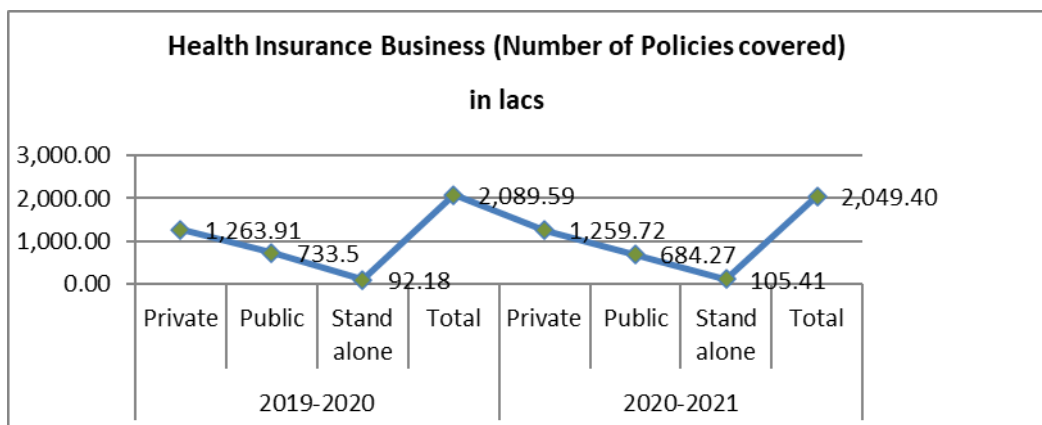


(Source: IRDA Annual Report 2020-2021, pp. 22)

**Interpretation:** It is inferred from graph no. 4, that the total number of health policies issued was 2089.59 lakhs in the year 2019 to 2020 and it declined to 2,049.40 lakhs in the year 2019 to 2020. An insurance policy is a legal agreement

between both the insured and the insurance company. The number of policy issues means more people have invested in health insurance, which is a good indicator for insurance providers.

## HEALTH INSURANCE SECTOR IN INDIA DURING PANDEMIC - CHALLENGES AND OPPORTUNITIES

Health insurance is an arrangement that gives financial protection against any medical emergency to an individual or group. 2020 marks a turning point in the insurance industry. The COVID-19 pandemic presents both opportunities and challenges on various fronts for the health insurers. It gives health insurance companies a chance to develop new policies and services and adapt to the needs of a more informed population [13].

The COVID-19 outbreak pushed many insurance companies to reconsider their clientele and business practises. Insurance Regulatory and Development Authority of India (IRDAI), India's insurance regulatory agency, has released rules for the claims submitted under the COVID-19 pandemic to general insurers and health insurers in response to the COVID outbreak [5]. The Corona Rakshak and Corona Kavach policies were two major policies introduced in India in accordance with the Insurance Regulatory Development Authority of India (IRDA) guidelines and directions [9]. In response to the pandemic, insurance providers added a COVID-19-specific health insurance plan to their customers' like "Arogya Sanjeevani," a comprehensive standard health insurance plans [14],[9],[5]. The prolonged lockdown that followed COVID-19 has compelled insurance companies to prioritise the use of digital technology for everything from selling new policies to settling policy claims [8].

Private healthcare will become more expensive due to unregulated insurance companies, and this will become the biggest threat to health insurers. Thus, a huge population of India is not insured by any health insurance schemes [7]. The General Insurance Council reports that between April and July 2020, the gross direct premium income for health insurance providers increased by 10.44 percent to ₹ 18,415.5 crore. Additionally, the overall sale of health plans has increased significantly during and after the outbreak as people become more alert of the importance of health insurance benefits [17]. In a nation like India, the IRDA plays a very vital role in ensuring that the insurance industry expands rapidly and that the benefits of the insurance go to a large number of consumers. With the privatisation of the insurance industry and the entry of several private insurers and stand-alone health insurance businesses, a significant yearly rise of 17.16% in gross direct premium in the health insurance sector has been noted [8]. The fluctuations of the incurred claims ratio (ICR) during the past few years have become the main concern facing the

health insurance sector. A growing middle-class population and income, more aware and health-conscious people, and tax benefits are some of the factors driving the growth of the health insurance industry.

In India, COVID-19 has changed various sectors, and the health insurance sector is one amongst them. The health insurance sector has altered positively in a lot of aspects, like putting more emphasis on clients, making cost-cutting initiatives, and utilising modern technology will support business growth or expansion [9]. Indian consumers are very price conscious; thus insurance companies need to find more effective ways to control product pricing and cut claim expenses [7]. Hence, the pandemic changed the minds of Indian citizens about health insurance programs, and people have started to realise the value of health insurance and its benefits.

## CONCLUSION & FUTURE IMPLICATIONS

During this pandemic in India, health insurance companies saw a rise and a fall in business and many new customers have purchase health plans [18]. The Covid-19 epidemic not only presents opportunities for the health insurance industry in many ways, but also poses challenges. The insurance sector is highly crucial for economic growth since it protects lives, encourages investment and household savings, and gives mass employment to the people of India [19]. The insurance industry consists of both life and non-life or general insurance. The impact of COVID-19 on the insurance sector was not uniform, meaning some products saw a significant increase and some showed a decline [19]. The pandemic has increased the need for health insurance, encouraged the development of new health insurance solutions, and emphasized the importance of health insurance benefits in times of uncertainty. For companies to enhance their insurance business and customer base must opt to new business models with innovations. The health insurance industry in India has to turn around and start to earn a profit with the help of better technological know-how from foreign partners and involvement by the Insurance Regulatory Development Authority of India (IRDAI). The COVID-19 pandemic presents a number of challenges for the health insurance sector while also giving opportunities to insurers to attract new customers [4].

It is clearly revealed from the given Table 1 that there is a significant increase in the gross premium income of health

insurers and the number of new policies issued during the period of the COVID-19 pandemic. This is a positive sign for the growth of the health insurance industry, but the increase in incurred claim ratio indicates that more premium money has been used to pay policyholder claims. Technology may be used to boost service performance, promote transparency, and to cut costs. The insurance companies should build strategies keeping in mind the different market forces and ready for the changes happening that the sector will experience [14]. In India, the health insurance market is a very promising and developing industry. A universal health insurance scheme is required in India in order to improve people's access to healthcare, especially for low-income households [17].

Limited research has been completed on evaluating the performance of health insurance during the COVID-19 pandemic, particularly in the Indian context. Therefore, more research is required with a focus on the operational effectiveness of the health insurance sector during and post pandemic by taking more factors into account.

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**CONFERENCE ARTICLE**

# LESSONS LEARNED: ACADEMIA'S TRYST WITH THE PANDEMIC-MENTAL AND PHYSICAL HEALTH IMPACTS

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## ABSTRACT

**INTRODUCTION:**

The COVID-19 pandemic brought various changes in the manner we work and the teaching-learning profession is not an exception. It is essential to understand the impact which the pandemic has had on the physical and mental well-being of the major stakeholders of the academic ecosystem.

**OBJECTIVES:**

This study discusses the condition of educational institutes due to the pandemic and its impact on the mental and physical well-being of the faculty members and students.

**RESEARCH METHODOLOGY:**

In order to understand the viewpoint of the students and faculty primary data collection was undertaken in graduate and postgraduate colleges in four Indian states namely Maharashtra, Gujarat, Andhra Pradesh, and Karnataka. There are approximately seven to eight thousand colleges in these four states which offer graduate and post-graduate courses. More than 80,000 students' study in these colleges. Due to the pandemic, it was not feasible to collect data from all of the colleges. In total, 25 colleges were contacted from these four states. Hence, the method of convenience sampling was used to collect the data. A structured questionnaire was designed and distributed to 1,750 students. 1,500 undergraduate and post-graduate students completed the questionnaire (85.7% response rate). From the same institutes, around 715 faculty were given a questionnaire to complete about issues faced in shifting to online teaching from offline teaching due to COVID-19. 600 faculty members completed the questionnaire (83.9% response rate).

**RESULTS:**

According to the findings, online learning has progressed but is resulting in a rise in loneliness and isolation among students and teachers. When one-on-one communication between instructors and students is disrupted, the majority of students felt isolated, which can lead to poor mental and physical health in pandemics.

**CONCLUSION:**

Research outcomes can help institute, university, and policymakers in designing effective mental and physical health policies or developing programs to mitigate the negative effects of online learning during the COVID-19 pandemic. These findings can help researchers discover that mental health is just as vital as physical health.

## INTRODUCTION

Teacher-student interaction has been considered of paramount importance in the learning and understanding of the student. Researchers have shown that in-person interaction and communication are crucial in enhancing the better understanding of concepts in education. Most learners prefer offline education [3].

Like other industries, academia also has been facing the repercussions of the COVID-19 pandemic. The virus has been very detrimental to the whole world in general [7]. The major concern here is the future of millions of learners is at stake with hindrances in learning. Policy initiatives by governments across the globe to temporarily shut down universities and schools had a deep dent in the learning of the students. Now, as it has been more than two years since this virus struck, it is important to understand the impact which the pandemic levied on the physical and mental well-being of the two most important stakeholders of the academic industry - the teachers and the students.

The learning of a student is multi-faceted. The learning of a student comes not only from the teacher-student interaction but also from the peer interaction, physical infrastructures like physics and biology labs, and the learning environment of the university and schools [3]. With the lockdown in place, the in-person interaction was hindered. This had an adverse impact on the learning of the students across the world [18]. This, in turn, has had a toll on the physical and mental well-being of these learners. The shift to online platforms for teaching also brought along the physical and mental demands from the teachers as well as students [1]. Academia has had to quickly adapt to online teaching. In the absence of in-person interaction with students, it required more preparation for lectures including the need to understand the technological aspects of online teaching. This created tremendous

pressure on the teachers' mental and physical well-being. This paper attempts to analyze the physical and mental

impact which the pandemic had on the teachers as well as students.

## DIGITAL DIVIDE

The shift to online teaching was made tougher since everyone did not have the same access to the technology. The income and educational differences had significant adverse effects on the technological readiness of the facility and the students for online pedagogy. The requirement to purchase hardware and software needed for the shift was not easily possible for many of the study's participants. Some Universities started using Artificial Intelligence and other high technology [18]. Artificial Intelligence is coming to rescue of many sectors all across the world [10].

## THE LEARNING GAPS

The digital divide created a learning gap among the students from the same course. The problem was faced irrespective of socio-economic status [11]. Students who were good at the technical aspects of online learning had a better experience during the shift [14]. Also, students who had access to superior technological products were a step ahead. The plagiarism possibility in online education, in terms of educational content, from the faculty perspective and assignments and exam answers from students' perspectives, create serious concerns about the quality of education. The latest technology adoption can help the academic industry to eliminate these hurdles and enhance the quality of the content and reduce the learning gap.

## LITERATURE REVIEW

The literature reviewed on the topic has suggested that most of the previous research studies discovered that the stakeholders of the education industry have been deeply impacted by the disruption this virus caused. In the in-depth review of the literature undertaken, the authors have sought to understand the parameters connected to this topic covered by previous research. The key points from previous research identified through this literature can be found in Table 1.

**TABLE 1: SUMMARY OF THE PUBLICATIONS INCLUDED IN LITERATURE REVIEW**

| | Author | Discussion Points |
|---|---|---|
| 1. | [6] | Increased workload post-pandemic resulted in exhaustion, anxiety, uncertainty, and other health issues |
| 2. | [14] | Need to have more clarity regarding policies and enhanced focus on communication and technical aspects of online teaching |
| 3. | [1] | The serious requirement to assess the online pedagogical content in terms of plagiarism and quality |
| 4. | [5] | Decreased performance standards in the STEM students due to the shift to online teaching. The negative impact on academic performance has been very severe. |
| 5. | [15] | The pandemic had a negative impact in terms of physical and psychological health of learners and teachers. |
| 6. | [16] | Anxiety, stress, and depression had the most common occurrences among the students since the virus has struck. |
| 7. | [19] | Psychological distress has been observed amongst college students. Regular counselling can be used to solve the issue. |
| 8. | [4] | The stressors impacted all types of organizations. Fear and anxiety caused due to social exclusion also were some of the prominent factors |
| 9. | [2] | Stress and anxiety have been recurring factors among teachers. |
| 10. | [12] | Emotional exhaustion, anxiety, stress, and depression were the main psychological and physical impacts on the teachers |
| 11. | [11] | Physical and mental well-being were not majorly confined to any specific age, gender, and educational status. |
| 12 | [18] | Deteriorated mental health due to absence of meeting with classmates, leaving habitual residential arrangements |
| 13 | [13] | The virtual learning environment has had a serious mental health impact on the graduate students across universities |
| 14 | [8] | Emotional intelligence-related interventions can be very effective in dealing with physical and mental issues because of a pandemic. |
| 15. | [3] | Learners show a strong inclination towards offline teaching. |

## METHODS

The methodology adopted for this research included a cross-sectional study of learners undertaking various university and school courses. It was conducted with an online questionnaire. This was done through stratified random sampling across various teaching departments. Demographic details and learners' educational preferences were collected through the Data Collection tool.

The tool was validated by six subject experts. Ethics clearance for this research has been waived off by the Director of Apeejay School of Management, Delhi, India.

The primary data collection to understand the viewpoint of the students and faculty was undertaken in graduate and postgraduate colleges in the four Indian states of Maharashtra, Gujarat, Andhra Pradesh, and Karnataka. There are approximately seven to eight thousand colleges in these four states which offer graduate and post-graduate courses. About more than 80,000 students' study in these colleges. Due to the pandemic, it was not feasible to collect data from all the colleges. In total 25 colleges were contacted from these four states. Hence, the method of convenience sampling was used to collect the data. A structured questionnaire was designed and distributed to 1,750 students, mostly through social media apps. 1,500 undergraduate and post-graduate students completed

the questionnaire (85.7% completion rate). From the same institutes, 715 faculty were given a questionnaire to complete about issues faced in shifting to online teaching from offline teaching due to COVID-19. 600 faculty members completed the questionnaire (83.9% completion rate). The participants in this study were encouraged to ensure correct mention of the issues they were facing after checking for the presence and continuity of symptoms due to the shift to online teaching. During the data collection, participants were encouraged to ensure correct mention of the issues faced by them and were asked to answer questions regarding physical and mental issues they were facing due to the shift to online teaching from offline teaching. They have given the choice of various indicators i.e., depression, anxiety, stress, and physical problems to choose.

The first section of the questionnaire collected data regarding age, gender, and education level. The second section collected data regarding the preferences of the students as well as faculty regarding online and offline teaching. The later section also had questions regarding the mental and physical bearings they faced due to the shift from offline to online teaching.

The data collected from the questionnaire was cleared of all personal identifiers before being compiled and analysed to maintain the anonymity of the respondent.

## RESULTS

The analysis of the primary data collected shows that majority of the stakeholders faced multiple issues due to the shift to online teaching. The findings of the primary data collected from the questionnaire are presented in Tables 2 and 3

TABLE 2: PARAMETER-WISE FREQUENCY AND PERCENTAGE DISTRIBUTION OF STUDENTS

| Demographic Details- Students | | | |
|---|---|---|---|
| Parameters | | Frequency | % |
| Gender | Male | 685 | 45.67 |
| | Female | 815 | 54.33 |
| Age | 16-20 | 225 | 15 |
| | 21-25 | 875 | 58.33 |
| | 26-30 | 310 | 20.66 |
| | 31-35 | 90 | 6 |
| Education | Undergraduate | 675 | 45 |
| | Postgraduate | 825 | 55 |
| Preference for Teaching | Online | 515 | 34.33 |
| | Offline | 985 | 65.66 |
| Mental Stress Reported in Online Teaching | Anxiety/ Stress | 1050 | 70 |
| | Depression | 540 | 36 |
| Physical discomfort Reported in Online Teaching | Eye Strain | 1255 | 83.66 |
| | Physical Discomfort | 1172 | 78.13 |
| | Backache | 910 | 60.66 |

TABLE 3: PARAMETER-WISE FREQUENCY AND PERCENTAGE DISTRIBUTION OF FACULTY

| Demographic Details- Faculty | | | |
|---|---|---|---|
| Parameters | | Frequency | Percentage |
| Gender | Male | 215 | 35.33 |
| | Female | 385 | 66.16 |
| Age | 20-30 | 65 | 10.8 |

|  |  |  |  |
|---|---|---|---|
|  | 30-40 | 210 | 35 |
|  | 40-50 | 245 | 40.8 |
|  | 50-60 | 80 | 13.33 |
| **Preference for Teaching** | Online | 160 | 26.67 |
|  | Offline | 440 | 73.33 |
| **Mental Stress Reported in Online Teaching** | Anxiety/ Stress | 443 | 73.83 |
|  | Depression | 345 | 57.5 |
| **Physical discomfort Reported in Online Teaching** | Eye Strain | 524 | 87.33 |
|  | Physical Discomfort | 489 | 81.5 |
|  | Backache | 510 | 85 |

## DISCUSSION

Very few papers in the review of literature discussed the physical impact on the stakeholders of academia. This research explored the physical impacts along with mental wellbeing impact. One more gap which was identified during the review of the literature was that only a few studies had focused on the faculty members. The researchers have tried to highlight the negative effects of the shift to online teaching, which affected the faculty members as well. In the following we have discussed our findings from the survey. Backache was one issue which has not been studied by many researchers. Most of the respondents in the survey, have mentioned being negatively affected by the shift to online teaching. The discussion is divided into two parts- physical and psychological effects.

### IMPACT OF PANDEMIC ON ACADEMIA - - PHYSICAL AND PSYCHOLOGICAL HEALTH

**Physical Impacts**

1. **Eye Strain** - One major impact of the shift to online teaching was the strain on the eyes. 87.33% faculty surveyed experienced the problem of eye strain. 83.66% students who filled the questionnaire faced the same issue. Especially teachers who were from the older age groups had difficulty working with computer screens for long periods [2]. They had problems such as headache, tired and dry eyes, and most of them who didn't need eyeglasses

earlier had to start wearing them after prolonged hours on the screen [6].

2. **Physical Discomfort** - The long hours in front of the computer screens also resulted in back and shoulder pains for the teachers and the students [15]. 81.5% faculty and 78.13% of students faced physical discomfort. Most of the teachers and students complained about feeling exhausted after a few hours of online teaching and learning [12].

3. **Backache** - 60.66% students and 85% faculty complained about backache due to online sessions. This was maybe due to sitting in one place for a long period, which most of the people were not used to.

**Mental impacts**

1. **Anxiety** – 73.83% faculty and 70.83% students faced anxiety issues due to shift to online teaching. To comprehend the technical aspects of online platforms resulted in anxiety for most of the participants [13]. This feeling was aggravated by the fear that others were doing better than them especially during exams and going ahead with the learning. Some senior faculty members also mentioned fear of death. This feeling has been reciprocated in another research also [4].

2. **Depression-** 57.5% of faculty members and 36% students felt depressed due to the absence of offline teaching. The respondents also mentioned feeling deprived and depressed due to a lack of interaction with their classmates. Most of the students were sad as they had to go to their hostel rooms in a hurry due to the lockdown. They missed the comfort of their usual

learning environment. COVID-19 has resulted in mental health issues across the industries [17].

3. **Stress-** The teachers and the students were stressed about their performance in the course and the resultant appraisal [16]. One major fear is of peers being efficient in handling technical aspects of online teaching [19]. One of the learners from the university mentioned stress due to ever-changing timetables and session slots stretching up too late at night. The general perception among professors was that the students were at home. They will be able to handle flexible timing.

4. **Emotional exhaustion-** Emotional distress and exhaustion were one more outcome of the challenges thrown by the pandemic [18]. Learners found it overwhelming to handle the extended hours and focus required to handle online learning.

# CONCLUSION

Students experienced various challenges according to the COVID 19 Pandemic, including government-imposed lockdown, physical distance limits, travel bans, and college campus closures, all of which led to isolation. However, internet-based online learning tools have greatly aided students in continuing their education from a distance. In comparison to traditional offline classroom learning, the study indicated that online learning has evolved and increased loneliness and isolation among students and instructors. Disruption in in-person communication between instructors and students leads to a sense of isolation, which leads to poor mental and physical health in pandemics. Our study has shown that most of the stakeholders prefer offline teaching compared to online teaching. This is reflected in various studies across the globe [4].

Finally, according to the findings of the study, students were extremely concerned about learning, which led to a rise in stress levels. Students' behaviour is affected as a result of their increased anxiety. Students and instructors may not be able to concentrate on teaching-learning if they are not psychologically fit or stable. During the COVID 19 pandemic, promoting students' and faculty members' psychological and physical well-being has been a primary focus for higher education universities and institutions. Most of the faculty members were in consensus that academic performance had deteriorated in the last two years post-

COVID-19. This feeling was mutual across various schools and universities around the globe [6]. Higher education institutions must identify and comprehend areas of intrusion to formulate and implement appropriate and effective health solutions.

## POLICY INTERVENTIONS

Investigators suggest that government agencies and educational institutions work together to address this issue soon. Students might be supported with internet access at a reduced cost, which would be a better solution to the problem of limited internet access. To increase the quality of online education programs, educators could be provided with training and workshops. Various strategies for health education to reduce mental stress and promote preventative behaviour are required. Finally, the researchers conclude that psychological health is equally vital as physical health.

## EMOTIONAL INTELLIGENCE TO THE RESCUE

Emotional intelligence can be a wonderful tool to ease the journey of the stakeholders to overcome the challenges thrown by the pandemic. EI has been used by multiple organizations to scale through the hurdles [8]

## IS TECHNOLOGY ADOPTION THE PANACEA?

The question which we are left with is – 'Can a better and more pervasive technology adoption be the cure for the ills which academia faced due to the virus?' Technology has been a game changer for many sectors as well as Small and medium Enterprises (SMEs) [9]. The researchers felt that the hardship faced by the stakeholders could be reduced by more training and skill enhancement [8].

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# USING TECHNOLOGY ACCEPTANCE MODEL, ANALYZING THE ROLE OF TELEHEALTH SERVICES IN THE HEALTHCARE INDUSTRY DURING COVID-19

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## ABSTRACT

The emergence of COVID-19 has brought a demographic shift in the usage of health services. Patients used to physically visit healthcare facilities but today many of them utilize technology to get advice from doctors. As a result, technology is becoming more widely used and accepted in the healthcare industry.

Using the technological acceptance model as a base, this study aims to identify the critical factors that impact patients' adoption of telehealth services. This study found that the intention to adopt technology is dependent on reliability, social norms, schemes, offers, hedonic motivation, convenience, and affordability. These factors comprise 67% of the total variance. Analysis using structural equation modelling revealed that reliability, convenience, and affordability at ($\beta$ =0.22, p=\*\*\*), ($\beta$ =0.31, p=\*\*\*), ($\beta$ =0.33, p=\*\*\*) shows positive intention by consumers to adopt telehealth services.

As a result, the hypotheses H1 (Reliability has a positive influence on the adoption intention of telehealth services), H5 (Convenience has a positive influence on the adoption intention of telehealth services), and H6 (Affordability has a positive influence on the adoption intention of telehealth services) are accepted. The path coefficient for social norms, hedonic motivation, schemes, and offers was negative and non-significant. Therefore, hypotheses H2 (Social Norms have a positive influence on the adoption intention of telehealth services), H3 (Social Norms have a positive influence on the adoption intention of telehealth services), and H4 (Hedonic Motivation has a positive influence on the adoption intention of telehealth services) were rejected. The findings also demonstrated that telehealth service adoption intentions positively impacted usage behavior.

# INTRODUCTION

India's health care facilities before COVID-19 had been under immense strain due to the unmanageable load of patients in hospitals and clinics. According to the World Health Organization (WHO) data, the ratio of physicians and patients in India is 0.7 to 1000 as against the world average of 2.5 doctors for 1000 patients [28]. After the outbreak of COVID-19 and the rush of patients to hospitals and healthcare centres, most service providers launched telehealth services to help stop the spread of the virus by promoting telemedicine services and reducing the extra load mounting on healthcare institutions. This was done to safeguard and prevent the patients and physicians from infections [3]. During a pandemic, telehealth functions as a bridge between physicians and patients. Patients may make appointments, call doctors, and receive consultations from a specialist by utilizing information and communication technology [1]. It also helps patients from remote locations without mobility, transportation, and little budget to interact and seek specialized advice at an inexpensive price [11]. Due to the shutdown in India, most people started utilizing telemedicine and telehealth services to restrict the spread of the virus, and most patients changed from physical consultations to online health services.

Based on the Technological Acceptance Model (TAM) the present study aimed to analyse the effect of telehealth services on the consumers, patients intending to use online medical services and its influence on user behavior.

## THE RATIONALE OF THE STUDY

The continuing COVID-19 has placed great pressure on the healthcare industry. Numerous health care facilities and clinics have begun tele-health services to reduce and prevent the infection from lessening the influx and stress. Many individuals utilize information and communication technology to connect and consult with doctors, and many still are sceptical regarding the acceptance of telehealth services. Thus, the present circumstance presents the need to understand the level of acceptance of technology by the people in the health care industry and to identify the factors that influence the adoption and utilization of technology. This would allow the industry to establish better patient management strategies and methods.

## OBJECTIVES OF THE STUDY

The current study aims to comprehend the factors which fundamentally influence the adoption of telehealth services given by the medical clinics and hospitals and to understand the level of fulfillment the patients have from the telehealth services.

# LITERATURE REVIEW

To accomplish the objectives of our study, key appropriate articles and research papers pertaining to technology adoption in relation to telehealth services were selected. This literature review included 19articles that formed the basis of informing our study. These articles supported an analysis to understand the acceptance, benefits, consequences, aspects, prominent characteristics, and downsides of adopting telehealth services in the healthcare business. The details of the findings are listed in Table1.

**TABLE 1: TELEHEALTH SERVICES – DESCRIPTION AND FINDINGS OF PREVIOUS RESEARCH**

| Authors | Description of the findings |
|---|---|
| [2] | In their study, the authors discovered that affordability is the most important factor influencing customers' or patients' willingness to embrace and adapt technology quickly and frequently. |
| [3] | The authors observed that patients or customers are more likely to utilize and embrace technology if they like the experience of using it and can extract and seek the information they require |
| [4] | According to the authors, customers and patients will not adopt new technologies unless they see an advantage from using the services. As a result, numerous health care providers entice clients with discounts, plans, deals, cash back, and free delivery. |

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| [5] | The authors discovered that the service provider's e-services must be of high quality, especially when patients wish to research doctors or facilities. As a result, the consumer should be able to explore the website easily. |
|---|---|
| [6] [7] | The author discovered that people's willingness to employ an invention or service is influenced by reliability. When consumers understand that telehealth services are neither legitimate nor trustworthy regarding real-time information, they are less likely to adopt new technologies. |
| [8] [9] | The author looked at how individuals in developed countries adopt new technologies when they value other people's opinions and when they are affected by people in society and close friends who give them advice. The pressure that a group puts on an individual to modify their attitude, opinion, perception, and conduct is known as social norms. |
| [10] [11] | The authors discovered that customer acceptance of online services is based on the technology's perceived simplicity of use, convenience, and utility. As a result, it is a critical factor in adopting new systems and technologies. |
| [12][13] | The authors claimed that individuals in undeveloped nations are unaffected by the simplicity of use and convenience. As a result, simplicity of use, usefulness, or convenience has little impact on the adoption of online purchase intent. |
| [14][15][16][17] | In their study, the authors discovered that customer trust is a crucial component influencing their desire to utilize online services. It primarily concerns the new system's risk, security, dependability, and belief. |
| [18] | The authors discovered that customers' intentions to adopt new technologies positively impacted their usage behavior. In the same way, internal and external factors influence the desire to accept new technologies. |
| [19] | The writers of the article emphasized the advantages of using telehealth services. The advantages of these services include ease and simple access to clinics and doctors, the ability to conduct a full examination remotely, bridge gaps in medical treatment, and the analysis of psychosocial and motivational aspects. Patient involvement concerns, restricted capacity to do physical exams, financial ramifications, and psychological and social obstacles are some disadvantages of telehealth services. |

Source: Authors Compilation of findings

Based on the literature research findings, it is clear that telehealth services are influenced by several factors. The factors considered relevant for our study are reliability, social norms, schemes and offers, hedonic motivation, convenience, and affordability which affect the intention and usage of technology.

## METHOD

The present study used a survey method to establish a link between the factors considered and the intention to adapt telehealth services.

The Head of Commerce has advised that clearance by the Chandigarh University, India Ethical Committee has been waived for this study.

**1.Sampling Unit-** A large part of the population is represented by the sample. Respondents from Delhi-NCR were the population that was taken into consideration for our study (India). Respondents who have at least used and experienced telehealth services make up the sample unit. With the assistance of senior physicians and management working in telehealth services, a systematic questionnaire was created for this purpose. A pilot study was conducted involving 25 responses to this draft questionnaire to better understand the challenges respondents had when filling out and comprehending the questionnaire.

**2. Sampling Procedure** – Given the enormous population of Delhi-NCR, we used a practical sample technique to choose respondents by asking friends and family members who had difficulty leaving their homes during COVID-19. To

ensure the universal applicability and validity of the results, sample selection was carried out.

**3. Data Collection Method-** The descriptive research design is the foundation of the current investigation. By consulting literature and through personal meetings with senior doctors and administrators from health care departments, a well-structured questionnaire was created to gather data. A total of 300 questionnaires were sent using personal contacts and google forms to the residents of Delhi-NCR, and 252 of them were returned and were legitimate and fully completed, representing an 84% response rate.

**4. Measurement Scale employed-** To investigate the factors that influence patients' intentions and utilization of telehealth services, a questionnaire containing closed-ended questions was being used, which were analyzed on a 5-point Likert scale with the following options: 1-Strongly disagree, 2-Disagree, 3-Neither agree nor disagree, 4-Agree, and 5-Strongly agree.

**5. Research and Statistical tools used-** For this study, we employed descriptive analysis, confirmatory factor analysis using a measurement model, and regression analysis with structural equation modelling (SEM) to test the hypothesis and explore the major factors influencing patients' willingness to use telehealth services. The research findings will aid in the provision of critical services to an extrapolated population.

According to the literature study, Shih [5], Kamal [7], Bokolo [6], Zhu et al [10] and Vijayasarathy [11] set out a number of factors like quality, reliability, easy to use, convenience and usefulness of technologies as factors that influences consumers to use telehealth services. The adoption of technology is one characteristic that stands out the most. In order to determine how customers or patients in the health care industry are influenced and what factors influence them to utilise technology, the current research employs TAM as the actual system. Consequently, a conceptual framework is developed based on the literature. Figure 1 depicts the conceptual framework used to test the following hypothesis.

**FIGURE 1: CONCEPTUAL FRAMEWORK OF THE STUDY**
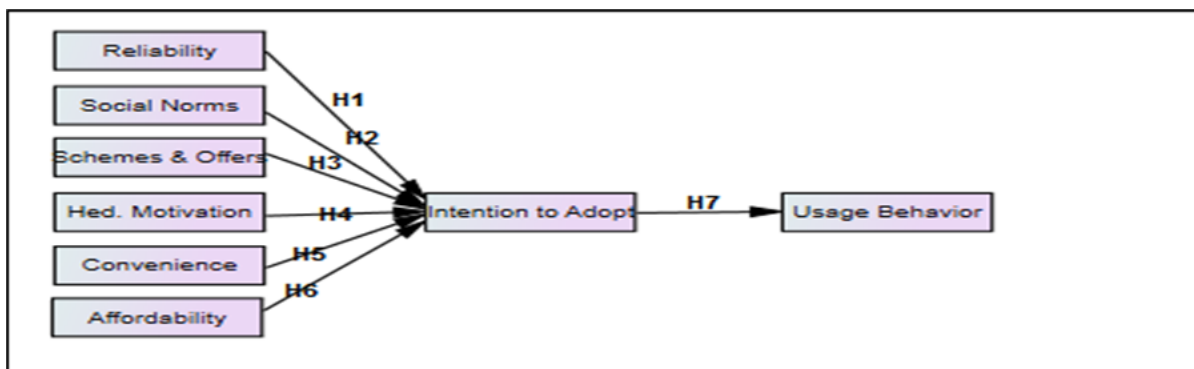


Source: Authors Compilation

## HYPOTHESIS OF THIS STUDY

**H1.** Reliability has a positive influence on the adoption intention of telehealth services (THS).
**H2:** Social Norms have a positive influence on the adoption intention of telehealth services.
**H3:** Schemes and Offers have a positive influence on the adoption intention of telehealth services.
**H4:** Hedonic Motivation has a positive influence on the adoption intention of telehealth services.
**H5:** Convenience has a positive influence on the adoption intention of telehealth services
**H6:** Affordability has a positive influence on the adoption intention of telehealth services

**H7:** Intention to adopt telehealth services has an impact on usage behavior

## DATA ANALYSIS AND INTERPRETATION

### 1. DEMOGRAPHIC ANALYSIS
According to demographics of our present research, most respondents who utilize telehealth services are between the ages of 31 and 60. This demography is appropriate for determining adoption intent based on the factors studied and the impact of adoption intention on user behavior. Males made up 58% of the responders, while females made up 41.67%.74.21% of respondents were graduates and

almost 80% of the respondents had used telehealth services at some point during pandemic. More than 90% of those polled have used telehealth services in recent years.

TABLE 2: DEMOGRAPHIC CHARACTERISTICS

| Demographic Characteristics | Group | Frequency | Percentage |
|---|---|---|---|
| Age | <30 | 103 | 40.87 |
| | 31-45 | 94 | 37.30 |
| | 45-60 | 55 | 21.83 |
| Gender | Male | 147 | 58.33 |
| | Female | 105 | 41.67 |
| Education | Graduate | 187 | 74.21 |
| | Postgraduate | 65 | 25.79 |
| Timeframe of people using telehealth services | <6 months | 68 | 26.98 |
| | 6months-1year | 85 | 33.73 |
| | 1-2 years | 73 | 28.97 |
| | >2 years | 26 | 10.32 |

Source: Authors Compilation

## 2. RELIABILITY ANALYSIS

Cronbach alpha was used to assess the internal consistency and reliability of the data. All the results were larger than the threshold limit of 0.7 [22]. In addition, all the endogenous constructs had CR values greater than 0.7, as suggested by [23].

The factor loading values were determined to be 0.5-0.89, indicating that the variables tested were related and adequate

TABLE 3: DESCRIPTION OF INDICATORS

| Construct | Items | Description of Indicators | Factor Loading | Cronbach alpha | CR | AVE |
|---|---|---|---|---|---|---|
| Reliability | REL1 | Organization renders promised services | 0.78 | 0.85 | 0.88 | 0.66 |
| | REL2 | Doctors attend to patients properly and give quality time | 0.84 | | | |
| | REL3 | Willingness to help patients promptly | 0.89 | | | |
| | REL4 | Patients can rely on the service provider | 0.75 | | | |
| Social Norms | SNM1 | During COVID-19, my friends and relatives want me to use telehealth services | 0.82 | 0.86 | 0.79 | 0.56 |
| | SNM2 | Family members influence me to use telehealth services | 0.74 | | | |
| | SNM3 | Most people who are close to me influence me to use THS | 0.69 | | | |
| Schemes and Offers | SCO1 | Schemes and offers by THS provides affect my intention | 0.79 | 0.79 | 0.85 | 0.65 |
| | SCO2 | Promotion affects my intention to use THS | 0.81 | | | |
| | SCO3 | Few expensive tests can be done with schemes provided by service providers | 0.83 | | | |
| | IMT1 | Personal issues can easily be shared | 0.71 | 0.82 | 0.76 | 0.52 |

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| Hedonic Motivation | IMT2 | I use THS based on my desire and need | 0.72 | | | |
| | IMT3 | I intend to use THS due to care and courteous behavior | 0.74 | | | |
| Convenience | CNV1 | Easy to take appointment as per need | 0.68 | 0.75 | 0.87 | 0.64 |
| | CNV2 | can make an appointment anytime | 0.73 | | | |
| | CNV3 | the time slot can be fixed at my convenience | 0.88 | | | |
| | CNV4 | Can cancel and reschedule the appointment as per my convenience | 0.89 | | | |
| Affordability | AFD1 | I prefer telehealth services due to price | 0.85 | 0.76 | 0.87 | 0.7 |
| | AFD2 | I intend to use THS due to no hidden charges | 0.84 | | | |
| | AFD3 | I prefer THS due to the refund and return policy | 0.83 | | | |
| Intention to Adopt online medical services | ITA1 | I intend to use THS due to schemes, discounts, and offers | 0.75 | 0.87 | 0.83 | 0.63 |
| | ITA2 | I will prefer using THS, specially during covid period | 0.82 | | | |
| | ITA3 | I intend to use THS as it saves time and money | 0.81 | | | |
| Usage-Behavior | UB1 | I will deliberately use it for safety | 0.74 | 0.89 | 0.79 | 0.56 |
| | UB2 | Choosing THS happens automatically whenever there is any problem | 0.76 | | | |
| | UB3 | Whenever I have an option, I will prefer THS | 0.75 | | | |

Source: Authors Compilation

**TABLE 4: DISCRIMINANT VALIDITY**

| Discriminant Validity | REL | SN | SO | IM | CONV | AFFD | ITA | UB |
|---|---|---|---|---|---|---|---|---|
| Reliability (REL) | **0.81** | | | | | | | |
| Social norms (SN) | 0.32 | **0.74** | | | | | | |
| Schemes and Offers (SO) | 0.12 | 0.23 | **0.801** | | | | | |
| Hedonic Motivation (IM) | 0.11 | 0.31 | 0.32 | **0.721** | | | | |
| Convenience (CONV) | 0.13 | 0.32 | 0.21 | 0.13 | **0.8** | | | |
| Affordability (AFFD | 0.07 | 0.33 | 0.34 | 0.29 | 0.27 | **0.83** | | |
| Intention to Adopt (ITA) | 0.32 | 0.23 | 0.41 | 0.31 | 0.32 | 0.33 | **0.79** | |
| Usage Behavior (UB) | 0.25 | 0.3 | 0.35 | 0.33 | 0.29 | 0.35 | 0.51 | **0.74** |

Source: Authors Compilation

Internal consistency is validated, convergent and discriminant validity are checked using a measurement model [24]. Tables 3 and 4 show the results of the validity analysis.

## 4.STRUCTURAL MODEL AND HYPOTHESIS TESTING, AMONG OTHERS.

SEM was utilized to create a link between the endogenous and exogenous variables in order to obtain model fit. The final model had an AGFI of 0.901, a CMIN/df of 2.82, a GFI of 0.912, and an RMSEA of 0.045 [25]. As a result, testing the influence of endogenous construct on the exogenous construct is critical to evaluate the hypothesis. Figure 2 illustrates the path coefficient and table4 the hypothesis results.
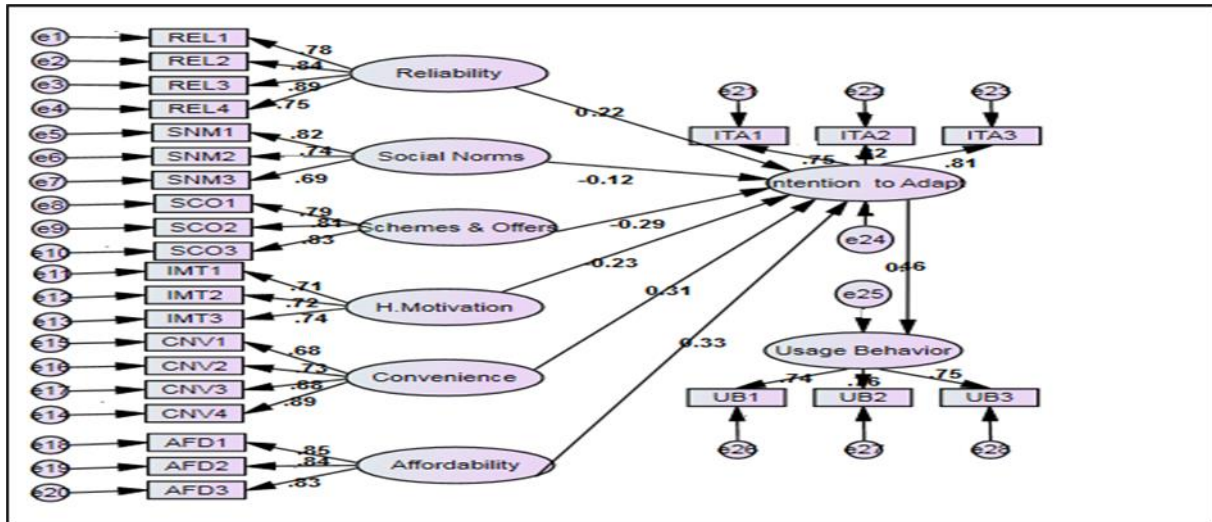
Source: Authors Analysis

According to the path coefficient analysis, reliability (β=0.22, P=***), convenience (β= 0.31, P= ***), and affordability (β = 0.33, P = ***) all had a favorable influence on customers' willingness and adoption intentions to use telehealth services. As a result, the hypotheses H1, H5, and H6 are accepted. In addition, the intention to use telehealth services has a beneficial influence on customer usage behavior (β =0.46, P=***). Therefore, hypothesis H7 has been accepted.

| Hypothesis | Proposed Relationship | Effect Type | Path coefficient | Result |
|---|---|---|---|---|
| H1 | Reliability-----------------&gt;ITA | Direct | 0.22*** | **Accepted** |
| H2 | Social Norms -------------&gt;ITA | Direct | -0.12 NS | Rejected |
| H3 | Schemes and Offers--------→ITA | Direct | -0.29 NS | Rejected |
| H4 | Int. Motivation-------------&gt;ITA | Direct | -0.23 NS | Rejected |
| H5 | Convenience-------------–&gt;ITA | Direct | 0.31*** | **Accepted** |
| H6 | Affordability--------------&gt;ITA | Direct | 0.33 *** | **Accepted** |
| H7 | ITA----------------------&gt;UB | Direct | 0.46*** | **Accepted** |

Source: Authors Compilation

However, social norms (β = - 0.12, P>0.05) Schemes and Offers (β = - 0.291, P >0.05), and hedonic motivation ((β = -0.23, p=>0.05), do not have any effect on consumer intention to adopt telehealth services. As a result, hypothesis H2, H3, and H4 are rejected.

## CONCLUSION

Due to the pandemic, telehealth services have proven their capacity to grow and penetrate in a rather short amount of time. Everyone has been compelled to use telehealth services at least once because of the present pandemic. Though people's expectations for technology usage intentions differ, most individuals think that dependability, affordability, and convenience are the three criteria that have the most impact on people's usage intentions. Therefore, H1, H5, and H6 are accepted and agree with the findings of [26], but social norms, hedonic incentives, and offers and schemes do not persuade individuals to adopt technology for health care. Patients seem to be less concerned with plans and deals, preferring to speak with a specialist to calmly address their own problems. These elements so have no impact on people's usage intentions. Therefore, the findings will have significance for the opportunities, applications, and aspects that telehealth service providers may utilize to align strategy in terms of boosting services for drawing in an increasing number of clients.

In terms of enhancing health and offering services to those who reside in rural areas and cannot afford to travel to hospitals, the usage of telehealth services would be advantageous. Although the technology is widely used, only time will tell if it represents an advancement in both information and communication technology (ICT) and good health.

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