Asia Pacific Journal of Health Management

Volume 15 Issue 4 2020

The Journal of ACHSM & SHAPE

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ACHSM Asia-Pacific Journal of Health Management

IN THIS ISSUE

Welcome to this fourth issue of the year, a record in the number of issues produced and yes, we continue to receive significant numbers of articles for publication. We appreciate the enthusiasm of authors but ask for their patience in our ability to process, peer review and publish. Exciting news for the APJHM was that we have been accepted for inclusion in the Directory of Open Access Journals (DOAJ). Allowing that organisation to speak for itself, we quote 'We are absolutely delighted to welcome this journal into DOAJ and look forward to seeing the article metadata soon.'

The benefits of supplying DOAJ with our metadata are said to be:

- Statistics show more than 900 000-page views and 300 000 unique visitors a month to DOAJ from all over the world.
- Many aggregators, databases, libraries, publishers, and search portals collect DOAJ free metadata and include it in their products. Examples are Scopus, Serial Solutions and EBSCO.
- DOAJ is OAI compliant and once an article is in DOAJ, it is automatically harvestable.

  DOAJ is Open URL compliant and once an article is in DOAJ, it is automatically linkable.
- Over 95% of the DOAJ Publisher community said that DOAJ is important for increasing their journal's visibility
- DOAJ is often cited as a source of quality, open access journals in research and scholarly publishing circles.'

This is encouraging news for our authors, readers the ACHSM and SHAPE who are involved and supportive of the APJHM.

The first article in this issue is an important commentary from the National President of ACHSM, Dr Neale Fong, who provides insights into leadership and management in the Covid_19 period, the positioning of the College and its offerings at this time and an announcement about the commencement of a certification process for College members.

The editorial again addresses the continuing progress of Covid-19 internationally. The editorial focusses on lessons learned across a number of nation states with a hope that this will encourage health professionals, policy makers, politicians, communities to reflect on the experience so far and develop a reasonably consistent framework and strategy that might improve future approaches to pandemic management. We would welcome contributions in this context.

Turato and Oprescu describe enablers for allied health front-line managers in public health environments to deliver sustainable patient care in a review article in the Australian context. This article is followed by Yousef Yaghoobi and colleagues designing an empowerment model for Iranian health centre managers: A comprehensive study that examine empowerment models for Iranian health centre managers to develop capabilities and competencies for this group. Muddle in a research article describes the relationship between leadership style and hospital employee engagement in Papua New Guinea. Arya provides a distinctly unique contribution in being a fine detective in learning health leadership lessons to conclude this group of articles particularly relevant to health management.

The next group of articles commences with the contribution of Bain, Goswami, Lloyd and Davis describing the post-implementation evaluation of a digital dictation system in a large health service using HOT-Fit framework, in Victoria Australia. This is followed by an article by seven colleagues from Iran that provides a research article on the assessment of staff performance in a CSSD unit using a 360-degree evaluation method. A further group of colleagues from Iran have also provided systematic review and meta-analysis of the care burden of informal care givers of haemodialysis patients, concluding that we should develop appropriate strategies to improve the quality of life for this group.The

Asia Pacific Journal of Health Management 2020; 15(4):i583. doi: 10.24083/apjhm.v15i4.583

next contribution from Yadav from India provides a comparative study of health as an economic dimension in respect to China and India. Colleagues from Nepal, Thailand and Australia make a topical contribution entitled 'infodemic monikers in social media during the covid-19 pandemic. Das and colleagues provide a contribution that addresses community preparedness and responses to prevention and control of Covid_19 in Bangladesh. As usual we conclude with our library bulletin provided by Yaping Liu.

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COMMENTARY

COMMENTARY FROM DR NEALE FONG FCHSM

President Australasian College of Health Service Management

INTRODUCTION

As this unprecedented year of 2020 draws to a close, many of us across the health sectors globally are considering the implications of the pandemic for the way in which we work in the future. While it seems that Australia, New Zealand and some of our near neighbours have wrestled the Covid19 beast into near submission, for much of the world the battle is still unfolding. That global inequity will keep our local health systems on high alert for the coming year.

As leaders we should pause to appreciate what we have been able to achieve for our communities this year in dealing with a multitude of complex challenges.

HOW WE WILL WORK

Depending on the organisation, large swathes of the workforce are unlikely to shift back to a pre pandemic "business as usual". Most pundits suggest it will settle into a hybrid model of working where we balance the efficiencies of remote work with the social needs, creativity and innovation generated by working with others.

A key element of this shift to remote working is that managers and leaders know how to manage, coach, collaborate, evaluate performance and motivate a remote team. Another is facilitating a workplace culture of trust and belonging where interpersonal connections are fostered and prioritised. People in management roles will have to undergo a major transformation with a focus on emotional intelligence and social skills. In the past, we promoted and hired people to leadership roles based on their technical skills; in the future, we will need managers who balance their technical and people skills.

One of the key challenges for the health sector will be to transform the delivery of care at pace with the broader world of work shifts that are occurring around us. Policy and delivery will need to stay in touch with the expectations of our patients – shifts to telehealth made possible in a crisis have become a consumer expectation going forward. It is both a formidable challenge and an opportunity to enhance the efficiency of great patient care that awaits all our health leaders.

TOGETHER WE CAN SUPPORT THAT FUTURE

The College (ACHSM) has pivoted to meet the demands of virtual operations in 2020, changing many aspects of how and when we support our members. Increased and shorter briefings from health leaders via webcast presentations and panels has been welcomed by our members and critical to staying in touch. Branches have been innovative with other forms of virtual learning experiences and the Board has developed and approved a new vision of learning and development value from 2021 onwards.

With credentialling through Certification to commence on December 1, the College aims to enhance the visibility and understanding of the critical role of health leaders in the system. It is through a commitment to lifelong learning that health managers and leaders are best equipped to rise to the challenges and vicissitudes we may need to come to expect from a world where pandemics and the health impacts of climate change are a reality for the coming decades. These challenges compound with the continued need to drive efficiencies to cope with the ageing population.

Together we can support our future by developing, supporting and guiding current and future health leaders. Looking forward to 2021, the College will introduce a new online service where all members can undertake a free self-assessment against the ACHSM Master Health Service Management Competency Framework that generates an individual report identifying strengths and weaknesses. The College will publish and use the de-identified collective data to drive learning opportunities. We will also be reviewing the Competency Framework for its currency and reviewing several of our core free member offerings such

Asia Pacific Journal of Health Management 2020; 15(4):i577. doi: 10.24083/apjhm.v15i4.577

as Mentoring. And we look forward to meeting for the National Congress in October 2021 in Canberra. Whilst we transform the way we work alongside you; we appreciate your collegiality and support as we move into a brave new future.

Dr Neale Fong FCHSM
President Australasian College of Health Service Management

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COVID-19: MOVING TOWARDS THE NEW NORMAL

DS Briggs AM

Since the last issue when we first spoke of the impact of Covid-19 we continue to be focused on addressing the challenges this virus has on health systems, nation states, communities, and people. The approach of countries and health systems has been variable as has the political interventions and interpretations of policy with some unfortunately placing parochial populism ahead of evidence and common sense.

Fortunately, political leaders and health policy makings are now examining what lessons can be learned and how we might develop a more balanced evidence based logical and compassionate approach to both community need and collective interests. One example of this is the work of Lieu and colleagues from the Institute for Health Policy and Systems Research that are providing through YouTube across country dialogue about Asia's post-pandemic health care. These multiple presentations are available at https://www.ihpsr.org.hk/. At the same time, the South China Morning Post traversed the differences between largely Asian countries relative success with the virus compared with western countries that includes commentary from a number of health professional and academic colleagues in a range of countries. [1]

Han, Tan and colleagues [2] have turned our attention to the lessons learnt across nine high income countries, five from the Asia Pacific region, Hong Kong (SAR), Japan, New Zealand, Singapore and South Korea as well as four European countries of Germany, Norway, Spain and the United Kingdom (UK). They provide a comparative analysis of lessons learned from the experiences of those countries.

These authors [2, p.1525] used an adaptive framework to present the analysis utilizing six measures of overall strategy, knowledge of infectious status, community engagement, public health capacity, health system capacity and measures for border control. They suggest that communities be fully engaged and empowered in the policy and process around decision making that affects their protection from the virus and the effect of the crisis. They go on to suggest that advice needs to be 'consistent and credible' and that 'principles of coproduction' of policy should be used. [2, p.1527] Mention was made about differing measures of what constitutes social distancing between countries and about policies that direct the wearing of masks.

The authors state that 'with few exceptions, political leaders have struggled to secure public trust and thus support for continued lifestyle changes.' [2 p.1529] The authors go on to cite other research that suggests that countries with female leaders 'have done better at securing public confidence and adherence to new measures than countries with male leaders'.[2, p.1529, 3] While many countries were not prepared to cope with the rapid pace of the spread of the virus some countries such as South Korea and Hong Kong (SAR) used to varying degrees, electronic health records, credit card transaction data, mobile phone positioning systems, close circuit television and police supercomputers to name some of the technology. [2 p.1530]

In conclusion Han, Tan et al suggest that we are not returning to normal but to a new normal. They suggest that all countries need a plan to move forward based primarily on epidemiological considerations. Secondly, we need systems to 'robustly monitor' the infection status before restrictions are eased. Measures to reduce transmission will be needed for some time and every country needs an 'effective find, test, trace, isolate, and support system'. [2, p.1532] There is much to be read in this Lancet article and I would encourage readers and colleagues to read the article content and reflect on the relevance to what has occurred in your health system.

Asia Pacific Journal of Health Management 2020; 15(4):i581. doi: 10.24083/apjhm.v15i4.581

The authors cited above raise the issue of coproducing policy and process as a better way to gain implementation and acceptance and credibility as a means for health systems and government to move forward. Felipe and colleagues [4] pre Covid published a perspective on co-production of knowledge, values, and social relations in health care. They describe co-production 'as a way of working together to improve health and of creating user led, people – centred health care services.' [4 p.1, 5] Felipe and colleagues see co-production as a space that brings together differing values and social relations that produces 'new interactions and forms of knowledge' providing more meaningful ways of 'shaping and taking part in healthcare'. [4 p.2] This gives us an opportunity to both codify what we did and did not do in addressing Covid-19 and designing a more inclusive and considered way of determining how we address pandemics in the 'new normal'.

Langley and colleagues [6] describe 'collective making' as a means to contribute to participatory design in the co-creation of knowledge in healthcare and blurring the boundaries between knowledge producer and knowledge user to the extent that 'dynamic and adaptive community partnerships are nurtured and developed'. These authors suggest that today's challenges require transdisciplinary approaches that blend skills, knowledge, and experience. A truism in respect to the Covid-19 challenges. [6, p.585]

Sandholt and colleagues [7] suggest that health systems need to adjust services to 'the needs of complex, ageing populations and again the Covid experience has described the vulnerability of aged care residents in care homes and the tensions of appropriately meeting the acute health care needs between the acute and aged care sectors. They propose 'human-centred design as a method to engage older adults and key professionals in innovation processes.' [7, p.4551] They describe a model based on inspiration, ideation and implementation and the challenges as recruitment, time, and resources. These authors propose that human centred design methods place the 'perspectives of older adults at the centre and recognizing the value of interdisciplinary work.' [7, p.4550]

The USA based Commonwealth Fund has just published the report of a task force on health care delivery system reform [8] that looks at the impact of Covid-19 overlayed over what they describe as the existing disparities of the USA health system. The task force was designed to focus on a vision of equitable and affordable healthcare for all and had goals of improving quality, advancing equity, and increasing affordability. The task force suggested six policy imperatives to achieve its goals. Imperatives are described as increasing delivery system preparedness for health disasters, greater accountability for healthcare quality, equity and cost, the strengthening of the primary healthcare system, supporting the empowerment and engagement of people, families, and communities together with a reduction in administrative burden and an encouragement of a balance of regulatory and competitive approaches to promote a high-performing health system. Similar outcomes to that proposed by Han, Tan, and colleagues in differing health care systems. [2]

Like the USA above, stating an emphasis on PHC, China has substantially increased investment in PHC, partly responding to emerging infectious disease challenges. XiLi [9] and colleagues suggest a number of strategies for health service improvement. They are supportive of other authors cited in this editorial and make a significant point in suggesting that:

> The primary health-care system should increasingly be configured to be a learning platform for knowledge generation and utilisation, which is built on digital data and innovative technologies, particularly for staff training, decision support, and quality control. [9, p.1802]

This Journal would be interested in the views of colleagues of 'lessons learned' from the Covid-19 experience and, more importantly how we progress the challenge made by Xi and colleagues [9] above,

DS Briggs AM
Editor in Chief

References

1. Power J. (2020) Coronavirus: why are Western countries like the US and Britain still not learning from Asia's success? South China Morning Post. Available at https://www.scmp.com/week-asia/economics/article/3110754/coronavirus-why-are-western-countries-us-and-britain-still-not?utm_source=Facebook&utm_medium=share_widget&utm_campaign=3110754&fbclid=IwAR15

HRwUAazk6ydGqVsqmUed8LmAy7sOud0z8HcAnaoaWEHr6PFXHQkaJHs.

2. Emeline Han*, Melisa Mei Jin Tan*, Eva Turk, Devi Sridhar, Gabriel M Leung, Kenji Shibuya, Nima Asgari, Juhwan Oh, Alberto L García-Basteiro,Johanna Hanefeld, Alex R Cook, Li Yang Hsu, Yik Ying Teo, David Heymann, Helen Clark, Martin McKee, Helena Legido-Quigley Lessons learnt from easing COVID-19 restrictions: an analysis of countries and regions in Asia Pacific and Europe Lancet 2020; 396: 1525–34 Published Online September 24, 2020 https://doi.org/10.1016/ S0140-6736(20)32007-9.
3. Coscieme L, Fioramonti L, Mortensen LF, et al. Women in power: female leadership and public health outcomes during the COVID-19 pandemic. medRxiv 2020; published online July 16.https://doi.org/10.1101/2020.07.13.20152397 (preprint).
4. Filipe A, Renedo A, Marston C (2017) Theco-production of what? Knowledge, values, and social relations in health care. PLoS Biol 15(5): e2001403. https://doi.org/10.1371/journal. pbio.2001403
5. Kickbusch I, Gleicher D. Governance for Health in the 21st Century. Copenhagen: World Health Organization (WHO) Regional Office for Europe; 2012
6. Langley, J. Wolstenholme, D. Cooke, J. 'Collective making' as knowledge mobilization: the contribution of participatory design in the co-creation of knowledge in healthcare. BMC Health Services Research (2018) 18:585 https://doi.org/10.1186/s12913-018-3397-y.
7. Sandholdt, C.T. Cunningham, J. Westendorp, RGJ. Kristiansen, M. (2020). Towards Inclusive Healthcare Delivery: Potentials and Challenges of Human-Centred Design in Health Innovation Processes to Increase Healthy Aging. Int. J. Environ. Res. Public Health 2020, 17, 4551; doi:10.3390/ijerph17124551 www.mdpi.com/journal/ijerph.
8. The Commonwealth Fund. (2020) Commonwealth Fund Task Force on Payment and Delivery System Reform Health Care Delivery System Reform: Six Policy Imperatives. November 2020. Available from https://www.commonwealthfund.org/publications/fund-reports/2020/nov/commonwealth-fund-task-force-payment-and-delivery-system-reform
9. Xi Li*, Harlan M Krumholz*, Winnie Yip*, Kar Keung Cheng, Jan De Maeseneer, Qingyue Meng, Elias Mossialos, Chuang Li, Jiapeng Lu, Meng Su, Qiuli Zhang, Dong Roman Xu, Liming Li, Sharon-Lise T Normand, Richard Peto, Jing Li, Zengwu Wang, Hongbing Yan, Runlin Gao, Somsak Chunharas, Xin Gao, Raniero Guerra, Huijie Ji, Yang Ke, Zhigang Pan, Xianping Wu, Shuiyuan Xiao, Xinying Xie, Yujuan Zhang, Jun Zhu, Shanzhu Zhu, Shengshou Hu (2020). Quality of primary health care in China: challenges and recommendations. Lancet 2020; 395: 1802–12. www.thelancet.com Vol 395 June 6, 2020.

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REVIEW ARTICLE

ENABLERS FOR ALLIED HEALTH FRONT-LINE MANAGERS IN PUBLIC HEALTH ENVIRONMENTS TO DELIVER SUSTAINABLE PATIENT CARE

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ABSTRACT

BACKGROUND:

Many allied health managers do not feel equipped to face the challenges of evolving business environments such as public hospitals The increasing demand on public hospitals due to chronicity of disease, an aging population and rising health costs will require managers to be resourceful, adaptable, influential and innovative The research on this topic is scarce with a lack of robust studies specific to allied health front-line managers working in public healthcare settings.

OBJECTIVES:

The review of the literature aims to identify enablers for front-line allied health managers to be more effective and better prepared for working in complex and challenging healthcare environments such as public hospitals.

METHOD:

Literature searches were performed using Scopus, PubMed, PsychINFO, CINAHL, ProQuest and Google Scholar databases for articles published between January 2000 and November 2019. Hand searching of reference lists of included papers also occurred. The included articles were studies containing cohorts of allied health professionals working in any healthcare setting that directly related to the study of management and/or leadership.

RESULTS:

The literature findings on this topic was scarce, however review of the 22 studies that met the criteria identified nine potential enablers for allied health front-line managers. These included incorporating effective leadership styles, leadership attributes and characteristics for working in health, allied health structure, representation of allied health in contexts of influence, associations / network and organisational support, evidence based and tailored allied health programs, measurable and robust feedback on performance and succession planning for the future.

CONCLUSION:

By identifying potential enablers, key strategies, resources and supports could be developed for allied health front-line managers working in complex settings such as public hospitals, that ultimately lead to improvements in patient safety, quality and experience.

IMPLICATIONS FOR PRACTICE:

More research with front-line allied health managers in practice is required to explore and validate the identified enablers. Once validated, further studies to determine the strategies, resources, influences and supports that could be developed to support enacting them would be important. Providing the necessary enablers to allied health front-line managers would equip them to manage the increasing challenges facing public healthcare organisations that are required to be more sustainable while delivering quality care to patients.

KEYWORDS

Management, Allied Health, Leadership, Enablers, Public Sector Healthcare

INTRODUCTION

Many allied health managers do not feel equipped to face the challenges of evolving business environments such as public hospitals. [1-6] The increasing demand on public hospitals due to chronicity of disease, an ageing population and rising health costs will require managers to be resourceful, adaptable, influential and innovative. [1,3,6-9] The research on this topic is scarce with a lack of robust studies specific to allied health front-line managers working in public healthcare settings. [1]

A succinct definition of allied health is difficult to articulate. The Allied Health Professions Australia (AHPA) describes these sub-set of professionals as autonomous practitioners that practice in an evidence-based paradigm with expertise in preventing, diagnosing and treating a range of conditions and illnesses and generally have a university qualification. [10] Allied health encompasses a diverse range of health professionals typically including: audiology, dietetics, diversional therapy, exercise physiology, music therapy, occupational therapy, orthoptics, pharmacy, physiotherapy, podiatry, psychology, radiographers, social work and speech pathology. [10,11]

There is increasing attention amongst policy makers, healthcare administrators, healthcare workers and researchers around the world regarding the sustainability of the health care industry into the future. [8,9,12] This is being driven by an ageing population, expensive medical interventions, community expectations and the rise in the incidence of chronic conditions. [1,3,7-9,13] Managers primary function is to get people to work together to fulfil an organisation's goals and objectives, focusing on organisation, direction and control of work to ensure a level of quality. [14] However, managers are being confronted by significant issues such as rising health costs, a projected reduction in healthcare workforce and equitable access to healthcare for disadvantaged groups. The constant focus of doing more with less could impact management's ability to deliver good quality healthcare to patients in the future. [9,13]

The limited research reviewed indicates that allied health managers working in increasingly complex and challenging healthcare environments such as public hospitals do not feel equipped to manage the issues they are facing. [1-7,9] Nevertheless, allied health professionals have a multitude of skills, knowledge and expertise that could be utilised to assist public health organisations tackle current and future issues in an efficient and cost-effective manner. [2,9] The challenge for allied health front-line managers is having the necessary skills, resources and influences to support staff to endure working in these highly pressured environments that require employees to be adaptable, flexible and resilient, often with minimal provision. [4]

The literature review presented addresses the following question: "*what are the enablers for front-line allied health managers to deliver sustainable and safe patient care in complex and challenging healthcare environments like public hospitals?*"

METHODS

An electronic Title/Abstract/Keyword search of relevant published literature was performed utilising Scopus, PubMed, PsychINFO, CINAHL, ProQuest and Google Scholar databases. Search terms included 'allied health management', 'managers', 'allied health leadership', 'leaders', 'allied health occupations' AND 'health care' AND 'programs.' Due to scarcity of the literature the search was expanded to include specific professions as defined by the AHPA [10], as well as international literature from contexts similar to Australia. The search was performed in December 2018 with an updated search performed in November 2019.

The electronic search yielded 85 references, an additional 5 were identified via reference searching. A total of 22 research studies with cohorts of allied health participants met the inclusion criteria outlined in Table 1. The selection process and criteria are shown as a Prisma diagram in Figure 1. A summary of the published research studies, including: aims, setting, design, characteristics and study findings can be found in Table 3.

TABLE 1: INCLUSION / EXCLUSION CRITERIA

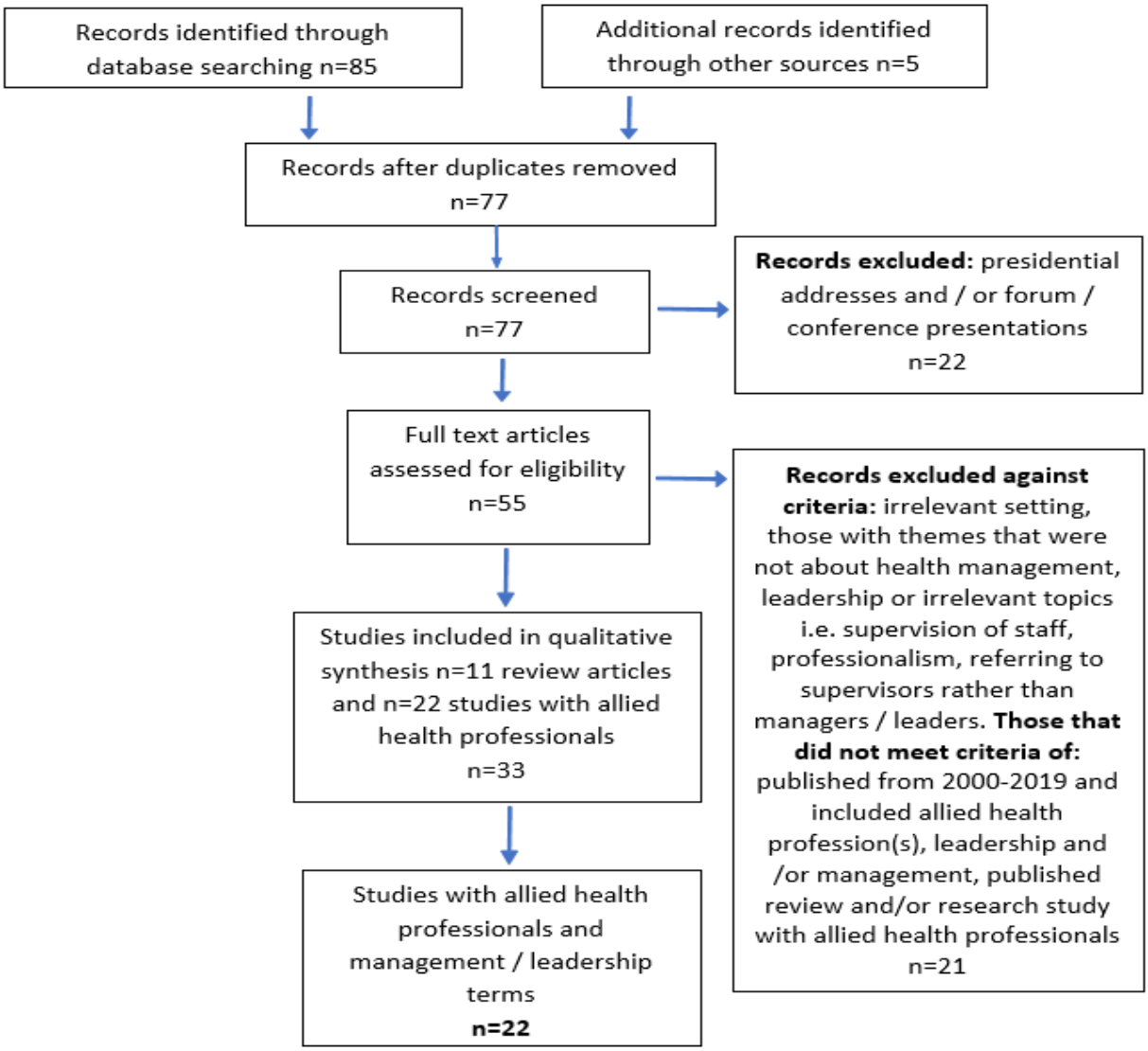
INCLUSION CRITERIA	EXCLUSION CRITERIA
Allied health participants as defined by AHPA	Irrelevant setting i.e. non health related
All environments / settings – public, private, associations	Literature reviews
Management / leadership terms identified in the article	Non-allied health cohorts of participants
Research study with cohorts of allied health Participants or a single profession e.g. Occupational Therapy, Physiotherapy, Social Work, Pharmacy	Irrelevant topics e.g. supervision
Articles published between 2000-2019	Conference / forum presentations, reports
Australian and international literature with similar context	Duplicate articles

Each article was reviewed by the principle researcher and the data summarised. The analysis of the articles was guided and reviewed by a second researcher to ensure nothing was overlooked or misinterpreted. The word 'enablers' was defined for this review as: "capabilities, forces and resources that contribute to the success of an entity, program or project". [15] The principle researcher identified capabilities, forces and resources described in the studies and summarised these into themes to determine a final list of enablers for discussion (Table 2).

TABLE 2: ENABLERS FOR ALLIED HEALTH MANAGERS

ENABLERS	RELEVANT LITERATURE
Incorporating effective leadership styles	2,3,7,12,16-24
Management/leadership attributes and skills for working in health	1,4-6,8,14,16,25-30
Viable allied health structure	1,2,9,29
Representation of allied health in contexts of influence	1,2,9,29,31
Associations and network support	2,10,32
Organisational support for front-line managers	1,2,4,5,9,16,18,28
Evidence based and tailored allied health management / leadership training	1,2,7,29,31-35
Measurable and robust feedback on performance	7,35
Ensuring allied health succession planning occurs at all levels	13,36,37

FIGURE 1: PRISMA DIAGRAM



RESULTS

The enablers for allied health front-line managers to deliver safe and quality outcomes for patients accessing healthcare organisations will be described in turn.

INCORPORATING EFFECTIVE LEADERSHIP STYLES

Research suggests that effective leadership styles are directly associated with leadership outcomes [3,16-18] and that different types of leaders are required for different situations. [3,7,12,19-21] Despite conflicting views in the literature, many supported the viewpoint that both sound management (utilise more of the transactional style where managers reward or discipline staff to achieve outcomes) and strong leadership (utilise more of the transformational style) are essential to the longer-term viability of today's public health organisations, which face substantive change. [3,7,12,19-23]

Furthermore, the most frequently observed leadership style in high performing managers incorporates those components outlined in transformational leadership. [2,3,7,12,17,20,23] This type of leadership motivates employee performance through role modelling behaviour that followers want to emulate, they build trust and encourage and inspire those around them as well as stimulate followers to bring forth new ideas and be innovative. They act as a coach, mentor, teacher, facilitator, confidant, and counsellor which provides support and reassurance to their followers. [17,20,22-23]

A study of physiotherapists in Ireland supported the enabler of developing an effective style of leadership and stated that the current shortened version of the multifactorial leadership questionnaire (MLQ) named the MLQ 5X is a valid and reliable instrument that can adequately measure

leadership styles. [7] They concluded it could assist with the foundation for understanding some of the critical components required in relation to adopting effective leadership styles.

Although there has been significant research on transformational leadership, other scholars are suggesting that transformational and transactional leadership may not adequately capture all the leadership behaviours relevant for organisations. [22,24] Other behaviours beyond these styles of leadership were required for organisations to be successful. Examples include pragmatic dimension, community orientation from servant leadership and aspects of ethical leadership to further enhance transformational leadership. [24]

MANAGEMENT / LEADERSHIP ATTRIBUTES AND SKILLS FOR WORKING IN HEALTH

Similar to incorporating effective leadership styles, developing appropriate attributes in managers can produce more effective outcomes within high pressured healthcare environments. [4] Managers who use a caring approach, such as supporting, encouraging, negotiating, respecting, accepting and trusting, may be able to provide improved staff support, more satisfying work conditions and retain staff for longer than "boss" managers. Boss managers often use a more negative approach such as blaming, criticising, complaining, rewarding to control, threatening, punishing and nagging behaviours. [4]

An Australian study interviewed directors of allied health in New South Wales (NSW) who described the attributes of successful allied health leaders as strong communication and listening skills, the ability to set a clear vision or direction, being innovative, showing authenticity, integrity and being accountable. [1] Other studies reviewed identified good communication, credibility and professionalism as key attributes for managers in healthcare. [5,6,8,14,16,25,27]

Further studies identified leadership characteristics and skills which are consistently associated with effective leadership in multiple health fields: emotional intelligence, vision and business acumen. [6-8,25-30] A study of physiotherapy leaders further supported these findings, with business skills perceived as very important within health organisations for starting or expanding a new service or facility within a hospital department. [5,30]

VIABLE ALLIED HEALTH STRUCTURE

In Australia there has been variation in allied health structures proposed and trialed in many hospitals across rural, regional and tertiary levels over the past few decades, with anecdotal feedback on the dire consequences of inappropriate structures from a few public hospitals in Queensland. [1,9,29] The division of allied health or integrated decentralisation approaches have proven to be viable models for structuring allied health and are continuing to grow in number as more research and evidence is published about their success. [2,9,29]

Findings from a recent study of allied health structures and leadership in the state of Queensland supports these findings, concluding that management of the allied health workforce is more effective with an integrated operational and professional governance structure with single points of accountability overseeing professional groups. [9] However, successful implementation and operation of this structure required credible, skilled and respected allied health mangers to enact them. [8,9]

REPRESENTATION OF ALLIED HEALTH IN CONTEXTS OF INFLUENCE

An issue facing allied health appears to be poor representation within leadership positions that can influence change within healthcare systems. [1,2,9,29] The study of allied health directors in NSW reported many participants felt powerless to affect the healthcare system compared with clinical colleagues. [1] They stated that although there is evidence that allied health professionals are well positioned to lead health system change, they remain under-represented in senior decision-making roles. [1]

Similarly, in a study of top management teams and boards in Australia, findings demonstrated allied health has small numbers in both; significantly lower than medicine and nursing. [29] They reported there was a fragmentation of services within the health care industry that lacked a defined point of accountability for allied health managers to drive change and quality standards. [29] Another Australian study stated that despite the numbers of allied health working in the healthcare industry, the contribution and value of allied health practitioners to improved health outcomes, remains under-represented in health policy, leadership and organisational reform settings. [2]

An international study undertook ethnographic fieldwork at four healthcare sites in England concluding that allied

health managers could contribute significantly to the National Health Service (NHS) in England if fully utilised. However, they found that a traditional model of leadership existed, consisting of exceptional, heroic individuals occupying positions of formal authority. They concluded this was against the distributed style of leadership being promoted as an effective type of leadership for healthcare today. [31]

A Queensland study interviewed five executives and 49 allied health professionals across nine health services and found that Executive allied health positions enabled allied health leaders to use their influence in organisational planning and decision-making to deliver effective patient care services. [9]

ASSOCIATIONS AND NETWORK SUPPORT

A 2016 Australian report recommended that to progress allied health leadership development, collaborations with many sectors, including professional bodies is crucial to ensure all facets of the health context are considered in the development of system wide leaders. [2] No further literature or published reports indicate if progress has been made with this recommendation at a national level in Australia, however the AHPA has an online network for allied health leaders who wish to linkup with other leaders across Australia. The aim is for leaders to pursue inter-professional collaboration and sharing of information relevant to allied health teamwork in service delivery, research and education. [10]

An example of leadership support that was developed by the Association of Schools of Allied Health Professions which was chartered in Washington, D.C in September 1967 is a not-for-profit national professional association for administrators, educators, and others who are concerned with critical issues affecting allied health education and practice. They recommended that there should be a national effort to prepare emerging leaders in allied health education and practice, which resulted in the association setting up a coalition of allied health leadership which is still active. [32]

ORGANISATIONAL SUPPORT FOR MANAGERS

Health organisations can be difficult places for front-line allied health managers to work due to minimal training and resources being in place to support managers. [1,2,16,28] Available research indicates that leadership capability impacts organisational performance and outcomes, making training on the matter an essential element of success for organisations. [1,2,5,18,28]

A Queensland study concluded that organisations providing clinical support, education, supervision, and the ability to engage in research can develop a sustainable, skilled and capable allied health workforce. [9] Furthermore, those organisations that provide effective and reliable data management systems allow allied health managers to design, implement and evaluate clinical service delivery. [9]

In a study of 138 allied health staff across public and private practice the researchers concluded that without clear expectations and support from the organisation on how teams should behave and work collaboratively to achieve the best outcomes, the issues described by allied health managers working in public health environments will continue. [4] They identified factors for allied health managers to support staff, recommending they provide a comprehensive orientation to the workplace and take the time to ensure staff understand the roles and responsibilities of their job description. [4]

EVIDENCE BASED AND TAILORED ALLIED HEALTH MANAGEMENT / LEADERSHIP TRAINING

The literature highlighted key points to consider in training allied health front-line managers. One study concluded that allied health clinicians have little preparation in business, regulatory policy, or financial matters and often feel inadequately trained to be competent in administrative roles. [29] Another study supported this finding, stating participants reported the transition from clinician to manager was complex due to the lack of skills in administration. [1]

A different factor included the variances in professions in relation to training needs. One international study exploring self-reported transformational leadership behaviour profiles found some allied health professional groups (radiographers and podiatrists) may require significantly more support than others due to their lower scores in the transformational leadership style. [7] Furthermore, directors of allied health described a different complexity of transitioning from a profession-specific manager to one being capable of encompassing the challenges and concerns of the wider professional groups. They stated that managing multiple professions and professionals and harmonising their organisational and professional efforts was challenging. [1,31] They recommended the

development of a state-wide leadership training, mentoring and coaching program specifically for the directors of allied health. [1]

Other enablers mentioned in the literature were targeting emerging / early career leaders and students in leadership development opportunities to build leadership skills early or before allied health practitioners enter the work force. [2,29] Another involved reviewing collaborative approaches between health, academic institutions, allied health, medical and nursing leadership bodies with strong governance to drive implementation. [1,2,29] The final suggestion involved developing evidence-based training models and/or frameworks tailored to individual needs to deliver effective outcomes. [1,2,29,31-35] A study within an Australian public health organisation demonstrated the effectiveness of using practice development methods for allied health leadership development. [33] The program received high ratings from participants, reporting enhanced skills in leading self and others, greater confidence in managing change and engaging with staff, colleagues, and patients. [33]

MEASURABLE AND ROBUST FEEDBACK ON PERFORMANCE

A study of transformational leadership behaviours in allied health professionals recommended implementing a robust evaluation program to measure the impact of leadership training, in terms of behavioural change and organisational outcomes. [7] This study found scope for utilising the MLQ in measuring specific allied health practitioner leadership behaviours before and after the delivery of leadership training. They recommended moving beyond impression management, with evaluation based on qualitative feedback, to a substantial evaluation which identifies specific areas of leadership training required by staff. [7]

A study on the preliminary validation of a leadership competency instrument for existing and emerging allied health professionals developed and tested a leadership competency instrument with 106 allied health professionals of varying levels. [35] They demonstrated initial evidence (internal consistency of >0.88) for the use of an instrument to assess leadership competency in allied health professionals. [35] No such instruments appear to exist that assess leadership competency in current and emerging allied health professionals, however, they stated being able to accurately assess leadership performance is vital in the development and improvement of health organisations. [35]

ENSURING ALLIED HEALTH SUCCESSION PLANNING OCCURS AT ALL LEVELS

One of the key factors in approaching the issues of ensuring competency in management and leadership in allied health is training that produces results and layers of succession planning that maintains momentum. There is a need for current allied health front-line mangers to future proof the development of emerging allied health managers through appropriate training, coaching and mentoring programs. [13]

In literature, a review by researchers concluded that a successful pharmacy department should have a developing succession plan that systematically reviews all employees to identify their strengths and areas to improve. They recommended organisations take a proactive stance in leadership succession planning, so they are better equipped to manage change. [36]

Further literature suggested utilising the annual performance review which is a mandatory requirement in all healthcare organisations. If utilised effectively this would be the time to begin the preparation process for succession planning and creating a culture of leadership. [37] In addition, the manager could assist the employee to prepare a plan that includes online courses, readings, attendance at relevant meetings, mentoring/coaching and the possibility for work shadowing opportunities. [37] Supplementary examples included participation in hospital committees, preparing for accreditation visits, or leading projects to learn, make contacts and gain on-the-job experience. [37]

DISCUSSION

The literature review of enablers for allied health front-line managers working in public health environments generated limited published evidence. However, the results from the studies reviewed identified nine potential enablers that could support allied health front-line managers to deliver safe and quality care to patients.

Of the enablers identified, five are within allied health front-line managers influence through seeking appropriate training, coaching and/or mentoring. The first two enablers included incorporating the right leadership styles and attributes [3,7,12,19-24], including growth in business and administration skills. [5,6,8,25-27] The third and fourth enablers comprised of ensuring skills development is tailored to meet the needs of the manager and the context

they are working in [1,7,31,30] and obtaining measurable and robust feedback on performance. [7,35] The fifth included establishing a succession planning framework that supported staff at all levels to gain skills in management / leadership. [13,35-37] These five enablers could be initiated by the allied health front line manager as part of a tailored program incorporated into the annual performance appraisal and development planning process reviewed 6-monthly, including a robust evaluation tool to provide constructive feedback on performance.

A further four enablers would require authorisation from others to enact the forces and system changes required and many were reported in studies as barriers to progress for allied health. Therefore, these enablers may need a high-level collective approach from allied health influencers to support front-line managers to enact them. The first enabler has strong evidence that the division of allied health or integrated decentralisation approaches have proven to be viable models for allied health structures [1,2,9,29] and should continue or be enacted when healthcare organisations decide to re-structure.

The second enabler has solid evidence to suggest allied health needs to raise its profile in contexts of influence, not only for the future of allied health, but for the sustainability of healthcare organisations. [1,2,9,29] A few articles suggested to raise the influence of allied health within local contexts would require developing a state or national strategy on key allied health issues. Additionally, the strategy should outline evidence-based recommendations that support allied health front-line managers to advocate for key enablers and / or influence change. [1,2,29] Executive allied health roles are positioned well to be strong influencers and lead the development of a collective strategy by collaborating with many sectors including education, professional associations, private and public healthcare organisations as well as working with nursing and medicine to build better partnerships. [1,2,9,29,31]

Furthermore, the third enabler of allied health associations and networks providing support for a collective strategy around matters / issues of significant importance for allied health at a state and national level could add significant momentum for change. [2,29] The fourth enabler of organisational support was included in several articles reviewed with data suggesting that organisations that provide appropriate training and resources for front-line managers are more successful and retain staff for longer. [1,2,4-6,9,16,18,28,29,33]

This paper summarises the potential enablers from the limited published information available. The data over the past two decades highlights many issues for allied health front-line managers working in healthcare organisations. Even with clear recommendations in the literature, it appears that little has changed for allied health managers working in these environments when compared with medicine and nursing. From a practical perspective, a focus on developing the professional identity of allied health in general and of allied health managers in particular is a worthy direction for the discipline [38].

The findings demonstrate the impact enablers could have on the ability of front-line managers to perform effectively in their role and may provide a framework for allied health to take up the challenge as a collective group in testing and enacting these enablers within healthcare organisations. A high-level collective approach by allied health at the state and national level could force the change required to be recognised in contexts of influence, alongside medicine and nursing. This is crucial for allied health as a workforce so they can contribute meaningfully on current and serious issues such as sustainability of the healthcare industry, to ensure safe and quality care is delivered to patients and consumers accessing healthcare.

LIMITATIONS

Many of the studies reviewed did not identify the context due to administering surveys through associations where participants worked in a variety of settings. It was felt that many of the enablers identified in any healthcare setting would be applicable to a public hospital environment and therefore were included for review.

CONCLUSION

Allied Health has a very important and unique role in health care. To be successful in today's fast-moving, change-responsive healthcare organisations, there is a need for proficiently trained allied health managers who can navigate and respond appropriately to the complexities of the system. This proficiency could include the ability to analyse the political environment in which they work and to use that knowledge to effect positive change and to create enablers. Providing the necessary enablers to allied health front-line managers would equip them to manage the increasing challenges facing public healthcare organisations that are required to be more sustainable while delivering quality care to patients. From a theoretical

perspective the paper provides a list of enablers that can be organised in a theoretical framework as part of future research. Identifying the enablers that might provide allied health managers with leadership skills to support change processes at all levels is essential. Future research should aim to further evaluate the enablers for allied health managers working in complex public health environments and determine why they may not be in place. This is vital, in order for allied health front-line managers to have the required capabilities, forces and resources to contribute fully to healthcare organisations. Furthermore, research about how allied health can build a collective strategy at a state and national level that influences healthcare policy and system change could assist organisations to be more sustainable, as well as support allied health front-line managers to have a stronger voice at the local level.

THE AUTHOR(S) DECLARE(S) that there is no conflict of interest.

ACKNOWLEDGEMENT: We would like to acknowledge those who reviewed this paper for their time and feedback

References

1. Bradd P, Travaglia J, Hayen A. Allied Health Leadership in New South Wales: a research program of perceptions and priorities of allied health leaders. Aust Health Rev 2017; 42(3):316-320. https://doi:10.1071/ah16135.
2. Joubert L, Boyce R, Mckinnon F, Posenelli S, MeKeever M. Strategies for allied health leadership development: enhancing quality, safety and productivity. Victoria: Department of Health and Human Services; 2016.
3. Snodgrass J, Douthitt S, Ellis R, Wade S, Plemons J. Occupational Therapy Practitioners perceptions of rehabilitation managers leadership styles and the outcomes of leadership. J. Allied Health 2008; 37(1):38-44.
4. Stagnitti K, Schoo A, Dunbar J, Reid C. An Exploration of issues of Management and Intention to Stay: Allied Health Professionals in South West Victoria, Australia. J. Allied Health 2006; 35(4):226-232.
5. McGowan E, Stokes E. Leadership and leadership development within the profession of physiotherapy in Ireland. Physiother. Theory Pract. 2017; 33(1):62-71. https://doi:10.1080/09593985.2016.1230659.
6. McGowan E, Martin G, Stokes, E. Perceptions of Leadership: Comparing Canadian and Irish Physiotherapists' Views. Physiother Can 2016; 68(2):106-113. https://doi:10.3138/ptc.2014-95.
7. Wylie D, Gallagher H. Transformational Leadership Behaviours in Allied Health Professions. J. Allied Health 2009; 38(2):65-73.
8. Desveaux L, Verrier M. Physical Therapists' Perceptions of Leadership across the Health Care Continuum: A Brief Report. Physiother Can 2014; 66(2):119-123. https://doi:10.3138/ptc.2013-02.
9. Mickan S, Dawber J, Hulcombe J. Realist evaluation of allied health management in Queensland: what works, in which contexts and why. Aust Health Rev 2018; 43:466-473. https://doi.org/10.1071/AH000201.
10. Allied Health Professions Australia. Available: https://ahpa.com.au/about-ahpa> 2019; (Accessed 10/11/19)
11. Bradd P, Travaglia J, Hayen A. Leadership in Allied Health: A Review of the Literature. Asia Pac. J. Health Manag 2017; 12(1): 17-24. https://doi:10.24083/apjhm.v12i1.103.
12. MacKie D. The Effectiveness of Strength-based Executive Coaching in Enhancing Full Range Leadership Development: A Controlled Research program. Consult. Psychol. J.: Pract. Res. 2014; 66(2):118-137. https://doi.org/10.1037/cpb0000005.
13. Rodger S. Leadership through an occupational lens: Celebrating our territory. Aust. Occup. Ther. J. 2012; 59(3):172-179. https://doi:10.1111/j.1440-1630.2012.00995.x.
14. Fleming-Castaldy R, Patro J. Leadership in Occupational Therapy: Self Perceptions of Occupational Therapy Managers. Occup Ther Health Care 2012; 26(2-3):187-202. http//doi:10.3109/07380577.2012.697256.
15. BusinessDictionary.com. Available: http//www.businessdictionary.com/definition/enablers.html (Accessed 25/11/19)
16. Kutz M. Leadership in athletic training: Implications for practice and education in allied health care. J. Allied Health, 2010; 39(4):265-279.
17. Gellis Z. Social Work Perceptions of Transformational and Transactional Leadership in Healthcare. Soc. Work Res. 2001; 25(1):17-25.

18. Guerrero E, Padwa H, Fenwick K, Harris L, Aarons G. Identifying and ranking implicit leadership strategies to promote evidence-based practice implementation in addiction health services. Implement Sci 2015; 11(69):3-13. http//doi:10.1186/s13012-016-0438-y.

19. Aarons G, Ehrhart M, Farahnak L, Hurlburt M. Leadership and organizational change for implementation (LOCI): a randomized mixed method pilot study of a leadership and organization development intervention for evidence-based practice implementation. Implement Sci 2015; 10(11):2-12. http//doi:10.1186/s13012-014-0192-y.

20. Avolio B. Full Range Leadership Development (Second Edition). Thousand Oaks, CA: Sage Publications; 2010.

21. MacLeod L. A Broader View of Nursing Leadership: Rethinking Manager–Leader Functions. Nurse Lead. 2012; 10(3):57-61.

22. Anderson M, Sun P. Reviewing Leadership Styles: Overlaps and the Need for a New 'Full-Range' Theory. Int. J. Manag Rev. 2017; 19:76–96. http//doi:10.1111/ijmr.12082.

23. Firestone D. A Research program of Leadership Behaviours among Chairpersons in Allied Health Programs. J. Allied Health 2010; 39(1):34-42.

24. Antonakis J, House R. Instrumental leadership: measurement and extension of transformational-transactional leadership theory. Leadersh Q. 2014; 25:746 – 771.

25. Chan Z, Bruxer A, Lee J, Sims K, Wainwright M, Brooks D, Desveaux, L. What Makes a Leader: Identifying the Strengths of Canadian Physical Therapists. Physiother Can. 2015; 67(4):341-348.

26. Desveaux L, Chan Z, Brooks D. Leadership in Physical Therapy: Characteristics of Academics and Managers: A Brief Report. Physiother Can. 2016; 68(1):54-58. http//doi:10.3138/ptc.2011-42 doi:10.3138/ptc.2011-42.

27. Schafer D. Three perspectives on physical therapist managerial work. Phys. Ther. 2002; 82(3):228-236.

28. Hazelbaker C. Perceived Skills and Abilities Required by Athletic Trainers in Hospital and Clinical Management Positions: A Delphi Research program. J. of Athl. Train 2013; 48(1):87-91. http//doi:10.4085/1062-6050-47.6.2.

29. Boyce R, Jackway P. Allied Health Leaders: Australian Public-Sector Health Boards and Top Management Teams. Victorian Department of Health and Human Services. Office of the Chief Allied Health Advisor; 2016.

30. Desveaux L, Nanavaty G, Ryan J, Howell P, Sunder R, Macdonald A, Verrier M. Exploring the Concept of Leadership from the Perspective of Physical Therapists in Canada. Physiother Can. 2012; 64(4):367-375. http//doi:10.3138/ptc.2011-42.

31. Petchey R, Hughes J, Pinder R, Needel, J, Partington J, Sims D. Allied health professionals and management: an ethnographic research program. National Institute for Health Research (NIHR), Service Delivery and Organisation programme. London: Queens Printer and Controller of HMSO; 2012.

32. Wilson S. Coalition of allied health leadership. J. Allied Health, 2004; 33(2):144.

33. Bradd P, Travaglia J, Hayen A. Developing allied health leaders to enhance person-centred healthcare. J Health Organ Manag 2018; 32(7):908-932. http//doi:10.1071/ah16135.

34. McGowan E, Walsh C, Stokes E. Physiotherapy managers' perceptions of their leadership effectiveness: a multi-frame analysis. 2016; 103(3):289-295. http//doi:10.3138/ptc.2014-95.

35. Ang H, Koh J, Lee, J, Pua, Y. Development and preliminary validation of a leadership competency instrument for existing and emerging allied health professional leaders. BMC Health Serv. Res. 2016; 16(64):1-8. http//doi:10.1186/s12913-016-1301-1.

36. Ellinger L, Trapskin P, Black R, Kotis D, Alexander E. Leadership and Effective Succession Planning in Health-System Pharmacy Departments. Hosp. Pharm. 2014; 49(4):369-375. http//doi:10.1310/hpj4904-369.

37. White S, Enright S. Is there still a pharmacy leadership crisis? A seven-year follow-up assessment. Am J. of Health Syst Pharm. 2013; 70(5):443-447. http//doi:10.2146/ajhp120258.

38. Mak, Ka-Hi May, Louise Kippist, Terry Sloan, and Kathy Eljiz. "What is the professional identity of allied health managers?." *Asia-Pacific Journal of Health Management* 14, no. 1 (2019): 58-58.

APPENDIX

TABLE 3: RESEARCH STUDIES REVIEWED

PUBLICATION DETAILS	AIM	SETTING AND LOCATION	STUDY DESIGN AND METHODOLOGY	SAMPLE SIZE AND CHARACTERISTICS	STUDY FINDINGS
Aarons et al., 2015 [19]	The main aim of this study was to assess the feasibility, acceptability and perceived utility of leadership and organisation change implementation (LOCI). The study also assessed preliminary effects of LOCI on supervisee-rated leader readiness and support behaviours.	Three different agencies that provide mental health services to children and families in California, United States of America	Mixed method two-arm randomised pilot study in which leaders were assigned to LOCI or to a webinar control condition	12 mental health service team leaders 100 staff that reported to the leaders	Quantitative and qualitative findings support the LOCI training and organisational strategy interventions in regard to feasibility, acceptability and perceived utility, as well as impact on leader and supervisee-rated outcomes. The results suggest that LOCI may be a viable strategy to support organisations in preparing for implementation and sustainability of Evidence Based Practice.
Ang et al., 2016 [35]	To develop and explore the psychometric properties of the Aspiring leaders in Healthcare – Empowering individuals (AHEAD) competency instrument developed by the authors for existing and emerging allied health practitioners.	Allied Health Division of the Singapore General Hospital	A cross-sectional survey design	106 allied health practitioners (34 men and 72 women) of different professional grades and professions	Internal consistency of AHEAD was excellent (q-values >0.88). Total and component AHEAD and Leadership Practices Inventory (LPI) scores correlated moderately (Spearman P values, 0.37 to 0.58). The c-index for discriminating between allied health practitioners' grades was higher for AHEAD than for the LPI (0.76 vs. 0.65). The results provide initial evidence for the use of AHEAD to assess leadership competency in allied health practitioners.
Bradd et al., 2017 [1]	To investigate the opinions and perceptions of allied health directors / advisors	New South Wales (NSW) Health, allied	Study completed over 6-months and consisted of two	15 (88%) allied health directors or advisors	Participants indicated the need to build and grow their influence to more clearly demonstrate allied health's contribution and

	in relation to leadership, governance and organisational factors from an Australian public health perspective.	health directors or advisors	parts: completion of a voluntary online survey and two confirmatory focus groups that explored thematic results from the survey.		to realign efforts towards more strategic issues influencing governance, performance, professional standards and advocacy. This study highlighted potential focus points for future leadership activities.
Bradd et al., 2017 [33]	Investigation of leadership development of allied health practitioners within a large public healthcare organisation in Australia	South Eastern Sydney Local Health District	Using experiential learning, the program tested whether practice development methods and action learning approaches developed the leadership skills of participants compared with a control group	16 participants (allied health cohort) 17 control group (allied health cohort)	The leadership program received high ratings by participants and provides new empirical evidence about the effectiveness of using practice development for allied health leadership development. Statistically significant difference was found with transformational elements, leadership outcomes, workplace culture and engagement after program completion for those in the intervention group compared to the control group.
Chan et al., 2015 [25]	To identify the personal strengths of Canadian physical therapists who hold leadership positions and compare them with the strengths of Canadian physical therapists who do not hold positions of leadership.	Canadian registered physical therapists	A quantitative, cross-sectional online survey	173 total participants: 108 occupied a position of leadership 65 were not in a leadership position	Those in the leader group had significantly more experience and achieved a higher level of education. Leaders most frequently exhibited the strengths of learner, achiever, responsibility, input and strategic, whereas non-leaders most frequently displayed strengths of learner, achiever, input, relator and harmony. Leaders were significantly more likely than non-leaders to possess the achiever strength. Gender, level of education and years of experience did not

					significantly influence which strengths were present in the leadership profile. There is substantial overlap between leaders and non-leaders in terms of leadership profile.
Desveaux et al., 2016 [26]	To explore the characteristics of physical therapy leaders in academic and managerial roles.	Canadian Physiotherapy Association	A quantitative, cross-sectional nationwide study using an online questionnaire distributed via email Those who met criteria also completed the Clifton StrengthsFinder survey	88 participants (52 managers, 36 academics)	The most prevalent strengths among both academics and managers were the learner and achiever characteristics. The study concluded that academics and managers in physical therapy share similar core characteristics, with slight variations in secondary characteristics.
Desveaux & Verrier., 2014 [8]	To describe and compare Canadian physical therapists' perspectives on the importance of characteristics required for leadership in the workplace and in society, exploring the implications for the profession.	Canadian Physiotherapy Association – registered email address	A quantitative, cross-sectional nationwide study using web-based survey	1,875 responded (30%) of 6,156. 1,511 (24.5% response) completed the questionnaire	The participants rated communication, professionalism and credibility as the most important characteristics. For each of the 15 characteristics, significantly fewer physical therapists chose the rating "extremely important" at the societal level than did so at the workplace level ($p < 0,001$). Physical therapists consistently rate leadership characteristics as more important in the workplace than at the societal level.
Desveaux et al., 2012 [34]	To explore the concept of leadership from the perspective of physical therapists in Canada.	Canadian Physiotherapy Association –	A quantitative, cross-sectional nationwide study	1,875 responded (30%) of 6,156. 1,511 (80.6%) completed the questionnaire	The top three characteristics of communication, professionalism and credibility that physical therapists perceive

		registered email address	using web-based survey		as important differ from those reported among other health professions. Practising in the private sector contributed significantly to the perceived importance of business acumen ($p < 0,001$). Of the 79.6% of respondents who self-declared as leaders, male gender, primary work facility in private practice or educational institution and supervision of students were factors associated with self-declaration as a leader.
Firestone D, 2009 [23]	To investigate leadership behaviours among chairpersons in allied health programs, based on their perceptions and the perceptions of the faculty	The chairpersons were invited to participant via email and were located in the northeast of the United States	A quantitative study utilising the Multifactorial Leadership Questionnaire (MLQ Form 5X-Short) and a supplemental questionnaire of demographic and program information	138 chairpersons and 327 faculty responded to the survey requesting demographic, program information and completion of the MLQ	Findings support the view that chairpersons predominately demonstrate leadership behaviors associated with transformational leadership factors and the contingent reward factor of transactional leadership. This study concluded that further development of the transformational leadership behaviours of chairpersons should be a priority for allied health professions.
Fleming-Castaldy & Patro, 2012 [14]	To examine the leadership characteristics of occupational therapy clinical managers in the field using the leadership practices inventory	Occupational Therapy managers in the United States who were members of the American Occupational Therapy Associations administration	A non-experimental survey design utilising a demographic measure and the Leadership Practices Inventory (LPI)	66 (44%) surveys were completed, with 53 (33%) meeting the criteria for analysis	No significant associations were found between respondent demographics and LPI scores. Respondents reported leadership capabilities reflect their power to influence and lead the profession in a demanding and ever-changing healthcare environment.

		and management special interest section			
Gellis Z, 2001 [17]	To evaluate empirically the nature of leader-follower interactions and the social work perceptions of transformational and transactional leadership in health care	Social workers were recruited in a large urban setting in the united states from 26 hospitals (10 academic teaching and 16 community hospitals)	A cross-sectional survey design utilising a single questionnaire	187 questionnaires were completed (80%) by the social worker employee about their direct line manager. This included completion of the MLQ Form 5X and a demographic survey	This study found that all five transformational factors and one transactional factor were significantly correlated with leader outcomes of effectiveness, satisfaction and extra effort.
Guerrero et al, 2016 [18]	To identify strategies that addiction treatment program leaders report using to implement new practices	Los Angeles County in the USA	Stage and iterative mixed-methods approach utilising focus groups and semi-structured interviews	122 substance use disorder programs (SUD). Participants completed a questionnaire 2 weeks before the study started. Each participant took part in two-hour focus groups (2 for clinical supervisors, 2 for program directors)	The study identified implicit leadership strategies that managers in SUD programs use to implement evidence-based programs (EBPs) in their organisations. The study also linked these strategies to two leadership styles of transformational and transactional leadership. The leadership approach to EBPs implementation was knowledgeable, proactive, supportive and perseverant.
Kutz M, 2009 [16]	To explore leadership in athletic training and the implications for practice and education in allied health care	United states, through the National Athletic Trainers Association national office	Non-experimental, exploratory research design: a Delphi technique and a national survey	Phase 1: expert panellists (18) evaluated 39 leadership competencies derived from an extensive literature review of 220 peer-reviewed journals and textbooks to	The study found that 49 leadership competencies were rated important for practice and 48 for education. Exploratory factor analysis revealed that leadership competencies were organised by four constructs: 1) personality characteristics, 2) diagnosing context and people skills, 3) communication and initiative and 4)

				develop the Leadership Development in Athletic training (LDAT) instrument Phase 2: implemented the LDAT instrument via a web-based survey to 161 respondents (random selection)	strategic thinking. Each leadership construct significantly increased in importance as the level of the Athletic training education program progressed.
McGowan & Stokes, 2017 [5]	To investigate the perceptions of physiotherapists in Ireland of leadership and leadership characteristics and to explore their participation in leadership development training	Ireland, members of the Irish Society of Chartered Physiotherapists	Cross-sectional nationwide study via an internet-based survey administered via email	N= 2,787 surveys sent out via email with 615 responses to the survey	A high proportion of respondents (74%) perceived themselves to be a leader, factors associated with this perception were time since graduation, highest qualification attained and leadership training. Leadership training was also associated with placing greater importance on achieving a leadership position. 41.5% of respondents had completed some sort of leadership training. Communication and professionalism were the most highly rated leadership characteristics in all 3 settings.
McGowan et al., 2016 [6]	To contribute to the growing body of research on leadership in physiotherapy by comparing leadership-related perceptions of physiotherapists in Ireland and Canada	Physiotherapists in Ireland and Canada	Comparison of the results of a survey of Canadian physiotherapists with those of the same survey administered to Irish physiotherapists	2-portion Z-tests to compare the percentage of physiotherapists in Ireland who self-declared as a leader with the percentage of physiotherapists in Canada that declared the same	Physiotherapists in both Canada and Ireland most often rated communication and professionalism as extremely important characteristics. Physiotherapists in Canada were more likely than those in Ireland to perceive themselves as leaders.

McGowan et al., 2016 [30]	To investigate the leadership frames of Physiotherapy managers in Ireland	Ireland, the chartered Physiotherapists in Management employment group of the Irish Society of Chartered Physiotherapists	An internet-based survey administered via email to a purposive sample	N=73 Physiotherapists were sent the survey with 45 (62%) respondents.	The human resource frame was the most frequently used (61%) and the political frame was the least (9%). The majority of respondents reported using one or no frames at all (65%). There was a statistically significant trend between the number of leadership frames a physiotherapy manager used and their effectiveness as a manager and leader. They concluded that the development of physiotherapy managers underused skills through appropriate leadership development training may enhance their leadership skill set and make them more confident leaders.
Mickan et al, 2018 [9]	To identify key organisational contexts and corresponding mechanisms that influenced effective outcomes for allied health professionals	Nine Queensland Health services	A quantitative realist evaluation including 1-1 interviews and focus groups	5 executives 49 allied health professionals	Executive allied health leadership roles enable allied health leaders to use their influence in organisational planning and decision-making to ensure allied health professionals deliver successful patient care services. Professional governance systems embed the management and support of the clinical most efficiently within professional disciplines. With consistent data management systems, allied health professional staff can be integrated within clinical teams that provide high-quality care. Interprofessional learning opportunities can enhance collaborative teamwork. Allied health professionals who are supported to understand and use research can deliver positive patient and business outcomes for the health service.

Petchy et al, 2013 [31]	To investigate the lived experience of allied health practitioners and how these vary by management level and the factors they perceive as promoting or restraining their engagement in management and their career progression	England National Health Service (NHS): four sites at Naguard and Whiteford NHS trusts, Greenshire Community Health and Cloffaugh Mental Health Care	Case studies: multiple methods of observations, informal conversations, formal interviews	4 NHS sites with clinician managers	Six broad and intersecting themes emerged from the case studies: 1) the problematic nature of clinician manager identity, 2) the variability of clinician management in relation to multiple styles of clinician management, rather than a single style, 3) the variable and complex relationship between the managerial and the clinical on the front line, 4) clinician management as a problem to be managed, 5) the significance of emotional labour in clinician management, 6) the problematic transition from clinician management to clinical leadership. There appears to be an association between management/ leadership style and their gender and professional values among the clinician managers studied.
Schafer D, 2002 [27]	To investigate the perceived importance of managerial role and skill categories among three groups of physical therapists	United States (US)	Survey across three distinct groups	Three groups: 1) Faculty members in professional physical therapist education programs (N=155). 2) Physical Therapists who held management positions in US hospitals (N=300) 3) Physical Therapists who held management positions in private practices in the US. Total respondents (n=343)	All groups identified communication, financial control, entrepreneur, resource allocator and leader as the 5 most important categories and rated technical expert and figurehead as least important. Work settings appears to have an impact on level of importance placed on managerial work categories. Those with universal application were communication, financial control and resource allocator.

Snodgrass et al, 2008 [3]	A pilot study to investigate the association between occupational therapy practitioners' perceptions of rehabilitation managers leadership styles and the outcomes of leadership	Tennessee, US	Cross-sectional, direct data survey research design	A random sample of 500 survey participants from a mailing list of OT practitioners from the Tennessee Occupational Therapy Association. Respondents included = 73 OT practitioners.	The results suggest that transformational leadership styles have a positive association with leadership outcomes, whereas transactional leadership styles have a negative association, excluding the positive transactional contingent reward attribute.
Stagnitti et al., 2005 [4]	To explore issues relating to recruitment and retention	South West Victoria, Australia	Survey	N=491 surveys sent to allied health professionals in the South West region of Victoria. N=184 professionals returned the survey, N=138 met the criteria as an allied health professional.	Results were related to Maslow's hierarchy of needs, with professional needs identified as feeling supported, orientation to the position, clear role description and that they would recommend the position to others. The immediate management structure was significantly related to retention. Reasons for leaving were related to management categories e.g. management structures, lack of career structure and lack of professional support. Reasons for not recommending their current position were: not for long term career, risk of deskilling if staying too long and financially unrewarding. Positive reasons for staying related to management: flexible work conditions, variety of clinical and management experience, good working environment, good support and autonomy.
Wylie et al., 2007 [7]	To explore self-reported transformational leadership behaviour profiles within the six largest allied health	National Health Service in Scotland, including 4 health boards	Questionnaire posted to 1700 allied health groups from 6 of the largest professions. A	N= 753 allied health professionals were administered the shorter version of the MLQ and	The study identified significant differences in transformational leadership behaviours between individual allied health professions. Radiographers and podiatrists scored consistently lower than the other

	profession groups in the NHS in Scotland		selective convenience sampling technique was utilised. A modified cluster sampling technique was used for randomisation	a contextual demographic survey.	professional groups across the range of transformational behaviours. The higher the seniority and prior leadership training positively influenced transformational behaviour. Employment within a primary or secondary setting or a multidisciplinary or unidisciplinary team had no effect.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

DESIGNING AN EMPOWERMENT MODEL FOR IRANIAN HEALTH CENTRE MANAGERS: A COMPREHENSIVE STUDY

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ABSTRACT

OBJECTIVES

Empowering managers plays a crucial role in developing the capabilities and competencies of individuals to improve the continuous performance of health centre organisations. The purpose of this study is to design a model of empowerment of health centre managers in Iran during 2018-2019.

DESIGN

In this applied, exploratory, and cross-sectional study, human resource empowerment components were extracted by reviewing the literature and interviewing subject specialists. Then, the conceptual model of the research was designed, and the questionnaire was formulated and validated. Data were collected by filling out a questionnaire from a total of 416 managers of health centres selected by stratified random sampling. The collected data were analyzed using descriptive statistics and confirmatory and exploratory factor analysis.

RESULTS

In the final model of empowerment of health centre managers, five factors were identified as effective factors. The standardised regression coefficients among the contextual, self-efficacy, managerial, organisational-value, and psychological factors with empowerment were 0.98, 0.95, 0.92, 0.90, and 0.76, respectively. The results of confirmatory factor analysis indicate the suitability of the final model of health centre managers' empowerment.

CONCLUSIONS

Due to the influence of contextual, self-efficacy, managerial, organisational-value, and psychological factors in the model approved in this study, the health system senior managers can have a systemic approach to issues. In addition, they can improve managers' abilities by employing a continuous self-assessment system in health centres, applying the proposed model, improving administrative infrastructure and working environment, paying attention to organisational culture, reward system, participatory management, information sharing, continuous training, and modeling.

KEYWORDS

Empowerment, Empowerment Model, Health Centres, Health Management

INTRODUCTION

Empowering managers is one of the most effective techniques for enhancing employee productivity and making optimal use of their capabilities and capabilities in organisational goals. It is an important strategy regarding its potential and beneficial functions in the organisation, such as increased commitment, better decision making, improved service quality, creativity, innovation, and increased job satisfaction. [1] Empowerment plays a crucial role in developing the abilities and competencies of individuals to improve the continuous performance of health centre organisations. [2] Ellis & Hartley [3] have emphasized that no profession can provide good quality services unless its members feel empowered and in control of their actions. Clearly, the presence of empowered managers is one of the factors contributing to the success of health centre providers. Upgrading these capabilities can be effective in directing resources and making maximum use of them.

The life and survival of the health centre system largely depend on different abilities, skills, knowledge, and expertise of human resources, especially the managers in that system. The more capable managers are, the more they can contribute to improving the performance level of the organisation. According to some experts, empowering managers and staff in the health system is a set of systems, methods, and actions that develop the capabilities and competencies of individuals to enhance the productivity, growth, and prosperity of the organisation and human resources. [4] Many writers and researchers have emphasized the key role of empowerment in promoting and sustaining human resource performance. Empowerment is removing barriers, creating a commitment to the organisation's goals in employees, creating a sense of risk, and encouraging creativity and innovation in individuals to accept greater responsibility and accountability for results. Empowering managers and employees can be one of the most important factors for making managers, employees, and organisations more efficient. [5] According to Robbins et al. [6], individual elements, intrinsic motivation, perception and commitment, environmental factors, job structure, the delegation of power or authority, and the sharing of resources and information are among the factors influencing empowerment.

Given the scarcity of resources in the health system and factors such as the need to prevent waste of limited resources, the optimal use of existing facilities, improving the job performance of employees and the efficiency and effectiveness of the organisation, the provision of high-quality services to the community, "accountability," "social justice", and "public satisfaction" are issues that cannot be achieved except with employee empowerment, especially health system managers. In addition, as health policymakers and senior executives in recent years have paid more attention to managerial positions and capabilities for managers, especially managers of health centres, more research is needed to design a model for empowering managers of health centres.

So, the main goal of this research which can be known as its novelty is to investigate the effect of various factors on the empowerment of health centre managers in Iran by designing a comprehensive model.

METHODS

This applied, exploratory, and cross-sectional study was conducted to design a model of empowerment of health centre managers in Iran during 2018-2019. The statistical population consisted of all managers of the health centres at the operational level, affiliated with Medical Sciences Universities of East Azerbaijan, West Azerbaijan and Ardebil provinces from Iran. The study was conducted in five phases for two years:

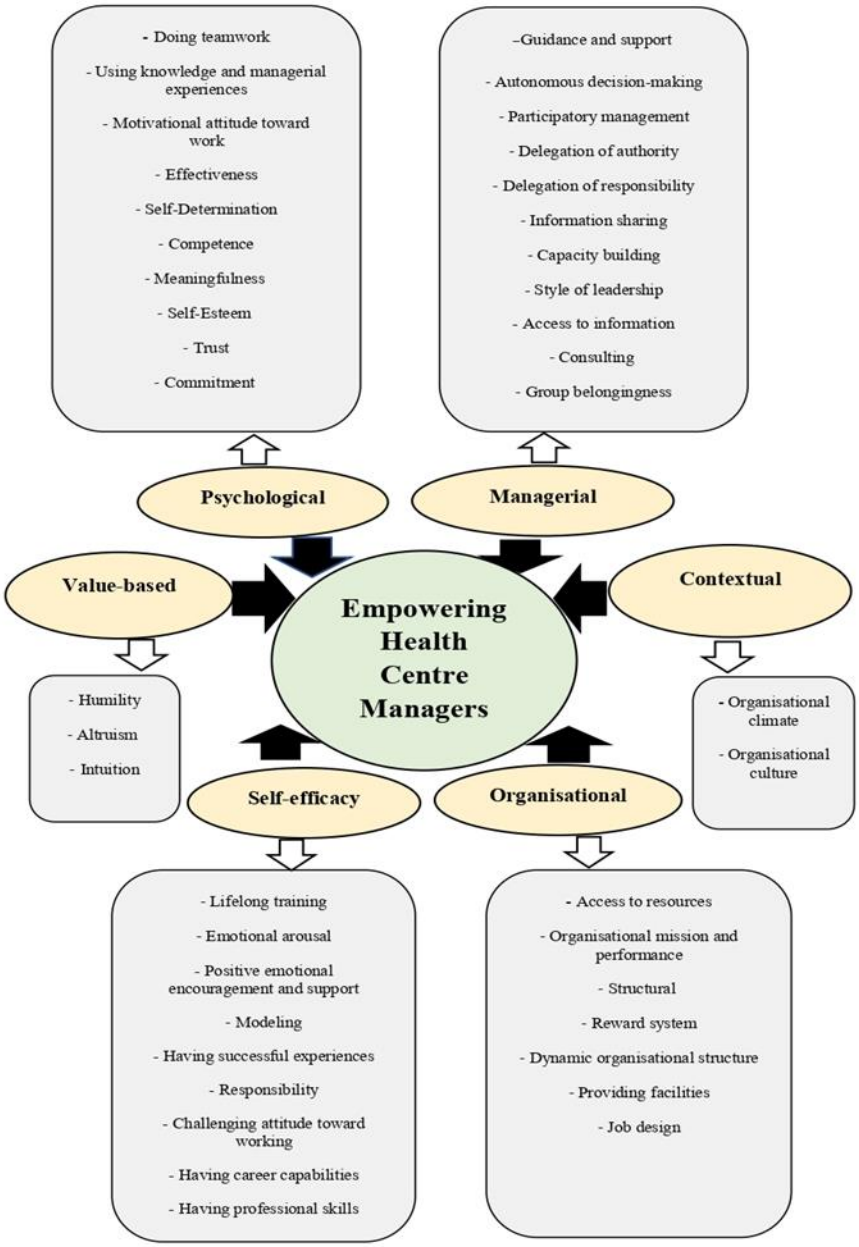
In the first phase, the topic was examined using desk research, literature review, and search of multiple databases from 1990 to 2019. A total of 10 valid human resources management models were identified: (Bandura [7], Faulkner and Laschinger [8], Konczak et al. [9], Kuokkanen and Katajisto [10], Vogt & Murrell [11], Spreitzer [12], Mallak & Kurstedt [13], Melhem [14], Cho et al. [15], and Eskandari [16]). Initial components influencing the managers' empowerment were extracted through a comparative matrix and described in Table 1.

The components extracted through the comparative matrix of the models under study were reviewed and validated through interviews with national health experts, managers, and specialists. Fig. 1 illustrates the conceptual model of empowerment of health centre managers derived from this process.

TABLE 1: ADAPTIVE MATRIX OF COMPONENTS AFFECTING MANAGERS' EMPOWERMENT BASED ON THE MODELS STUDIED

	Row	Empowerment Model / components	Kuokkanen and Katajisto	Faulkner and Laschinger	Eskandari	Cho et al.	Melhem	Konczak et al.	Bandura	Mallak and Kurstedt	Spreitzer	Vogt and Murrel
	1	Continuous training	*	*	*		*		*	*		*
	2	Guidance and support	*	*	*	*	*		*	*		*
	3	Access to resources	*	*			*	*	*	*	*	*
	4	Participatory management	*	*	*	*	*	*	*	*		*
	5	Effectiveness	*	*	*				*	*	*	
	6	Self-Determination	*	*	*		*		*	*	*	
	7	Competence	*	*	*				*	*	*	
	8	Meaningfulness	*	*	*				*	*	*	
	9	Organisational culture	*		*				*	*	*	*
	10	Organisational mission and performance	*	*	*		*	*	*		*	*
	11	Reward system		*	*				*	*	*	*
	12	Emotional arousal	*	*	*	*			*	*	*	
	13	Delegation of authority	*	*	*		*	*	*	*		*
	14	Delegation of responsibility	*	*			*	*	*	*		*
	15	Positive emotional encouragement and support	*	*	*	*			*	*	*	*
	16	Modeling	*	*				*	*	*		
	17	Having successful experiences	*	*	*		*		*	*	*	*
	18	Responsibility	*	*	*	*	*	*	*	*	*	*
	19	Autonomous decision-making	*	*	*		*	*	*	*	*	*
	20	Information sharing	*	*	*	*	*	*	*	*	*	
	21	Capacity building	*		*	*		*	*	*	*	*
	22	Consulting	*	*				*	*	*		*
	23	Dynamic organisational structure	*	*	*	*	*	*	*	*	*	*
	24	Humility	*	*		*			*		*	
	25	Altruism	*	*		*			*		*	
	26	Intuition	*	*		*			*		*	
	27	Trust	*	*	*	*	*		*		*	
	28	Commitment	*		*	*			*		*	
	29	Job design	*	*	*		*	*	*	*	*	*
	30	Having career capabilities	*	*	*		*	*	*		*	*
	31	Having professional skills	*	*	*		*	*	*		*	*
	32	Motivational attitude toward work	*	*	*				*	*	*	*
	33	Challenging attitude toward working	*	*	*		*	*	*	*	*	*
	34	Organisational climate	*		*			*	*	*	*	*
	35	Style of leadership	*	*	*	*	*	*	*	*		*
	36	Providing facilities	*	*			*	*	*	*	*	*
	37	Structural	*	*	*	*	*	*	*	*	*	*
	38	Access to information	*	*	*	*	*	*	*	*	*	
	39	Group belongingness	*	*	*	*			*			*
	40	Doing teamwork	*	*	*				*			*
	41	Using knowledge and managerial experien	*		*		*		*		*	*
	42	Self-Esteem	*	*	*		*		*	*	*	

FIGURE 1: THE CONCEPTUAL MODEL FOR THE EMPOWERMENT OF HEALTH CENTRE MANAGERS



In the second stage, the initial researcher-made questionnaire with 42 components in 6 dimensions (psychological, organisational, managerial, self-efficacy, contextual, and value) was designed with 42 main items, and its validity and reliability were assessed. Besides, the content validity ratio (CVR) and the content validity index (CVI) were evaluated using the judgment of a panel of experts. Several items whose CVR was less than 0.42 (based on the number of experts) and their CVI was less than 0.79 were also eliminated; overlapping components were merged. Based on the results, the number of components was reduced to 37 items, and thus the questionnaire items were 37. The items of the Likert five-point questionnaire were scored from "very low" (score 1) to "very high" (score 5). In this questionnaire, items of some of the variables were two-part, and some three-part, whose scores were calculated in one main item. The reliability of the questionnaire was calculated by Cronbach's alpha (0.96) method using internal consistency methods.

In the third phase, before starting the field study, the sample size was determined. For this purpose, since this study used factor analysis and structural equation modeling and as some researchers suggest 5 to 10 samples per variable, so the sample size obtained from the provinces were chosen to be 10 times the number of components using stratified

random sampling. Since the number of the health centres in East and West Azerbaijan were two times that of health centres in Ardebil province, therefore, the sample size was constituted of 40% samples from East Azerbaijan, 40% samples from West Azerbaijan and 20% samples from Ardebil.

One of the criteria for entering the subjects in this study is employed in the management position of the health centre at sampling time, and their desire to participate in answering the questionnaire, and the criteria for excluding subjects was their disconnection from the University of Medical Sciences for any reason or unwillingness to participate in the study. Moreover, considering the probability of a drop in completing the questionnaire, a questionnaire was distributed among the managers of the face-to-face health centres after the researcher had provided explanations about the research objectives, the confidentiality of information, and their consent to participate in the study. 416 completed questionnaires were collected, and 14 incomplete questionnaires were excluded from the study.

In the fourth phase, the collected data were analyzed using SPSS 22 software. Exploratory factor analysis (EFA) was used to determine the factors affecting the empowerment of health centre managers in different dimensions.

In the fifth phase, the results of the EFA obtained from the fourth step were validated using the confirmatory factor analysis (CFA) method and AMOS 24 software. Additionally, the results of CFA were evaluated and validated using fit indices.

RESULTS

According to the demographic data of the managers of the health centres studied (Table 2), the highest frequency among the 416 respondents was 252 males (61%). The highest frequency was in the age group 41-50 with 176 (42%) subjects. The highest level of education was in postgraduate and professional doctorate with 225 (54%) subjects. The highest work experience was in the 11-20 years' age group with 201 (48%) subjects.

Prior to EFA, test accuracy indices were evaluated to determine the factors affecting the empowerment of health centre managers. Assuming the normality of the study population, the KMO index (0.960) indicates the adequacy of sample size and the significance of Bartlett's test for sphericity (P <0.001).

Based on the results of EFA, five main factors with eigenvalues greater than 1 were extracted as influencing factors on empowerment. Overall, these factors explained 56.807% of the total variance (Table 3).

Varimax rotation was used for better alignment. The 37 main items related to the 37 components of empowerment of health centre managers were classified into five main factors. Each of these factors was named after considering the content of the items and taking advantage of the theoretical foundations and opinions of the professors and experts. Table 4 presents the results of EFA in extracting the factors and naming them along with the factor loadings of the factors affecting the empowerment of health centre managers.

TABLE 2. DEMOGRAPHIC INFORMATION RELATED TO MANAGERS OF HEALTH CENTRES STUDIED

VARIABLE	VARIABLE LEVELS	FREQUENCY	PERCENTAGE
Sex	Male	252	61
	Female	164	39
	Total	**416**	**100**
Age	20-30	22	5
	31-40	168	41
	41-50	176	42
	>50	50	12

	Total	**416**	**100**
Marriage status	Married	378	91
	Unmarried	38	9
	Total	**416**	**100**
Level of education	Associate degree	4	1
	BA	181	44
	MA and professional doctorate	225	54
	Ph.D.	6	1
	Total	**416**	**100**
Length of service	1-10	76	18
	11-20	201	48
	21-30	135	33
	31-40	4	1
	Total	**416**	**100**

TABLE 3. EIGENVALUES AND EXPLAINED VARIANCE OF THE FACTORS EXTRACTED FROM EFA

Factor	Extraction Sums of Squared Loading			Rotation Sums of Squared Loading		
	Eigenvalues Total	**% of Variance**	**Cumulative %**	**Eigenvalues Total**	**% of Variance**	**Cumulative %**
1	15.256	41.232	41.232	6.066	16.396	16.396
2	2.258	6.103	47.334	4.261	11.516	27.912
3	1.298	3.507	50.841	4.183	11.306	39.219
4	1.161	3.137	53.978	3.395	9.176	48.394
5	1.047	2.828	56.807	3.113	8.413	56.807

TABLE 4: RESULTS OF EXPLORATORY FACTOR ANALYSIS IN EXTRACTING FACTORS AND NAMING THEM WITH FACTOR LOADINGS OF COMPONENTS

FACTOR	COMPONENT	QUESTION CODE	FACTOR LOAD
Self-efficacy	Responsibility	Q25	0.707
	Using knowledge and managerial experiences	Q2	0.701
	Continuous training	Q20	0.698
	Challenging attitude toward working	Q26	0.688

	Having successful experiences	Q24	0.643
	Having professional skills	Q28	0.632
	Emotional arousal	Q21	0.603
	Positive emotional encouragement and support	Q22	0.565
	Modeling	Q23	0.558
	Having career capabilities	Q27	0.482
Organisational-value	Altruism	Q16	0.654
	Dynamic organisational structure	Q13	0.653
	Organisational mission and performance	Q11	0.633
	Humility	Q15	0.599
	Job design	Q14	0.575
	Reward system	Q12	0.563
	Intuition	Q17	0.562
	Access to resources	Q10	0.549
Managerial	Delegation of authority	Q32	0.772
	Delegation of responsibility	Q33	0.772
	Information sharing	Q34	0.617
	Group belongingness	Q37	0.607
	Guidance and support	Q29	0.550
	Consulting	Q36	0.530
	Capacity building	Q35	0.508
	Autonomous decision-making	Q30	0.498
	Participatory management	Q31	0.497
Psychological	Meaningfulness	Q7	0.696
	Self-Determination	Q6	0.659
	Trust	Q8	0.605
	Competence	Q4	0.588
	Commitment	Q9	0.565
	Effectiveness	Q5	0.492
Contextual	Motivational attitude toward work	Q3	0.674
	Doing teamwork	Q1	0.657
	Organisational culture	Q19	0.598
	Organisational climate	Q18	0.572

CFA was used to confirm the results of the EFA. Fig. 2 shows the CFA model of factors affecting the empowerment of health centre managers based on standardised coefficients.

Standardised regression coefficients were used to compare the effects of five factors of self-efficacy, organisational-value, managerial, psychological, and contextual on the empowerment of health centre managers, which are summarised in Table 5.

Based on CFA results, standardised regression coefficients were obtained 0.98, 0.96, 0.92, 0.90, and 0.76, respectively, between contextual, self-efficacy, managerial, organisational-value, and psychological factors, with the empowerment of health centre managers (P<0.001).

Table 6 presents the standardised regression coefficients of components affecting the empowerment of health centre managers based on CFA.

Based on confirmatory factor analysis, standardised regression coefficients of all 37 components related to the main factors (i.e., self-efficacy, organisational-value, managerial, psychological, and contextual) affecting the empowerment of health centre managers were significant at 37 main items at P<0.001 and all components were confirmed.

CFA results were evaluated based on multiple fit indices, indicating the appropriateness of the final model of empowerment of health centre managers (Table 7).

FIGURE 2: CONFIRMATORY FACTOR ANALYSIS MODEL OF FACTORS AND COMPONENTS AFFECTING THE EMPOWERMENT OF HEALTH CENTRE MANAGERS BASED ON STANDARDISED COEFFICIENTS

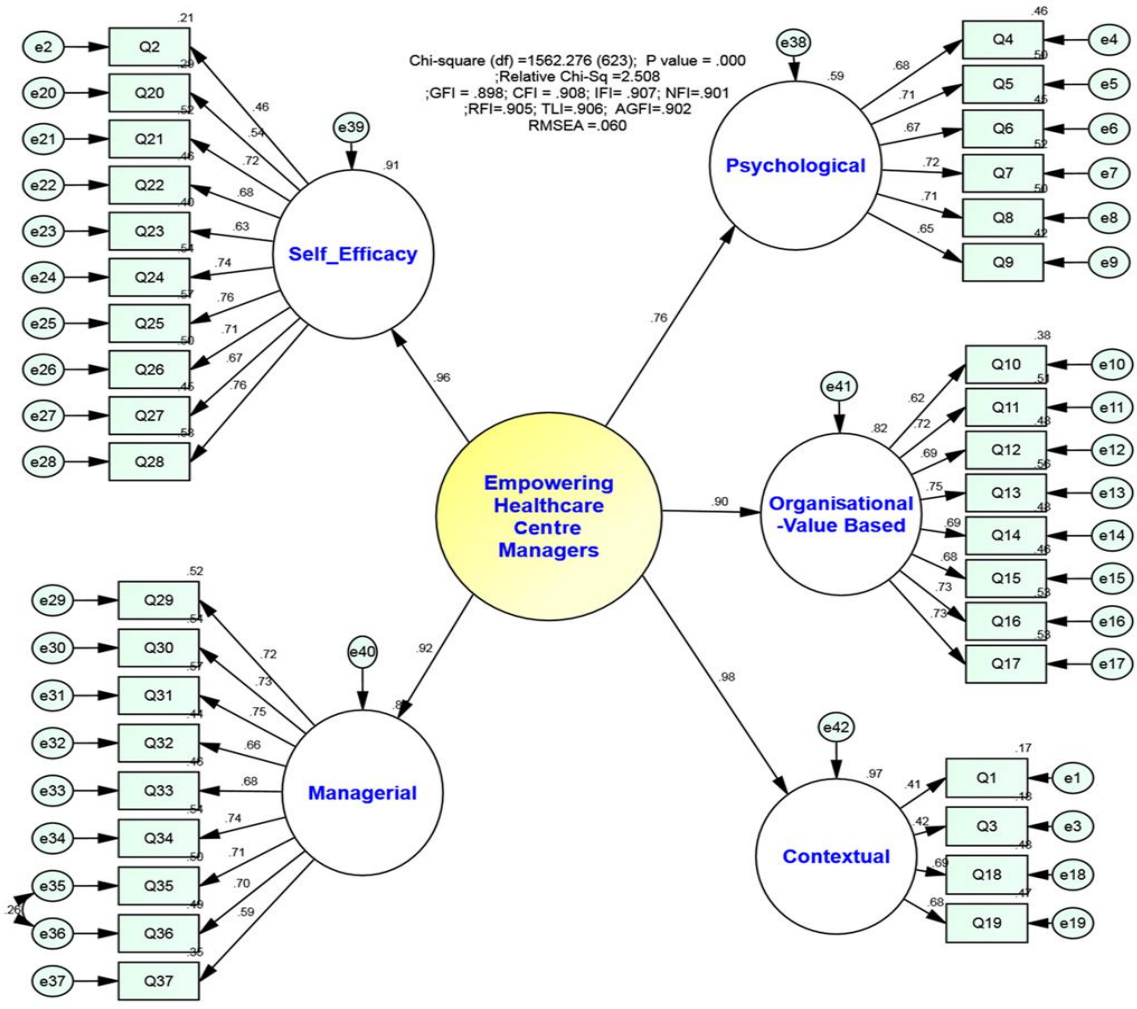


TABLE 5. STANDARDISED REGRESSION COEFFICIENTS FACTORS AFFECTING THE EMPOWERMENT OF HEALTH CENTRE MANAGERS

Independent Variable	Dependent Variable	Standard regression coefficient	t	P-value	Status
Self-efficacy Factor	empowerment of health centre managers	0.956	10.969	0.001	Confirmed
Organisational-value Factor	empowerment of health centre managers	0.905	9.755	0.001	Confirmed
Managerial Factor	empowerment of health centre managers	0.925	10.932	0.001	Confirmed
Psychological Factor	empowerment of health centre managers	0.765	8.326	0.001	Confirmed
Contextual Factor	empowerment of health centre managers	0.985	7.322	0.001	Confirmed

TABLE 6: STANDARDISED REGRESSION COEFFICIENTS OF COMPONENTS AFFECTING THE EMPOWERMENT OF HEALTH CENTRE MANAGERS

FACTOR	COMPONENT	QUESTION CODE	STANDARD REGRESSION COEFFICIENT	T	P-VALUE	STATUS
Self-efficacy	Responsibility	Q25	0.756	15.104	0.001	Confirmed
	Using knowledge and managerial experiences	Q2	0.463	9.156	0.001	Confirmed
	Continuous training	Q20	0.536	10.620	0.001	Confirmed
	Challenging attitude toward working	Q26	0.709	14.137	0.001	Confirmed
	Having successful experiences	Q24	0.737	14.708	0.001	Confirmed
	Having professional skills	Q28	0.763	15.255	0.001	Confirmed
	Emotional arousal	Q21	0.722	11.123	0.001	Confirmed
	Positive emotional encouragement and support	Q22	0.676	13.455	0.001	

	Modeling	Q23	0.631	12.552	0.001	Confirmed
	Having career capabilities	Q27	0.671	13.372	0.001	Confirmed
Organisational-value	Altruism	Q16	0.728	12.262	0.001	Confirmed
	Dynamic organisational structure	Q13	0.749	12.525	0.001	Confirmed
	Organisational mission and performance	Q11	0.718	12.131	0.001	Confirmed
	Humility	Q15	0.676	11.593	0.001	Confirmed
	Job design	Q14	0.695	11.837	0.001	Confirmed
	Reward system	Q12	0.693	11.818	0.001	Confirmed
	Intuition	Q17	0.728	12.267	0.001	Confirmed
	Access to resources	Q10	0.620	11.235	0.001	Confirmed
Managerial	Delegation of authority	Q32	0.664	12.911	0.001	Confirmed
	Delegation of responsibility	Q33	0.677	13.146	0.001	Confirmed
	Information sharing	Q34	0.737	14.295	0.001	Confirmed
	Group belongingness	Q37	0.592	11.514	0.001	Confirmed
	Guidance and support	Q29	0.724	14.041	0.001	Confirmed
	Consulting	Q36	0.701	15.907	0.001	Confirmed
	Capacity building	Q35	0.708	14.524	0.001	Confirmed
	Autonomous decision-making	Q30	0.735	14.253	0.001	Confirmed
	Participatory management	Q31	0.753	14.591	0.001	Confirmed
Psychological	Meaningfulness	Q7	0.724	12.823	0.001	Confirmed
	Self-Determination	Q6	0.673	12.033	0.001	Confirmed
	Trust	Q8	0.710	12.603	0.001	Confirmed
	Competence	Q4	0.677	8.536	0.001	Confirmed
	Commitment	Q9	0.646	11.602	0.001	Confirmed
	Effectiveness	Q5	0.707	12.567	0.001	Confirmed
Contextual	Motivational attitude toward work	Q3	0.423	6.312	0.001	Confirmed
	Doing teamwork	Q1	0.412	7.826	0.001	Confirmed
	Organisational culture	Q19	0.680	7.887	0.001	Confirmed
	Organisational climate	Q18	0.693	7.938	0.001	Confirmed

TABLE 7. FIT INDICATORS OF THE FINAL MODEL OF EMPOWERMENT OF HEALTH CENTRE MANAGERS

FIT INDICES	OPTIMUM LEVEL	ESTIMATED LEVEL
χ^2/df	3.00≤	2.508
p-value	0.05<	0.001<
GFI (Goodness of Fit Index)	0.90≥	0.900
RMSE (Root Mean Squared error)	0.08≤	0.060
IFI (Incremental Fit Index)	0.90≥	0.907
NFI (Normed Fit Index)	0.90≥	0.901
RFI (Relative Fit Index)	0.90≥	0.905
AGFI (Adjusted Goodness of Fit Index)	0.90≥	0.902
TLI (Tucker-Lewis Index)	0.90≥	0.906
CFI (Comparative Fit Index)	0.90≥	0.908

DISCUSSION AND CONCLUSION

This research is a comprehensive study that has been conducted to investigate the factors affecting the empowerment of managers of health centres in Iran, to design a new model. The present study investigated the effect of the self-efficacy factor with indicators and components such as responsibility', using knowledge and managerial experiences, continuous training, challenging attitude toward working, having successful experiences, having professional skills, emotional arousal, positive emotional encouragement and support, modeling, and career capabilities; the psychological factor with components such as meaningfulness, personal determination and choice, trust, competence, commitment, and effectiveness; the managerial factor with components such as delegation of authority, responsibility, information sharing, group belongingness, guidance and support, counseling, capacity building, autonomous decision-making, and participatory management; the organisational-value factor with components such as dynamic organisational structure, organisational mission and performance, job design, reward system, access to resources, humility, altruism, and insight; and the contextual factor with components such as organisational culture, organisational climate, motivational attitude toward work, and doing teamwork on empowering health centre managers.

Regarding the self-efficacy factor affecting the empowerment of managers of health centres, the results of this study indicated the high impact of having professional skills. Various researchers have pointed out the importance of this in their studies. For instance, Robbins et al. [17] suggested that managers' technical, human, and cognitive skills are among the factors affecting their ability to perform better, which supports the results of the present study. Another finding of this study proved that "responsibility" is one of the most important components of the self-efficacy factor affecting the empowerment of health centre managers. In this regard, Konczak et al. [9], and Johnson [18], through their empowerment models, identified accountability as one of the effective elements of self-efficacy on employee empowerment. These results are in line with the results of the current research.

Concerning managerial components affecting the empowerment of managers of health centres, the findings of the present study showed that participatory management variable was of great importance in employee empowerment because of staff involvement in the decision-making process. Several researchers have reported the importance of this issue. According to Avolio et al. [19], leadership and management techniques in employee empowerment encourage them to think critically, engage in the decision-making process, and instill loyalty through understanding their mutual needs. They

showed that participatory management and leadership plays an important role in employee empowerment. According to Lan & Chong [20] with the psychological empowerment they do, transformational and participatory leaders significantly change employees' attitudes toward work and put them on the path to organisational effectiveness. According to Daft [21], participatory management provides the necessary framework for empowerment and adds depth and meaning to it through empowerment. The results of these studies are in line with those of the present study. Another finding of the present study is that the reduction in the organisation and increased staff empowerment has merged information sharing as one of the managerial components affecting the empowerment of managers of health centres. Randolph [22] presented three indicators for predicting human resource empowerment in the organisation, such as information sharing in the organisation, structural changes to reduce the focus on the organisation and increase employee empowerment, and organisational climate management, team building, and employee sharing Greasley et al. [5] showed that access to information is one of the pillars of employee empowerment. To this end, they must receive the information needed at the right time to make sensible decisions. This information should be easily accessible and quickly transmitted to the relevant staff. The results of these studies are in line with obtained results of present study.

Regarding the organisational-value components affecting the empowerment of health centre managers, the findings of the present study based on the results of CFA showed that the variable dynamic organisational structure was of high importance. Avolio et al. [19] believe that the closer the organisational structure is to the networked organisational structure where employees' autonomy is high, employees feel more competent and empowered. In empowerment, employees not only need authority but also need sufficient training, financial credibility, and information to be able to account for their decisions. According to the results of this study, humility and altruism are among the most important components of the organisational-value factor affecting the empowerment of health centre managers. Researchers see humility as one of the factors of employee empowerment. In their view, humility means not only to care for oneself but also to care for others, their abilities, and talents. [23] Altruism refers to helpful and beneficial behaviors such as intimacy, empathy, and compassion among colleagues that help employees with work problems, whether directly or indirectly, and promote empathy in the altruist. [24] According to Markoczy & Xin [25], altruism has an impact on empowerment because it helps colleagues and employees perform their assigned tasks in a way beyond what is expected. The findings of these researchers confirm the results of the current study.

Concerning the psychological factor components affecting the empowerment of health centre managers, the findings of the present study revealed the high significance of meaningfulness. According to Liu et al. [26], Spreitzer [12], and Greasley et al. [5], meaningfulness means that an employee feels that he pursues important and valued career goals and moves on a road where his/her time and energy are precious. Lan & Chong [20] believe that a sense of meaning comes from the proportion of one's job requirements, beliefs, values, and behaviours. Ideally, employees will understand the importance of their job to the organisation and themselves and will pay more attention to their work.

According to the results of this study, trust is one of the most important components of the psychological factor affecting the empowerment of managers of health centres. The results of Schermuly et al. [27] show that individuals' intragroup trust and relationships are effective in empowering and enhancing the capabilities of organisational individuals. According to Spreitzer [12], trust in others is a key element in interpersonal interactions; without it, alliance and cooperation neither forms nor sustains and empowered people trust others; they are confident that they will be treated fairly and honestly. They are confident that the authorities will treat them impartially. In other words, trust means having a sense of personal security and empowerment.[12] The obtained consequences of these researchers confirm the results of the present study.

Regarding the contextual factors affecting the empowerment of health centre managers, the findings of the present study showed that "organisational climate" was of great importance. Ekvall's [28] showed that organisational climate is a set of customs, traditions, beliefs, attitudes, and characteristics of the workplace that are perceived directly or indirectly by employees, and are a major force influencing the behavior of organisational employees. Mok & Au-Yeung [29] studied the relationship between organisational climate and nursing empowerment in Hong Kong and showed a positive relationship between organisational climate and

psychological empowerment. Based on the results of CFA, other findings identified organisational culture as one of the important elements of contextual factor empowerment of health centre managers. The results of Auernhammer & Hall [30], showed the high importance of collaborative organisational culture. This culture requires members of the organisation to participate in affairs so that the organisation can meet the expectations of changing environmental factors which are in line with those of the present research.

Since no model has been presented to managers of health centres for utilizing the empowerment approach, the present study was able to induce factors and components affecting health centre managers' empowerment to executive processes through synergy in designing a model. To optimize the use of managers 'capacities and capabilities in the dynamic environment of health centres, access to a validated model (one of the factors influencing managers' empowerment in the health centre system) enables a picture of the prospects and future of health centres in achieving organisational goals. The model approved in this study has addressed the factors and components affecting the empowerment of health centre managers. The challenge for health centres is to understand the need to make good use of the intellectual resources, mental capacity, and potential of its managers, and to provide the appropriate framework for this. Given the impact of contextual, self-efficacy, managerial, organisational-value, and psychological factors on the final model validated in this study, senior health system managers can have a systemic approach to deal with these issues.

Besides, by utilising a continuous self-assessment system in health centres, applying the proposed model, improving administrative infrastructure, and working environment, paying attention to organisational culture, reward system, participatory management, information sharing, continuous training, and modeling, they can improve managers' abilities. To this end, it is recommended to establish some committees to empower human resources to utilize scientific methods and utilize the results of ongoing research and provide the framework for realizing this dynamically and actively. In this way, they can be suitably effective by utilizing a continuous self-assessment system to achieve the desired status. Also, the results of the present study can be used in communities with similar health systems to empower its human resources, especially the operational managers of health centres.

LIMITATION OF THE STUDY

The geographical distribution of the statistical population was one of the limitations of the present study, which was solved by managing the time of data collection.

ACKNOWLEDGMENTS

The authors express their gratitude to all the professors, specialists, administrators, and those who assisted the researchers in this study.

CONFLICT OF INTEREST

The authors declare that there was no conflict of interest.

REFERENCES

1. Yukl GA, Becker WS. Effective empowerment in organizations. Organizations management journal 2006; 3(3): 210-231.
2. Zhang X, Ye H, Li Y. Correlates of structural empowerment, psychological empowerment and emotional exhaustion among registered nurses: A meta-analysis. Appl Nurs Res 2018; 42: 9-16.
3. Ellis JR, Hartley CL. Nursing in today's world: Trends, issues & management. 10th ed. Philadelphia: Wolters Kluwer, Health/Lippincott Williams & Wilkins; 2012.
4. Patrick AW, Laschinger HKS. The effect of structural empowerment and perceived organizational support on middle level nurse managers' role satisfaction. J Nurs Manag 2006; 14(1): 13-22.
5. Greasley K, Bryman A, Dainty ARJ, Price ADF, Naismith N, Soetanto R. Understanding empowerment from an employee perspective: What does it mean and do they want it? Team Perform Manag 2008; 14(1/2): 39-55.
6. Robbins TL, Crino MD, Fredendall LD. An integrative model of the empowerment process. Hum Resour Manage Rev 2002; 12(3): 419-443.
7. Bandura A. Self-Efficacy: The Exercise of Control. 1st ed. New York: W. H. Freeman publication; 1997.
8. Faulkner J, Laschinger H. The effects of structural and psychological empowerment on perceived respect in acute care nurses. J Nurs Manag 2008; 16(2): 214-221.

9. Konczak LJ, Stelly DJ, Trusty MI. Defining and measuring empowering leader behaviors: Development of an upward feedback instrument. Educ Psychol Meas 2000; 60(2): 301-313.

10. Kuokkanen L, Katajisto J. Promoting or impeding empowerment? Nurses' assessments of their work environment. JONA, J Nurs Adm 2003; 33(4): 207-217.

11. Vogt JF, Murrell KL. Empowerment in Organizations How to Spark Exceptional Performance. Calif.: University Associates, San Diego; 1990.

12. Spreitzer GM. Psychological empowerment in the workplace: Dimensions, measurement, and validation. Academy of Management Journal 1995; 38(5): 1442-1465.

13. Mallak LA, Kurstedt HA. Understanding and using empowerment to change organizational culture. Industrial Management 1996; 38(6): 8-40.

14. Melhem Y. The antecedents of customer-contact employees' empowerment. Employee Relations 2004; 26(1): 72-93.

15. Cho J, Laschinger HK, Wong C. Workplace empowerment, work engagement and organizational commitment of new graduate nurses. Nursing Leadership- Academy of Canadian Executive Nurses (Toronto, Ont.) 2006; 19(3): 43-60.

16. Eskandari M. Designing an empowerment system model for managers. Journal of Humanities Teacher 2004; 8(2): 53-80.

17. Robbins SP, De Cenzo DA, Coulter MA. Fundamentals of Management: Essential Concepts and Applications. 9th ed. England: Pearson publication; 2017.

18. Johnson MO. The shifting landscape of health care: Toward a model of health care empowerment. Am J Public Health 2011; 101(2): 265-270.

19. Avolio BJ, Gardner WL, Walumbwa FO, Luthans F, May DR. Unlocking the mask: A look at the process by which authentic leaders impact follower attitudes and behaviors. Leadersh Q 2004; 15(6): 801-823. Avolio BJ, WL Gardner, FO Walumbwa, F Luthans and DR May

20. Lan XM, Chong WY. The mediating role of psychological empowerment between transformational leadership and employee work attitudes. Procedia Soc Behav Sci 2015; 172(1): 184-191.

21. Daft RL. The Leadership Experience. 6th ed. Boston: Cengage Learning publication; 2014.

22. Randolph WA. Educating part-time MBAs for the global business environment. J Coll Teach Learn 2008; 5(8): 11-18.

23. Dennis R, Bruce E. A factor analysis of page and Wong's servant leadership instrument. Leadership & Organization Development Journal (LODJ) 2003; 24(7/8): 455-459.

24. Biswas S. Affective commitment as a mediator between psychological climate, job involvement and citizenship behavior. Management and Laboure Studies. 2008; 33(4): 22-32.

25. Markoczy L, Xin K. The Virtues of Omission in Organizational Citizenship Behavior. USA: University of California; 2004.

26. Liu Y, Wang W, Chen D. Linking ambidextrous organizational culture to innovative behavior: A moderated mediation model of psychological empowerment and transformational leadership. Front Physiol 2019; 10: 2192.

27. Schermuly CC, Meyer B, Dammer L. Leader-Member exchange and innovative behavior the mediating role of psychological empowerment. J Pers Psychol 2013; 12(3): 132.

28. Ekvall G. Organizational climate for creativity and innovation. EUR J WORK ORGAN PSY 1996; 5(1): 105-123.

29. Mok E, Au-Yeung B. Relationship between organizational climate and empowerment of nurses in Hong Kong. J Nurs Manag 2002; 10(3): 129-137.

30. Auernhammer J, Hall H. Organizational culture in knowledge creation, creativity and innovation: Towards the freiraum model. J INF SCI 2014; 40(2): 154-166.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

THE RELATIONSHIP BETWEEN LEADERSHIP STYLE AND HOSPITAL EMPLOYEE ENGAGEMENT IN PAPUA NEW GUINEA

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ABSTRACT

Engagement, an important concept in the determination of overall employee output, has become an important factor within the healthcare sector, and in light of various challenges facing employees, such as high workloads and long working hours, engagement also plays a significant role in ensuring improved healthcare output. Meanwhile, leadership, which plays a major role in guiding and influencing employees toward goal achievement, is the driving force behind employee engagement. Accordingly, the purpose of this study was to examine the nature of the relationship between three different leadership techniques—transformational, transactional and passive avoidant—and employee engagement in the Papua New Guinea (PNG) healthcare sector. Research has shown that transactional and transformational leadership have the highest level of impact on employee engagement as a result of the role leaders play in the inspiration and stimulation of employees. The methodology applied to examine this statement involved a random selection of 84 health employees from three PNG hospitals: ANGAU Memorial Provincial Hospital, Mount Hagen General Hospital and Port Moresby General Hospital. A correlation analysis of the quantitative research methodology was then applied to evaluate the relationship between key variables in the collected data. A final analysis of results revealed that, within the PNG healthcare sector, transformational and transactional leadership both have a positive relationship with employee engagement, while passive avoidant leadership has a negative relationship with employee engagement.

KEYWORDS

Employee Engagement; Transformational Leadership; Transactional Leadership; Passive Avoidant Leadership; Change Management; Effective Leadership; Patient Care

INTRODUCTION

1.BACKGROUND

Adequate healthcare service delivery is often hampered by factors such as poor management and resource provision. [1] For developing countries, inadequate healthcare service delivery is usually a direct consequence of unequal resource distribution, which in turn leads to healthcare institutions experiencing a lack of access to sufficient resources and funding. [2] These challenges then lead to increased employee turnover as a result of the combined effects of reduced employee satisfaction, low motivation and burnout from the increased workload stemming from a high patient-to-physician ratio. [3] As such, the quality of healthcare services provided by affected healthcare workers is reduced, adversely affecting patient outcomes.

In the developing country of Papua New Guinea (PNG), population 7.4 million, an examination of the healthcare sector clearly illustrates inadequate healthcare service delivery as a result of unequal resource distribution. All healthcare centres and aid posts each serve a population between 3,000 and 20,000, with 80% of demand for healthcare coming from rural areas, which contain a

majority of PNG's population. [4] However, although PNG has experienced an increasing demand for healthcare services due to rapid annual population growth, limited access to sufficient healthcare services continues to be a major issue given the inadequate resource distribution and fund allocation. [5] Low patient outcomes, as a direct result of these challenges, can be attributed to reduced employee motivation, satisfaction and motivation.

Consequently, employee engagement—through the level of motivation, satisfaction and commitment emotionally displayed by employees towards organisational goal achievement—plays a significant role in determining health worker output in the face of the above challenges. [6] Employee engagement level is also influenced by factors such as work environment, team organisation and pay in such a way that poor working environment, poor team organisation and insufficient pay directly yields reduced levels of motivation, satisfaction and commitment, which in turn leads to reduced engagement levels among employees. Consequently, the level of employee engagement is therefore significantly associated with the leadership style being utilised—transformational, transactional or passive avoidant—where higher engagement levels are observed due to effective leadership styles, but ineffective styles result in lower engagement levels. [7]

Each leadership style has distinct characterisations. Whereas passive avoidant leadership involves intentional avoidance of employee management, both transactional and transformational leadership comparatively involve a higher level of leader–follower interaction. More specifically, passive avoidant leadership entails the absence of active involvement in employee organisation and management owing to the intentional neglect of behaviour which is oriented towards leadership. [7] As a result, this lack of involvement makes passive avoidant leadership unsuitable for application within the high-stress environment within the health care sector, which introduces the necessity for increased leader-follower interaction for the purpose of maintaining high employee output.

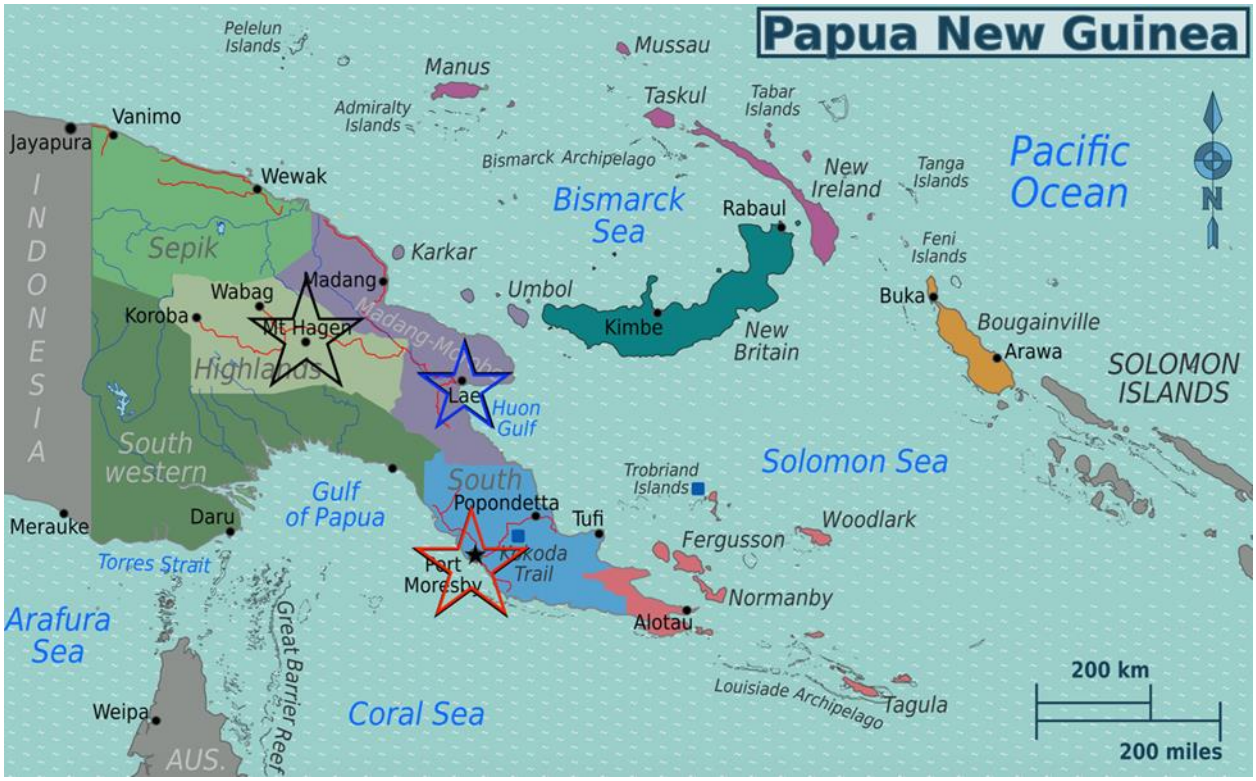
Transactional leadership revolves around management based on the contingency reward system, which involves reward provision upon the portrayal of employee effort. The contingency reward system is used to complement the exception-based management model applied for this leadership technique, whereby while rewards are provided based on the achievement of high output by employees, low output results in punishment, which may be issued in the form of salary bonus cuts and reduced work break periods. [8] Transactional leadership is further divided into two main forms: transactional active and transactional passive. Whereas transactional active leadership involves active monitoring of workers and immediate response to identified issues, transactional passive leadership only features leader intervention upon the occurrence of issues requiring immediate intervention. [8] As such, the contingency reward system therefore acts as a motivator towards high-quality output by employees through providing salary bonuses, promotions or other rewards for high effort.

Finally, transformational leadership involves constant leader–follower interactions with the aim of achieving set goals. Through transformational leadership, leaders use techniques such as charisma, employee motivation and intellectual stimulation to ensure a high output quality is achieved and maintained, even without contingency rewards. [8] More specifically, motivation and intellectual stimulation result in employee inspiration towards the achievement of set goals and objectives, in a way which ensures high levels of output regardless of various issues within the internal and externa work environment. Consequently, the characterisations of transformational leadership, through their encouragement of employee satisfaction, commitment and motivation, have significant levels of impact on employee engagement levels, especially amid high-stress working conditions in the health sector. As such, this makes transformational leadership suitable for application within the health sector with the aim of maintaining high levels of output.

Nevertheless, despite the significant effect of leadership on employee engagement, most current literature ignores employee engagement among healthcare workers in low-to-middle-income countries, creating a literature gap. [9] The need to investigate healthcare employee engagement within such countries stems from the existence of various limitations facing the health sector due to insufficient resource distribution, highlighting the need to investigate the most effective leadership techniques for enhancing engagement levels and, ultimately, patient outcomes. Accordingly, this study aims to fill this literature gap via a quantitative methodology investigating the relationship between three leadership styles—transformational, transactional and passive avoidant—and employee engagement in the PNG health sector.

In this light, three major hospitals—Port Moresby General Hospital, Mount Hagen General Hospital and ANGAU Memorial Provincial Hospital—were used for the examination of the impact of leadership styles on employee engagement in the PNG health sector.

FIGURE 1: A GEOGRAPHICAL MAP OF THE LOCATION OF PORT MORESBY GENERAL HOSPITAL (RED) MOUNT HAGEN GENERAL HOSPITAL (BLACK) AND ANGAU MEMORIAL PROVINCIAL HOSPITAL (BLUE)



Port Moresby General Hospital(PMGH), which has a 1012 bed-count and a 1600 staff-count, is the largest PNG hospital. Furthermore, its large patient capacity in addition to its access to superior medical equipment compared to other hospitals within PNG facilitated the establishment of its status as the National Referral Hospital. According to Ambang [10], its administration structure consists of a number of appointed directors— Director of Corporate Services, Director of Nursing and the Director of Medical Health Services, who answer to the overall head of operations and management, the CEO. [10] ANGAU Memorial Provincial Hospital, which has a 900 staff-count and a total of 800 beds, is the second largest hospital in PNG. Its administrative structure bears a high level of similarity to that of PMGH, and consists of a group of directors who answer to a CEO. In addition, Chiefs of Department are appointed to reside over the operations within all medical specialties. Mount Hagen General Hospital is the third largest hospital in PNG. It has a 400 staff-count and a total of 250 beds for gynaecology, obstetrics, paediatrics, surgery and medical patients. As compared to the other two hospitals, Mt Hagen has a different administrative structure, which consists of a group of managers—the Hotel Services, Finance, HR, Transport and Maintenance managers, as well as directors—the Nursing and Medical Services Directors who answer to the Hospital Manager. In addition, all medical specialties have Chiefs of Departments who are in charge of their operational and technical management and organisation.

Regardless of the differences in administrative structure, all three hospitals encounter similar issues such as poor investment in medical infrastructure and lack of sufficient manpower to cater for the existing high health care demand. [10] In order to solve this issue, the PNG national government developed a new National Health Plan, which would enable the improvement of medical resource distribution through the combination of all health care institutions under the Provincial Health Authority banner. [10] However, in spite of these efforts, the PNG heath sector is still characterised by issues such as workforce demotivation, technical skill maldistribution and high numbers of advanced age health workers as opposed to younger employees. In this light, this study aims at examining the impact of leadership techniques on employee engagement levels in the face of such issues, for

the purpose of facilitating the overall improvement of patient outcomes as a result of improved health worker output. For the outline of this examination, this paper structure features literature review, methodology, results and discussion sections, which provide a detailed window into the analysis and conclusions provided by data collected during the course of this study.

2. LITERATURE REVIEW

The PNG health care sector faces issues such as low numbers of health workers based on the health care supply-demand ratio, as well as poor medical resource and technical skill distribution. [4] Consequently, these issues in turn result in the low employee engagement levels owing to the resulting work strain associated with high patient to physician ratios and insufficient medical resources and equipment to adequately support the demand for health care, especially in rural areas. In this case, the implementation of effective leadership techniques becomes necessary for the establishment and maintenance of high levels of employee engagement in spite of all the existing challenges within the PNG health sector. As such, this study provides a critical analysis of the effect of three leadership techniques—transformational, transactional and passive avoidant—on employee engagement within the PNG health sector, with the aim of facilitating the overall improvement of employee output regardless of the various challenges which have been identified.

According to Chaudhry and Javed [8], passive avoidant leadership is a technique which features the intentional avoidance of employee management by leaders. Consequently, this bears the implication of an absence of provision of management directions by leaders during the implementation of this leadership technique. Intentional avoidance of management in turn leads to the intentional neglect of behaviour which is leadership-oriented, thus resulting in extremely low levels of leader-follower interaction. [11] As a result, the low level of leader-follower interaction portrayed by passive avoidant leadership makes this technique unsuitable for implementation within the health sector, which features a high level of reliance on such interactions for the maintenance of a smooth flow of operations.

Transactional leadership involves the use of a contingency reward-punishment system to complement the exception-based management model which implies leader involvement in employee management only upon the condition that employee output is provided in return, with high output levels being rewarded with rewards such as salary bonuses and promotions. Xenikou [12] supports this by highlighting the two major transactional leadership characteristics as exception-based management and contingent reward, whereby the provision of rewards based on good performance is combined with the conservative resource application upon the need for unexpected event resolution. Upon the consideration of these two characteristics which apply to the two forms of transactional active and transactional passive leadership, the general transactional leadership technique can be categorised as a model which is based on defensive management. As such, although the contingency reward system may be associated with improved levels of employee motivation, transactional leadership may also lead to low levels of employee satisfaction as a result of exception-based management which leads to low levels of leader-follower interaction. Consequently, this implies transactional leadership would yield low levels of suitability for application within the health sector owing to its adverse effects on job satisfaction, which in turn directly affects employee engagement levels.

Compared to transactional and passive avoidant leadership, transformational leadership features the highest levels of leader-follower interaction. Transformational leadership involves the application of motivation and intellection stimulation for the purpose of improving employee commitment and satisfaction with the aim of improving overall engagement levels. This leadership technique consists of four major dimensions—inspiration based on motivation, individualized consideration, stimulation of an intellectual thinking processes and idealized influence. [13] Whereas consideration is enacted through listening and response to the needs of followers by leaders, inspirational motivation is enacted through the constant application of employee motivation efforts by leaders. Comparatively, idealised influence features the development of high leader-follower trust levels, while intellectual stimulation revolves around the honing of follower problem solving skills through improving the overall level of problem identification and awareness.

Effective utilisation of these four dimensions facilitates the establishment of the role model status of leaders within organisations, thus helping the improvement of follower productiveness and success. Transformational leadership therefore leads to the association of leaders with high passion, energy and visibility within their designated

working environments, which in turn enables the development of effective communication and problem solution among employees. Consequently, this yields increased levels of follower empowerment and motivation as a result of the establishment of communal-based approach to organisational management, which in turn leads to high levels of employee engagement in general, thus making transformational leadership suitable for application within the high-stress working environment associated with the health sector.

Examination of the characteristics of each of the three leadership techniques is therefore important for the determination of their potential effect on employee engagement. As stated by Hutchinson & Jackson [14], the effectiveness of nurse leadership is a significant determinant of the achievement of optimum patient outcomes. As such, identification of effective leadership techniques is important owing to its ability to aid the avoidance of implementation of ineffective leadership techniques which would adversely affect patient outcomes as a direct result of low health worker output. [6] Effective leadership technique identification is therefore important for not only facilitating professional development within the health sector, but also enabling better leadership skill development in addition to flexibility and adaptability with the aim of improving decision making and strategy development abilities.

Effective leadership technique implementation yields improved health worker engagement levels, which will in turn yield improved patient outcomes as a direct result of improved health worker commitment, satisfaction and motivation. In spite of the established importance of effective leadership techniques in the improvement of employee output, a research gap which features a lack of sufficient analysis of the implementation of effective leadership in the PNG health sector, has been identified. [13] In this light, the analysis of the effect of leadership techniques on employee engagement provided by this study will thus enable the closure of this research gap through the selection of effective leadership techniques to enable the improvement of employee engagement levels within the PNG health sector, which will also enable the overall improvement of the quality of health care service provision.

3. RESEARCH QUESTIONS

To achieve the study purpose, three research questions were utilised:

- RQ1: Is there a positive relationship between transformational leadership behaviours and employee engagement among healthcare workers
- RQ2: Is there a positive relationship between transactional leadership behaviours and employee engagement among healthcare workers?
- RQ3: Is there a positive relationship between passive avoidant leadership behaviours and employee engagement among healthcare workers?

METHODS

1. STUDY CONTEXT AND SETTING

For this study context, a quantitative research methodology was applied since it allowed for conducting further analytical studies based on the research findings. [15] More specifically, a correlational study design was used to analyse the relationship between employee engagement and leadership, through the collection of data from responses provided in questionnaires to determine the degree of correlation between dualistic variables. [16] The variables analysed were transformational leadership, transactional leadership, passive avoidant leadership and employee engagement. Based on research questions and the purpose statement, determining the independent and dependent variables facilitated the application of correlation analysis.

2. POPULATION

The target population was 84 health employees randomly selected from an ID employee group of volunteers comprising nursing officers, allied health workers, nurses, doctors and health extension officers. Three hospitals—Port Moresby General Hospital, Mount Hagen General Hospital and ANGAU Memorial Provincial Hospital—were identified for the population sample selection, whereby 28 volunteer employees were selected from each hospital according to the aforementioned specifications.

Sampling strategy

Assumptions based on the Pearson correlation model were used to determine the sampling strategy. [17] These assumptions included approximate normal data distribution, rough inter-variable linear association and absence of significant outliers within the model. [18] As

such, G-power was utilised for the computation of the sample size required to calculate the Pearson correlation; a 0.3 correlation coefficient, 0.8 statistical power threshold and 0.05 alpha level were selected. The overall determination of the sample size was based on the analysis of the G-Power output, which was computed after the selection of the aforementioned values of the correlation coefficient, alpha level and statistical power threshold. This analysis aided the setting of the optimum population sample at 84 with regard to the given parameters in order to facilitate the overall accuracy of data collected. The selected population sample was equally divided among the identified ID group of volunteer employees within three institutions selected for analysis, with the aim of providing equal grounds for the analysis of impact of the three leadership techniques on employee engagement based on the examination of all individual responses.

Study variables

Variables included employee engagement, transformational leadership, transactional leadership and laissez-faire leadership. A positive correlation was identified if employee engagement increased with an increased utilisation of any of the three leadership styles in the identified healthcare institutions. Otherwise, a negative correlation was identified.

Data collection procedure and instruments

IRB approval and study permission were obtained before research began, according to ethical considerations. Ethical considerations included: submission of necessary research forms for IRB approval, seeking of approval from the chairman and chief executive officers before commencement of the study, ensuring that participants were informed of their anonymity and the voluntary nature of the study and the use of a two-factor authentication password protected computer to ensure the safety of participant information after the study. During the study, two questionnaires—the MLQ_5X and the Gallup Q12 survey form—were administered after return of informed consent forms by each of the 84 participants. These questionnaires featured survey questions which according to Avolio and Bass [19], play a significant role as useful leadership measurement tools for the effectiveness of the various leadership techniques identified for this study. This effectiveness is facilitated by the design of these survey questions, which enable them to accurately determine the level of employee satisfaction, commitment and engagement through the use of a five-point Likert scale which is attached to all respective responses. Demographic variables (division, age group, years of experience, department and gender) were also collected, in addition to leadership and employee engagement data. Afterwards, participant responses were collected and stored in a laptop with a two-factor authentication security password. This whole data collection process took place over a period of three days at each of the selected institutions, thus giving a total of nine days for the whole data collection period. The expected valid response rate for this study was set at 95%.

Analysis methods

Descriptive and inferential statistics were used for data analysis. Descriptive statistics were used to illustrate numerical data in a summarised, precise and organised format, through measures such as standard deviations, percentages and mean values. [20] Inferential statistics, on the other hand, utilised a general linear model and correlation tests for data analysis in order to examine the relationship between employee engagement and leadership styles, based on collected data. [21] Reliability tests for the data collected from the MLQ_5X and Gallup Q12 questionnaires used were based on the 0.74 to 0.94 reliability range reported by Bass and Avolio [22] after conducting a study using a large (N=1394) data set. More specifically, the Cronbach's Alpha Coefficient for reliability yielded a 0.93-0.72 and 0.58-0.78 range for transformational and transactional leadership respectively, while for passive avoidant leadership, it yielded a 0.72-0.49 range.

RESULTS

1. GENERAL VARIABLES FOR EACH HOSPITAL

Referring to Table 1 below, the most frequently occurring age groups within the sample population were 29-39 and 40-50 years with 5-10 and 15-20 years of experience being recorded for most of the population, which mostly belonged to the female gender. In addition, while Nursing division had the overall highest occurrence frequency, followed by the doctor, Allied Health and Support Service divisions, Registered Nurse and Back of House were the departments with the highest occurrence frequency within the sample population. This has been illustrated in Table 1 below.

TABLE 1: PERCENTAGE FREQUENCIES FOR THE NOMINAL AND ORDINAL VARIABLES

VARIABLE	N	%
AGE		
18-28	5	5.95
29-39	34	40.48
40-50	34	40.48
51-60	10	11.90
61-65	1	1.19
GENDER		
FEMALE	45	53.57
MALE	39	46.43
DIVISION		
ALLIED HEALTH	20	23.81
DOCTOR	20	23.81
NURSING	24	28.57
SUPPORT SERVICES	20	23.81
DEPARTMENT		
BACK OF HOUSE	13	15.48
HEALTH EXTENSION OFFICER	2	2.38
HOTEL SERVICES	7	8.33
IMAGING	2	2.38
LABORATORY	6	7.14
MIDWIFE	5	5.95
OTHER	2	2.38
PATHOLOGY	2	2.38
PHYSIOTHERAPY	4	4.76
RADIOLOGY	5	5.95
REGISTERED NURSE	18	21.43
REGISTRAR	7	8.33
RESIDENT	3	3.57
SENIOR MEDICAL OFFICER (SMO)	8	9.52

YEARS OF EXPERIENCE		
LESS THAN 5	4	4.76
5-9	23	27.38
10-14	18	21.43
15-19	22	26.19
20+	17	20.24

Note. Due to rounding errors, percentages may not equal 100%.

2. TRANSFORMATIONAL LEADERSHIP

As seen in Table 2 below, Transformational leadership had the highest overall Q12_mean, maximum and minimum in Hospital 1, while Hospital 2 and 3, although to a lower extent, also recorded high Q12_mean values for this leadership style

In Table 3 below, Inspirational Motivation, Idealised Behaviours and Idealised Attributes the highest mean values, thus identifying them as the most desirable transformational leadership traits.

Transformational leadership had the highest Pearson Correlation Matrix among the three leadership styles being studied. This can be seen in Table 4 below.

Finally, compared to transactional and passive avoidant leadership, transformational leadership had the highest Variance Inflation Factor (VIF) and Linear Regression Coefficients as illustrated by Table 5 and 6 below.

TABLE 2. MEAN (M), STANDARD DEVIATION (SD), SAMPLE SIZE (N), MINIMUM (MIN), MAXIMUM (MAX), SKEWNESS AND KURTOSIS FOR EACH OF THE THREE HOSPITALS

VARIABLE	*M*	*SD*	*N*	MIN	MAX	SKEWNESS	KURTOSIS
Q12_MEAN							
HOSPITAL 1	4.04	0.21	28	3.42	4.42	-0.63	1.09
HOSPITAL 2	3.60	0.46	28	2.42	4.25	-0.81	0.29
HOSPITAL 3	3.66	0.70	28	2.25	4.75	-0.38	-0.87
TRANSFORMATIONAL							
HOSPITAL 1	3.01	0.24	28	2.55	3.90	1.36	4.94
HOSPITAL 2	2.38	0.46	28	1.60	3.20	-0.16	-1.14
HOSPITAL 3	2.33	0.73	28	1.10	3.55	-0.28	-1.28
TRANSACTIONAL							
HOSPITAL 1	2.77	0.41	28	1.38	3.38	-1.28	2.85
HOSPITAL 2	2.47	0.61	28	1.50	3.88	0.46	-0.27
HOSPITAL 3	2.58	0.71	28	1.38	3.88	-0.22	-0.87
PASSIVE AVOIDANT							

HOSPITAL 1	0.69	0.40	28	0.12	1.62	0.44	-0.72
HOSPITAL 2	2.51	0.77	28	0.62	3.50	-0.81	-0.20
HOSPITAL 3	1.15	0.76	28	0.00	3.62	1.88	3.66

Note. '*' denotes the sample size is too small to calculate statistic.

TABLE 3. TRANSFORMATIONAL LEADERSHIP RATIO AND INTERVAL VARIABLES

VARIABLE	*M*	*SD*	*N*	MIN	MAX	SKEWNESS	KURTOSIS
IDEALIZED ATTRIBUTES	2.68	0.71	84	0.75	4.00	-0.53	-0.26
IDEALIZED BEHAVIOURS	2.76	0.69	84	0.25	4.00	-1.29	2.69
INDIVIDUAL CONSIDERATION	2.05	0.77	84	0.00	4.00	-0.45	0.11
INSPIRATIONAL MOTIVATION	3.00	0.62	84	1.25	4.00	-0.90	0.01
INTELLECTUAL STIMULATION	2.38	0.83	84	0.00	4.00	-0.68	0.02
TRANSFORMATIONAL	2.57	0.60	84	1.10	3.90	-0.72	-0.27

Note. '*' denotes the sample size is too small to calculate statistic.

TABLE 4. Q12_MEAN, TRANSFORMATIONAL, TRANSACTIONAL AND PASSIVE AVOIDANT PEARSON CORRELATION MATRIX

VARIABLE	1.	2.	3.
1. Q12_MEAN	-		
2. TRANSFORMATIONAL	0.57**	-	
3. TRANSACTIONAL	0.27*	0.46**	-
4. PASSIVE AVOIDANT	-0.17	-0.27*	-0.19

Notes. *p < .05. **p < .001. n = 84.

TABLE 5. TRANSFORMATIONAL, TRANSACTIONAL AND PASSIVE AVOIDANT VARIANCE INFLATION FACTORS

VARIABLE	VIF
TRANSFORMATIONAL	1.32
TRANSACTIONAL	1.27
PASSIVE AVOIDANT	1.09

TABLE 6. TRANSFORMATIONAL, TRANSACTIONAL AND PASSIVE AVOIDANT LINEAR REGRESSION COEFFICIENTS PREDICTING Q12_MEAN

VARIABLE	*B*	*SE*	CI	B	*T*	*P*
(INTERCEPT)	2.48	0.29	[1.90, 3.05]	0.00	8.56	< .001
TRANSFORMATIONAL	0.49	0.09	[0.31, 0.68]	0.56	5.30	< .001
TRANSACTIONAL	0.01	0.09	[-0.17, 0.20]	0.01	0.13	.896
PASSIVE AVOIDANT	-0.01	0.05	[-0.11, 0.09]	-0.02	-0.20	.842

Note. CI is at the 95% confidence level. Results: F (3,80) = 12.91, p < .001, R2 = 0.33
Unstandardized Regression Equation: Q12_Mean = 2.48 + 0.49*Transformational + 0.01*Transactional - 0.01*Passive Avoidant

3. TRANSACTIONAL LEADERSHIP

As seen from Table 2, Hospital 1, which also had the highest transformational leadership preference, had the highest preference for transformational leadership, followed by Hospital 3 and 2, as determined by the recorded Q12_Mean values recorded for each case. The transformational leadership traits which had the highest level of preference among the population sample were found to be Contingent Reward, Transactional and Management Exception Passive, as seen in Table 7 below.

After transformational leadership, transactional leadership was seen to have the second highest Pearson Correlation Matrix among the three leadership styles being studied as illustrated in Table 4. In addition, Table 5 and 6 show that transactional leadership, compared to transformational and passive avoidant leadership, had the second highest Variance Inflation Factor and Linear Regression Coefficients.

4. PASSIVE AVOIDANT LEADERSHIP

According to the results collected, although to a lower extent than the other two leadership styles Hospital 2 had the highest preference for passive avoidant leadership, followed by Hospital 3 and 1 respectively. This was according to the Q12_Mean values recorded for each hospital as seen in Table 2. Furthermore, Management Exception Passive, Passive Avoidant and Laissez faire were the passive avoidant traits with the highest preference rate, as indicated by the high mean values illustrated in Table 8 below.

Compared to transformational and transactional leadership, passive avoidant leadership was seen to have the lowest Pearson Correlation Matrix, which was found to be a negative value, as illustrated in Table 4. In addition, Table 5 and 6 show that passive avoidant leadership, compared to transformational and transactional leadership, had the lowest Variance Inflation Factor and Linear Regression Coefficients.

TABLE 7. TRANSACTIONAL LEADERSHIP RATIO AND INTERVAL VARIABLES

VARIABLE	*M*	*SD*	*N*	MIN	MAX	SKEWNESS	KURTOSIS
CONTINGENT REWARD	2.81	0.75	84	1.00	4.00	-0.58	-0.29
MANAGEMENT EXCEPTION ACTIVE	2.40	0.65	84	0.75	4.00	-0.44	0.45
TRANSACTIONAL	2.61	0.59	84	1.38	3.88	-0.26	-0.35

Note. '*' denotes that the sample size was too small to calculate a statistic.

TABLE 8. PASSIVE AVOIDANT LEADERSHIP RATIO AND INTERVAL VARIABLES

VARIABLE	*M*	*SD*	*N*	MIN	MAX	SKEWNESS	KURTOSIS
LAISSEZ FAIRE	1.34	1.21	84	0.00	4.00	0.61	-0.90
MANAGEMENT EXCEPTION PASSIVE	1.57	0.96	84	0.00	3.75	0.48	-0.71
PASSIVE AVOIDANT	1.45	1.02	84	0.00	3.62	0.69	-0.83

Note. '*' denotes that the sample size was too small to calculate a statistic.

DISCUSSION AND CONCLUSIONS

1. TRANSFORMATIONAL LEADERSHIP

As previously described, transformational leadership utilises individual consideration and the stimulation of charisma and intellectual senses for the purpose of achieving set goals. [23] As such, transformational leadership involves the application of various mechanisms for improving organisational output by enhancing employee motivation, performance and morale. [24] According to the collected results, transformational leadership had the overall highest preference rate in Hospital 1, as indicated by the recorded Q12_Mean value which was the highest value among the three leadership styles being studied. This shows the overall high rate of preference for transformational leadership among health workers from these particular categories. The mean for Hospital 1 also establishes that transformational leadership is the most preferred leadership style within the population sample.

Moreover, the Variance Inflation Factor recorded for transformational leadership was the overall highest value among the three leadership styles. This finding implies a high-level impact exists between transformational leadership and employee engagement, highlighting a positive relationship between the two variables. This relationship could be a result of high leader–follower interaction portrayed through transformational leadership, which facilitates efficient communication between parties. Effective communication bears significant importance within the health sector through its facilitation of easy issue identification due to employees communicating suggestions, requests and grievances to managers. [24] Consequently, transformational leadership, through enhancing effective communication, significantly contributes to developing problem-solving initiatives for issues identified as interfering with effective employee performance. Solving such issues in turn helps improve employee engagement levels, resulting in improved patient outcomes.

Further support for the positive relationship between transformational leadership and employee engagement was illustrated by the 0.57 correlation coefficient, suggesting a significant effect between the leadership styles and the Q12_Mean. Moreover, a moderate size correlation coefficient of 0.46 was observed between transformational and transactional leadership, implying a positive relationship. This finding also implies that, since an increase in transformational leadership styles results in increased employee engagement, an increase in transactional leadership would yield the same result. Consequently, the overall highest positive correlation with Q12_Mean, VIF and overall preference rate portrayed by transformational leadership highlights the need to utilise this style of leadership in the PNG health sector to achieve increased employee engagement. As such, the null hypothesis of the first research question, which highlighted the absence of a positive relationship between engagement among healthcare employees and transformational leadership techniques, was rejected in favour of the alternate hypothesis, which highlighted a positive relationship.

2. TRANSACTIONAL LEADERSHIP

Transactional leadership revolves around irregularity-based management, whereby leaders get involved in employee management only when irregularities occur. [25] As such, employees are motivated to achieve set goals through a contingency reward system which ensures successful employees are rewarded, while those who fail are punished. [16] According to the collected results, this leadership style had the overall second highest preference rate among the three hospitals, with Hospital 1 having the highest preference for transactional leadership, followed

by Hospital 3. These findings show the high preference rate of transactional leadership within the specific health worker divisions and departments recorded for each case, implying increased engagement upon its utilisation.

A high preference rate for transactional leadership was also illustrated by the calculated VIF value, which was the second highest among the three leadership techniques. This high preference rate would be a result of a contingency reward system involved during the implementation of transactional leadership, which is a major facilitator of increased employee engagement, as a result of the associated motivation. Thus, a positive relationship exists between transactional leadership and employee engagement.

The small positive relationship has also been highlighted by the existence of a moderate positive correlation coefficient of 0.27 between transactional leadership and the Q12_Mean, indicating that an increase in transactional leadership would yield increased engagement levels within the PNG health sector. This relationship is further cemented by the existence of a positive correlation between transactional and transformational leadership, as previously mentioned, which indicates that the application of both leadership styles results in improved engagement levels among healthcare workers. A positive relationship was also discovered between transactional leadership and employee engagement, showing that increased application of transactional leadership styles would increase employee engagement in the PNG health sector. Consequently, the null hypothesis of the second research question, which highlighted the absence of a positive relationship between employee engagement among healthcare employees and transactional leadership techniques, was rejected in favour of the alternate hypothesis, which highlighted a positive relationship.

3. PASSIVE AVOIDANT LEADERSHIP

Passive avoidant leadership revolves around leaders' intentional avoidance of involvement in employee organisation. [26] In contrast to transformational and transactional leadership, this style bears the highest degree of passive management, which implies the existence of a low level of leader–follower interaction. According to collected results, Hospital 2 had the highest overall preference rate for passive avoidant leadership styles. Although a high preference rate was recorded within this hospital, passive avoidant leadership style still had the lowest overall preference among the three hospitals.

The low preference was further highlighted by the VIF value calculated from the collected data, which was the lowest for the three leadership techniques, implying that a negative relationship exists between passive avoidant leadership and employee engagement. The negative relationship was also illustrated by the negative small size correlation coefficient of -0.27 between passive avoidant leadership and the Q12_Mean, portraying the negative effect this leadership style has on employee engagement. This negative relationship may directly result from the absence of leader–follower interactions in passive avoidant leadership, which ultimately reduces motivation and satisfaction levels among employees within the high-stress environment in the health sector.

Additionally, the low preference and negative correlation with the Q12_Mean imply that passive avoidant leadership styles negatively affect employee engagement levels, such that the increased application of this leadership style leads to reduced engagement levels. Therefore, in order to yield an increase in employee engagement levels in the PNG health sector, the application of passive avoidant leadership styles should be avoided. Consequently, the null hypothesis of the third research question, which highlighted the absence of a positive relationship between employee engagement among healthcare employees and passive avoidant leadership techniques, was not rejected, while the alternate hypothesis, which highlighted a positive relationship, was rejected.

This research aimed to examine the relationship between employee engagement and three leadership styles—transformational, transactional and passive avoidant—in the PNG health sector. Although this study had the limitations of time constraints, lack of control over the environment and shift variability, strengths such as population validity and convenient data gathering facilitated the collection of data for accurate analysis. Consequently, accurate analysis of the collected data enabled a critical examination of the nature of the relationship between employee engagement and leadership styles. More specifically, while the results revealed a positive relationship between both transformational and transactional leadership styles and employee engagement in the PNG health sector, a negative relationship was revealed between passive avoidant leadership and employee engagement. Consequently, this finding facilitated the rejection of the null hypotheses of the first two research questions, which highlighted the absence of a positive relationship between

employee engagement and transformational and transactional leadership in the PNG health sector. Moreover, the collected results led to a failure to reject the third null hypothesis, which highlighted the absence of a positive relationship between passive avoidant leadership and employee engagement in the PNG health sector. As such, in light of the aforementioned strengths these results portrayed some disparity to Huang et al.'s [26] findings, which highlighted the importance of workplace safety climate as the overall determinant of employee engagement levels. Although safety climate can be considered as a major influencing factor of engagement levels, findings collected during this study portrayed leadership style as the most significant influencing factor on employee engagement.

While findings obtained during this study illustrate the implications of increased utilisation of transformational and transactional leadership styles, reduced utilisation of passive avoidant leadership in the PNG health sector in order to yield increased engagement levels has also been illustrated. Regardless of limitations caused by the total reliance of quantitative analysis on numerical indicators and the small size of the population sample compared to the overall population of health workers in PNG, results obtained during the course of this study still possess a high degree of statistical relevance.

Ultimately, these findings provide a strong foundation for conducting future academic research on employee engagement in the PNG health sector. In addition, managerial implications of this study would facilitate the establishment of improved managerial structures within the health sector through the implementation of effective leadership techniques for the purpose of improving patient outcomes as a direct result of increased engagement levels. Such improvements would in turn aid in the development of healthcare management policies that combine leadership styles which positively impact employee engagement, leading to the overall advancement of healthcare service provision in developing countries. Through further research on the relationship between engagement and effective leadership in future studies, health care advancement may feature a higher degree of sustainability, which may enable the continued provision of high quality services in spite of future challenges arising not only from the ever-growing demand for health care, but also the issue of unequal distribution of resources which occurs in many developing countries.

References

1. Musinguzi C, Namale L, Rutebemberwa E, Dahal A, Nahirya-Ntege P, Kekitiinwa A. The relationship between leadership style and health worker motivation, job satisfaction, and teamwork in Uganda. J Healthc Leadersh 2018; 10:21-32.
2. Okello DR, Gilson L. Exploring the influence of trust relationships on motivation in the health sector: a systematic review. Hum Resour Health 2015;13(1):1-18.
3. Ashwell HE, Barclay L. Problems measuring community health status at a local level: Papua New Guinea's health information system. Rural Remote Health 2010;10(4): Article 1539. Available: <https://www.rrh.org.au/journal/article/1539> (Accessed 24/05/20)
4. Cairns A, Witter S, Hou X. (2018). Exploring factors driving the performance of rural health care in Papua New Guinea [Policy note]. Available from: <https://openknowledge.worldbank.org/handle/10986/29875> (Accessed 24/05/20)
5. Razee H, Whittaker M, Jayasuriya R, Yap L, Brentnall L. Listening to the rural health workers in Papua New Guinea–the social factors that influence their motivation to work. Soc Sci Med 2012;75(5):828-835.
6. Giltinane CL. Leadership styles and theories. Nurs Stand 2013;27(41):35-39.
7. McCleskey JA. Situational, transformational, and transactional leadership and leadership development. Journal of Business Studies Quarterly 2014;5(4):117-130.
8. Chaudhry AQ, Javed H. Impact of transactional and laissez faire leadership style on motivation. International Journal of Business and Social Science 2012;3(7):258-264.
9. Lowe G. How employee engagement matters for hospital performance. Healthc Q 2012;15(2):29-39.
10. Ambang T. Implementation of the National Health Plan in the PNG decentralised health system. Contemporary PNG Studies. 2015 May; 22:105.
11. Tyczkowski B, Vandenhouten C, Reilly J, Bansal G, Kubsch SM, Jakkola R. Emotional intelligence (EI) and nursing leadership styles among nurse managers. Nurs Adm Q 2015; 39(2):172-180
12. Xenikou, A. (2017). Transformational leadership, transactional contingent reward, and

organizational identification: The mediating effect of perceived innovation and goal culture orientations. Frontiers in Psychology, 8. doi:10.3389/fpsyg.2017.01754

13. Batista-Taran LC, Shuck MB, Gutierrez CC, Baralt S. The role of leadership style in employee engagement. In: MS Plakhotnik, SM Nielsen, DM Pane. Proceedings of the Eighth Annual College of Education and Graduate Student Network Research Conference (pp. 15-20). Miami, FL: Florida International University; 2013.
14. Hutchinson, M., & Jackson, D. (2013). Transformational leadership in nursing: Towards a more critical interpretation. Nursing Inquiry, 20(1), 11–22. https://doi.org/10.1111/nin.12006
15. Neuman WL, Wiegand B. Criminal justice research methods: qualitative and quantitative approaches. National Criminal Justice Reference Service; 2011.
16. Gay L, Mills G, Airasian P. Educational research competencies for analysis and applications (8th ed.). Hoboken, NJ: Pearson; 2006.
17. Patel VM, Ashrafian H, Uzoho C, Nikiteas N, Panzarasa P, Sevdalis N, Darzi A, Athanasiou T. Leadership behaviours and healthcare research performance: prospective correlational study. Postgrad Med J 2016;92(1093):663-669.
18. Osborne J, Waters E. Four assumptions of multiple regression that researchers should always test. Pract. Assess. Res. Evaluation 2002;8(2):1-9.
19. Avolio, B. J., & Bass, B. M. (2004). Multifactor leadership questionnaire (MLQ). Mind Garden, 29.
20. Neuman WL. Basics of social research: qualitative and quantitative approaches. Boston: Pearson/Allyn and Bacon; 2007.
21. Durrheim K. Research design. In: M Terre Blanche, K Durrheim. Research in practice: applied methods for the social sciences. Cape Town: University of Cape Town Press; 2002.
22. Bass, B., & Avolio, B. (1995). MLQ Multifactor leadership questionnaire. Redwood City, CA: Mind Garden
23. Hoch JE, Bommer WH, Dulebohn JH, Wu D. Do ethical, authentic, and servant leadership explain variance above and beyond transformational leadership? A meta-analysis. J Manage 2018;44(2): 501-529.
24. Saravo B, Netzel J, Kiesewetter J. The need for strong clinical leaders–transformational and transactional leadership as a framework for resident leadership training. PloS One 2017;12(8). Available: <doi: 10.1371/journal.pone.0183019> (Accessed 24/05/20)
25. Aga DA. Transactional leadership and project success: the moderating role of goal clarity. Procedia Comput Sci 2016; 100:517-525.
26. Huang, Y. H., Lee, J., McFadden, A. C., Murphy, L. A., Robertson, M. M., Cheung, J. H., & Zohar, D. (2016). Beyond safety outcomes: An investigation of the impact of safety climate on job satisfaction, employee engagement and turnover using social exchange theory as the theoretical framework. Applied ergonomics, 55, 248-257.

ACHSM Asia-Pacific Journal of Health Management

VIEWPOINT ARTICLE

HEALTH LEADERSHIP LESSONS FROM A FINE DETECTIVE

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ABSTRACT

OBJECTIVE:

To explore lessons on leadership from interactions and success of two very fine detectives – Sherlock Holmes and Dr Watson

METHODS:

From the review of Sir Arthur Conan Doyle's depiction of Sherlock Holmes, some clear and useful lessons have been drawn for health leaders. An erratic, unsystematic Sherlock Holmes and an analytical, systematic and introspective Dr Watson provide useful lessons for health leaders on trust, teamwork and how complementary abilities enable achievement of a great outcome.

CONCLUSIONS:

It is really important for health leaders to not forget the elementary message to remain focused on care provision, enable the provision of care that the community wishes to receive and avoid of the temptation of making decisions without appropriate information set to inform those decisions.

KEYWORDS

leadership, health, management

Sherlock Holmes, Dr. Watson and their interactions have fascinated many. Their success in solving some puzzling scenarios has also generated an interest in the differences in the way they go about their business. An erratic, unsystematic Sherlock Holmes has an eye for detail and is able to connect seemingly unconnected pieces of evidence and do so in a perceptive, logical and rigorous manner. (1) He has exceptional deductive abilities. (2) Dr. Watson, on the other hand, is analytical, systematic and introspective. He has the ability to dig into details, however, has the unique ability to also put aside his own analysis and go with Sherlock Homes' hunch, who he seems to trust more than he trusts his own scientific, analytical and systematic approach to identify a problem. More importantly, the pair are able to circumvent the bureaucracy in an effort to uncover the truth. This requires testing boundaries, norms and sometimes bypassing procedures, yet doing so in an honest and ethical manner.

All very worthy observations for leaders in relation to trust, teamwork and how complementary abilities enable achievement of a great outcome.

Tales of Sherlock Holmes and Watson have also generated commentary on lessons that can be learned on leadership. (3) Chaturvedi captures some important lessons including the following:

- The need for Sherlock Holmes to know what other people don't know (`My name is Sherlock Holmes. It is my business to know what other people don't know.' Sherlock Holmes in The Adventure of the Blue Carbuncle).

  A very clear lesson for the health sector is that providing leadership in as complex a sector as healthcare requires expertise in a wide range of

Asia Pacific Journal of Health Management 2020; 15(4):i283. doi: 10.24083/apjhm.v15i4.283

arenas – from clinical systems and process improvement, to technology and innovation, to financial management. (4) It is important that health leaders know everything about their business, including those details that others don't know.

- Not to theorise before one has data or information (`It is a capital mistake to your eyes before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts.' Sherlock Holmes in A Scandal in Bohemia).

  It is important for decision-makers and leaders to be objective and base decisions on facts. To manage complexity and change, there is a need for health leaders with technical expertise to understand evidence, technology, innovation, value, complexity and change (4).

- Weakness in one part can lead to compensatory excellence in another (`Weakness in one limb is often compensated for by exceptional strength in the others.' Sherlock Holmes in The Adventure of the Six Napoleons and Other Cases).

  It is true that a weakness in one part of the organisation can unleash over-compensatory strength in another part. Weakness should not always be considered a liability.

- Problem-solving requires exclusion of impossible but not improbable (`When you have eliminated the impossible, whatever remains however improbable must be the truth.' Sherlock Holmes in The Sign of the Four).

  At times it is not easy to get to the bottom of things. However, the strategy of not excluding `improbables' does help to get to the root causes of a problem. Not spending enough time and energy asking `why' a few times, interrogating evidence and systematically analysing systems and processes even though the error or omission may have occurred in the past, is often the reason for new problems and challenges remaining hidden.

Hashim has commented on Sherlock Holmes' ability to give importance to what he cannot see as much as what he can. These include paying attention to detail, having a trustworthy companion like Dr. Watson (even if they do not always see eye to eye on a lot of matters), acceptance of perspectives other than one's own, need for a depth of knowledge and a hunger to attain new knowledge, taking the time to think things through, ponder on the findings to make sense of it all and being passionate about what one does irrespective of rewards. (2)

Webb made very astute observations about an observant Sherlock Holmes. (5) `You see, but you do not observe. The distinction is clear.' Webb makes an important point here that leaders must recognise patterns and understand the significance of what they see. Sherlock Holmes had the ability to gather the facts and then separate those which were crucial, from others which were merely incidental (Sherlock Holmes in The Crooked Man). Sherlock Holmes' dialogue `That was a curious incident' signifies Sherlock Holmes curiosity in observations that did not elicit interest or response in occurrences by others.

Herron also captures some aspects from Sir Arthur Conan Doyle's depiction of Sherlock Holmes as a remarkable detective. (6) He observes that details matter; partners are indispensable; there is more than one way to approach the problem; but also the fact that even when problems are solved many questions remain unanswered.

These are important lessons for health leaders. Reforms must always be informed by a detailed analysis of both benefits of potential consequences. The complexity of providing leadership in healthcare lies in having skills and expertise to ensure safe service delivery; ensuring treatment effectiveness considerations guide optimisation of service delivery; evidence base and best practice considerations determine what should be provided, by whom and how change should be implemented; technology and innovation is continuously assessed for use; delivery systems and processes are continuously improved; understanding of supply and demand considerations to ensure that best value is delivered for the consumer, community and society in general and models of care; and therefore the workforce is continuously configured and aligned to deliver the most effective and appropriate interventions possible. (4)

Many commentators argue about the need for the reform idea to be shared and even encourage organisations to develop a vision by consensus. Indeed, a new vision has to be shared vision that everyone can relate to. However, if

transformation is not about maintaining status quo, but a change in paradigm that leads to exponential gain, the vision sometimes may need to be new and different that may not be accepted by the dominant majority and may require development of a new coalition (7),

McLaughlin and Cox note that even though Sherlock Holmes uses deductive logic he almost certainly at certain points also uses `retroductive' process i.e. the process involving taking a visible and tangible endpoint and then reasoning backward by examining where earlier in the leader's experience there were indications of the eventual outcome. (6)

What might be some other very interesting learnings for leaders in healthcare?

"It's elementary, my dear Watson!"

Working in a health bureaucracy, some decision makers often forget that they are in the business of providing care. The bureaucratic systems and processes are essential to ensure consistent and systematic management, however, when financial considerations start taking precedence over care considerations in the name of efficiency and effectiveness to provide more and better care, the `elementary' message that healthcare provision must be all about providing healthcare, is sometimes lost. The `CARE' in terms of healthcare provision must always be C-clinical needs focused, A- appropriate, R-respectful, E-evidence-based. From a recipient or patient's perspective, the care has to be all about being C- courteous, A-accessible, R-responsive and E-explicit.

It is quite possible that Sir Arthur Conan Doyle may have specifically chosen a character to balance the eccentric and insecure Sherlock Holmes, in the form of a doctor and called him Watson. Incidentally, the letters in the name Watson do signify the need for W-waste elimination, A-appropriate, T-transparent, S-safe, O-outcome focused and N-innovative healthcare.

"Watson, you idiot. Somebody stole our tent …"

Sherlock Holmes and Watson went camping. Watson is suddenly shaken up by Sherlock and asked "look up, Watson. What do you see?". "I see the stars." "And what does that tell you?" "Astronomically, it tells me that Jupiter is in the fourth house. Meteorologically, it tells me that it will be bright tomorrow. Philosophically, it tells me that God is all-powerful and we are mere dust compared to him. Why, Sherlock what do you see?"

"Watson, you idiot! Someone's stolen our tent!"

This may well be the funniest joke in fictional literature, however, signifies the irony in healthcare provision. In an effort to provide efficient, effective, right and appropriate care, it is important to ensure that the care that the health system and health professionals consider right and appropriate is the care that the recipient (or the patient), their families and the wider community wish to have. When providing complex and life-prolonging interventions, it is important to remember something that can be done, may not necessarily be something that the recipient of care wants to be done. A scientific Dr. Watson, with knowledge of astronomy, meteorology and philosophy could see everything but not that the tent was missing.

"The temptation to form premature theories upon insufficient data is the bane of our profession"

It is not unusual for healthcare leaders to theorise what might be in the best interest of the recipients of care, their families and the wider community. Many strategic plans are developed, operationalised and precious resources invested with little data or information. Sometimes it is as if people delivering health care and those receiving it are in two different `camps.' People responsible for the delivery of healthcare convince themselves, often based on partial or inadequate information, that recipients of care are going to benefit from it without necessarily understanding the expectations, perspectives and desires of those receiving health care. Decisions are made based on misperceptions which lead to mistrust, wastage of resources and perpetual restructuring of healthcare systems and processes.

All of the above is definitely not as a result of lack of leadership or can be attributed to bad culture. In healthcare, we have well-meaning decision makers who make the best effort to provide the most appropriate strategy and invest valuable resources. However, this must be done with the benefit of information. It is true that often data or information is just not available and delaying decision-making because of inadequate information would also be counter-productive. In such situation transparency, openness and explicitness about the information that is available and that forms the basis for decision-making is important.

The belief that a strategic plan just has to be written because one is expected and then has to be operationalised so that performance could be measured, misses the point completely.

"That was a curious incident!"

It is with enthusiasm and confidence that we endeavour to provide high quality, safe, consistent, reliable, effective, efficient and appropriate health care. However, it is important that the healthcare delivery system is developed with careful consideration of the entire environment in which care is delivered. This requires effective engagement with all stakeholders, working to a common goal so that all perspectives are considered in formulating the strategy and the plan for healthcare delivery. A care delivery system must consider the needs of recipients, providers and of the wider community. Innovation and solution generation must focus on the needs and expectations of the recipients of care as well as make the best use of the talent that is available to meet those needs and expectations.

It is curious that the most visible displays in many healthcare organisations are their strategic plans, performance frameworks, performance indicators and display of achievements. It is not incomprehensible to develop a health care system in which back room functions that support healthcare delivery are invisible (including strategic plans, value statements, quality improvement frameworks, monitoring and evaluation reports, audit systems and the like). Instead, the effort should go in providing care. If the focus of a healthcare organisation begins to shift from those it is there to serve to those who serve, the entire system is at risk of becoming a servant to meet the needs of providers rather than the recipients.

"In solving a problem of this sort, the grand thing is to be able to reason backward"

It is sometimes very useful to consider what is it that we are trying to achieve and then work backward to develop systems and processes that will enable us to achieve it. Of course, it is always easy to conceptualise something with an expectation that it will deliver the output or outcome desired or necessary. Unfortunately, such conceptualisation is not always successful.

References

1. Thompson A. On leadership, Sherlock Holmes and the analytical leader. Accessed February 12, 2019. https://linked2leadership.wordpress.com/2013/06/18/on-leadership-sherlock-holmes-and-the-analytical-leader/.
2. Hashim I. Thinking Like Sherlock Holmes. Accessed February 12, 2019. https://leaderonomics.com/leadership/thinking-like-sherlock-holmes.
3. Chaturvedi M. 7 Leadership lessons you can learn from Sherlock Holmes. Accessed February 12, 2019. https://www.linkedin.com/pulse/7-leadership-lessons-you-can-learn-from-sherlock-chaturvedi-dms-hr/.
4. Arya DK. Do our leaders have technical expertise to lead change. Asia Pacific Journal of Health Management 2015; 10(3):S144-S146.
5. Webb K. How Leaders Can Be As Observant As Sherlock Holmes. Accessed February 12, 2019. https://keithwebb.com/how-leaders-can-be-as-observant-as-sherlock-holmes/.
6. Herron M. Leadership thoughts from Sherlock Holmes. Accessed February 12, 2019. https://www.clintonpublicschools.com/site/default.aspx?PageType=3&ModuleInstanceID=6292&ViewID=DEDCCD34-7C24-4AF2-812A-33C0075398BC&RenderLoc=0&FlexDataID=13148&PageID=4840&Tag=.
7. Arya DK. So, you want to lead a transformational change? Asia Pacific Journal of Health Management 2012;7(2):8-14
8. McLaughlin M, Cox E. *Leadership Coaching: Developing braver leaders.* New York: Routledge, 2016.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

POST-IMPLEMENTATION EVALUATION OF A DIGITAL DICTATION SYSTEM IN A LARGE HEALTH SERVICE USING HOT-FIT FRAMEWORK

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ABSTRACT

OBJECTIVE:

The objective of this study was to evaluate a digital dictation system (DDS) that has been implemented in a large health service. The data collected in this study was used to understand the overall uptake and performance of the system and consequently improve the quality of care delivered by the organisation.

METHODS:

A mixed method research design was used in this study. Clinicians and Medical Transcriptionists (MTs) using the DDS across the two campuses of the health service over a period of four months, were surveyed to assess the extent to which the implementation of the DDS is fulfilling its purpose. In addition, system usage statistics, project implementation documents and user support emails were also analysed.

RESULTS:

This study utilised an existing comprehensive and validated evaluation framework, the Human, Organisation and Technology Fit (HOT-Fit) framework. Human fit: 79.55% (n=35) of Clinicians and 33.33% (n=2) of MTs reported an overall satisfaction with the DDS. Organisation fit: The document analysis revealed that the DDS selected aligned best with current organizational IT strategies and was an easy fit with existing practices. Technology fit: An overall satisfaction of 53.49% (n=23) from the Clinicians and 16.67% (n=1) from the MTs was reported on the DDS. Out of 22 issues lodged regarding the system, 77.27% (n=17) issues met the Service Level Agreement (SLA).

CONCLUSIONS:

The overall findings of the study suggest that, the DDS was a good fit within the organisation in terms of Human fit and Organisation fit. In terms of Technology fit there existed some technical issues on the end-user level due to the system being new to the end users. To overcome this and facilitate the smooth functioning of the DDS, effective communication with the vendor and other relevant stakeholders was recommended so that end users i.e. the Clinicians and MTs understand the system, its functionality and their role in providing timely and high-quality information for clinical care.

KEYWORDS

post-implementation, evaluation, hot-fit framework, health information system, digital dictation system

INTRODUCTION

The implementation of health information systems (HIS) can have a profound impact on healthcare organisations and the delivery of health services. Using information and communications technology (ICT) in healthcare offers numerous opportunities to support healthcare professionals in their daily routine; for example accessibility to up-to-date patient information at the right time, to lower the risk of clinical errors, diagnostic and medication errors, and to augment the quality and efficiency of patient care. [1] The implementation of HIS also has associated threats. Contemporary HIS are expensive and failures in implementation may cause an adverse impact on the health care organisations and provision of health services. [1,2] Consequently, systematic appraisal of these systems is imperative, in order to understand their true potential and safeguard the benefits that can be delivered over the long term.[3]

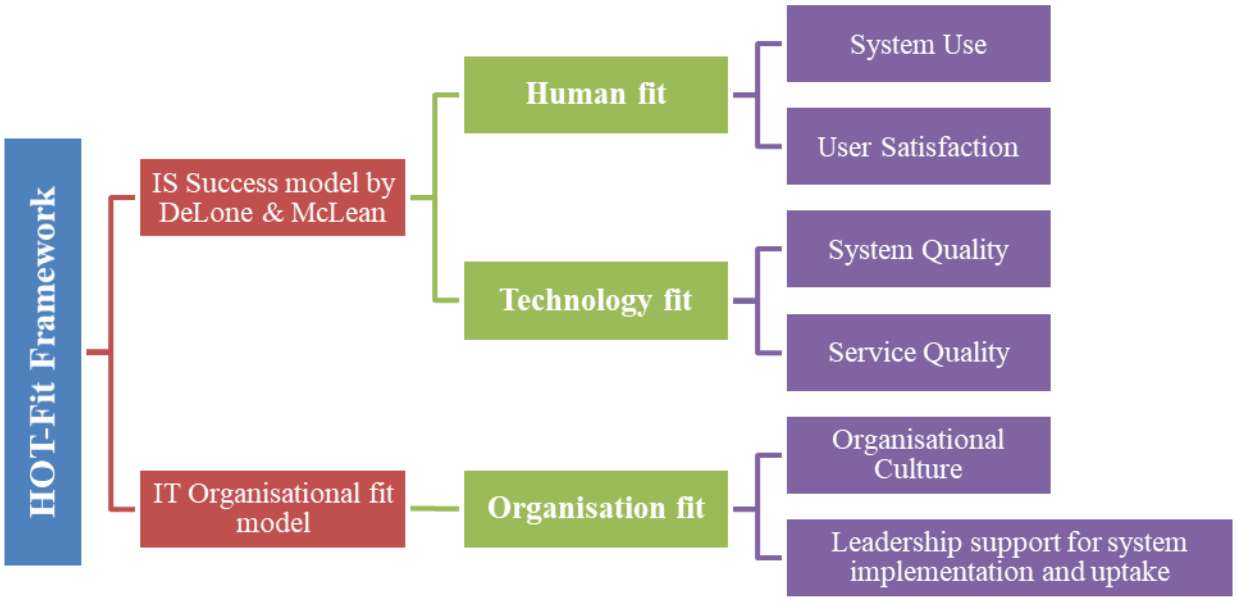
Findings from various studies on post-implementation evaluation of HIS have highlighted that a poor fit between human, organisation and technology factors were the main causes for adoption failures of HIS in hospitals.[4-7] Studies on implementation of HIS have been discussed extensively in the literature, but studies on post-implementation evaluation of HIS in terms of human, organization and technology fit are scarce.[8,9] To fill this gap, Yosuf and colleagues made a critical assessment of the existing literature on frameworks and models of evaluation of information systems. The result of their analysis was a comprehensive framework that can be used to evaluate HIS. This framework, around HIS 'fit' they termed: Human, Organisation and Technology Fit (HOT-Fit).[6]

The HOT-Fit framework is a combination of DeLone and McLean's Information System (IS) Success model and the IT Organisation fit model (also known as the MIT 90s model). The IS success model complements the IT Organisation fit model in fulfilling the limitations of the existing HIS evaluation frameworks. [2,6] This framework emphasises the significance of each of the Human, Organisation and Technology fit dimensions. It is flexible in its application and can be used to evaluate any HIS based on the type, context and relevance of the study.[6,10] According to Yosuf, "the framework can and should be applied in a flexible way, taking into account different contexts and purposes, stakeholders' point of views, phases in system development lifecycle and evaluation methods''. [6] The concept of 'fit' in the HOT-Fit framework is often interpreted as intuitive, intricate and impressionistic. [6] It is associated with the competence and capability of the HIS, the human and the organisation to align with each other and can be analysed and measured through various factors such as System use, User satisfaction, System quality, Service quality, Organisational culture and Leadership support.[7]

The digital dictation system (DDS) that has been implemented in the study organisation accelerates the patient journey by speeding up the turnaround time (TAT) of outpatient letters, discharge summaries and operations reports. The improved turnaround ensures that vital clinical information is made available more quickly to inform ongoing management and care. The DDS plays a pivotal role in providing efficient, economic, and effective administrative services by maximising the use of technology and eliminating delays, waste and rework. The system can transfer dictation files electronically anywhere throughout the system. Automatic Speech Recognition (ASR) technology improves the accuracy of the system and decreases the requirement of re-dictation thus saving time.[11] The implementation was based on generating these benefits and a post-implementation evaluation was undertaken to inform improvements in the use of the system, identify issues with the service performance, and determine the effectiveness of the implementation.

The HOT-Fit framework used to evaluate the DDS was modified according to the context of this study, shown in Figure 1.

FIGURE 1 - HOT-FIT FRAMEWORK MODIFIED ACCORDING TO THE RELEVANCE AND CONTEXT OF THE STUDY.



The Human fit dimension assists in gaining an understanding of how the system is used and user satisfaction. The Organisation fit dimension helps to explain how the DDS has been accepted and evaluates the support provided by the leaders to deploy the system in the organisation. While Technology fit dimension contributes in understanding and gauging the support provided by the teams responsible for looking after the system and ensuring service quality.

METHODS

SETTING

The study organisation operates several distinctively different services geographically distributed across Australia. The focus of this study was Hospital 1 (H1) and Hospital 2 (H2) (same health service) in Victoria, Australia. H1 is one of Victoria's largest maternity hospitals with 229 beds and is a major teaching public hospital, a leader in women's health management, and a regional centre for neonatology, maternity, and general and specialty gynecology services. H2 is a general community public hospital with 200 beds located in one of the fastest growing municipalities of Victoria H2 provides various services, including general medical and surgery, palliative care, day chemotherapy, renal dialysis, allied and mental health services, rehabilitation programs, and a 24-hour emergency department, all in modern and comfortable surroundings.

DESIGN

A mixed method study design was considered for this research. Formal approval from the Human Research Ethics Committee (HREC) was granted as a 'low-risk' research study as the study was considered a routine HIS and health services evaluation and a quality improvement activity. No individual patient records were screened.

DATA COLLECTION

The study was conducted over a period of four months (second quarter of a calendar year). A survey instrument was designed using the dimensions of the HOT- Fit framework relevant to this study. It comprised of two branching arms to capture the responses of the Clinicians and Medical Transcriptionists (MTs) separately. The survey included questions related to the computer literacy skills and baseline comfort with technology. The questions were based on a validated and a reliable source called Use of Technology (UOT) component of the Technology and Internet Assessment (TIA) scales [12] Additional data collected include:

- system usage statistics;
- user support emails;
- project implementation documents;
- Service Level Agreement (SLA) with the vendor.

System usage statistics in H1 and H2 provided an estimate of the total amount of utilisation by the work type and an indication as to whether the system has fulfilled its purpose.

Project implementation documents were analysed to understand the culture of the organisation and assess the Organisational fit in terms of change management and leadership support during the DDS implementation and uptake. While user support emails and the SLA were reviewed to determine the Technology fit by evaluating the system and service quality of the DDS. An overview of the study design is shown in Table 1 below.

TABLE 1 - HUMAN, ORGANISATION AND TECHNOLOGY FIT (HOT-FIT) FRAMEWORK.

AN OVERVIEW OF THE STUDY DESIGN BASED ON THE HOT-FIT FRAMEWORK

DIMENSION	SUB-DIMENSION	TARGET	DATA TYPE
HUMAN FIT	User satisfaction	Clinicians and MTs	User survey
	System use	Database of the DDS.	System usage statistics and volume of total dictated jobs
ORGANISATION FIT	Leadership support for the system implementation and uptake	Clinicians and Organisation.	User survey and DDS project implementation documents.
	Organisational culture	Clinicians and Organisation	User survey and DDS project implementation documents.
TECHNOLOGY FIT	System quality	Clinicians and MTs	User survey, user support emails raised to the support groups.
	Service quality	Clinicians and MTs	User survey, user support emails raised to the support groups and the Service Level Agreement (SLA).

INCLUSION AND EXCLUSION CRITERIA (PARTICIPANTS AND RECRUITMENT PROCEDURE)

The participants of the study were the Clinicians and MTs who were the key users of the DDS across the two hospital campuses of the health service (H1 and H2). Those identified as active system users during a period of four months of the study were included and invited to complete the survey. Participants active or inactive beyond the four months' timeframe were excluded from the study to maintain the integrity of the research in terms of limited time and meticulous nature of the research.

From the total 100% (n=880) of the active and inactive user pool of the Clinicians, the sample was sized down to 25% (n=220) with respect to the inclusion and exclusion criteria as active system users. While the total number of MTs' active user pool providing in-house transcription service was (n=10) and were all included.

The final sample size of the study, i.e. 100% (n=230) comprised of 95.65% (n=220) Clinicians and 4.35% (n=10) MTs. The survey was kept open for three weeks with a weekly reminder to the participants.

DATA ANALYSIS

Statistical analysis was performed for quantitative survey data, system usage statistics and volume of dictated jobs. To determine the correlation between different variables of the survey data, the Chi-square test was adopted. Cross tables were used to represent the relationship of the row variables with the column variables. Any missing observation was dropped from the analysis. The hypothesis that the variables depend on each other was tested against the null hypothesis of no dependence at a 5% significance level. In other words, if the variables are related, the probability of observing a relationship (p-value) would be lower than 5% (0.05). If the variables are not related, the test would return a p-value larger than 0.05 and, therefore, a result that a statistically significant relationship does not exist can be concluded. However, it must be noted that the small sample size can be a threat to the validity of the test.

A qualitative thematic analysis was carried out for open text answers, project implementation documents, user support emails and, the SLA by collating the data and identifying themes around the key issues identified by the stakeholders. Analysis of data was conducted using both, SurveyMonkey™ and Microsoft Excel™ software.

RESULTS

To address the aims of the study key demographic information and a synthesis of the findings of the dimensions of HOT fit framework are presented. Fifty-one users of the system responded to the survey, just over 22.17% of the initial sample. A sample of 44 healthcare professionals and 6 medical transcriptionists (n=50) were analysed separately for their responses to certain relevant variables.

DEMOGRAPHICS

Of the 51 respondents, 62.75% (n=32) were female and 37.25% (n=19) were male with a mean (± s.d.) age range of 35 to 44 (± 11.7) years.

According to the data, 52.94% (n=27) held a graduate degree (masters or PhD) and 33.33% (n=17) held a bachelors' degree. Not all respondents indicated their employment status however 37.25% (n=19) of the participants were permanent, part time employees; 25.49% (n=13) were consultants, on-appointments for example sessional VMO; and 25.49% (n=13) had permanent, full-time employment status.

1. Human Fit

a.) System Use:

The DDS usage statistics to determine the volume of system usage by each specialty work type is explained in Table 2.

b.) User Satisfaction:

The survey results for Clinicians' user satisfaction showed 79.55% (n=35) overall satisfaction with the DDS. Detailed results on Clinician user satisfaction are represented in Section 3 (i.e. Table 3.1, Table 3.2 and Table 3.3). This contrasted with MTs' user satisfaction that showed only 33.33% (n=2) overall satisfaction with the DDS. Results are represented in Table 4.

TABLE 2 - SYSTEM USE - ACCORDING TO WORK TYPE AND TURNAROUND TIME (TAT)

TAT = time taken to dictate the patient information by the clinician till e-signing (finalizing) the letter/report in hours; **n**= total number of hours over the period of 4 months; **Usage**= The extent (based on 'n') of the DDS used by the Clinicians to dictate the patient information and to serve the purpose to fulfill the requirements of clinical standards of documentation of their specialty work type; **Work Type**= specialty services provided by H1 and H2.

USAGE	PURPOSE	WORK TYPE AND TAT *(N)*
HIGH USAGE ***(601 AND ABOVE)***	Outpatient Letters	Surgical Clinic *(n=705)* Urogynecology *(n=692)* Paediatric Clinic *(n=670)*
MEDIUM USAGE ***(301-600)***	Outpatient Letters	Endo-surgery B *(n=450)* Gynaecology *(n=426)* Orthopaedic *(n=383)* Perinatal Medicine *(n=343)*
LOW USAGE ***(0-300)***	Outpatient Letters Operations Report Medico-Legal reports	Perinatal Mental Health *(n=1)* Gerontics *(n=2)* Oncology *(n=1)* Gerontics *(n=2)*

TABLE 3.1 - USER SATISFACTION: RESULTS OF CLINICIANS' SATISFACTION OF THE DDS UNDER HUMAN FIT OF THE HOT-FIT FRAMEWORK

FREQUENCY OF CURRENT DDS USAGE?	OVERALL SATISFACTION WITH THE CURRENT DDS			TOTAL
	Neutral	Satisfied	Dissatisfied	
DAILY	0	2	1	3
MANY TIMES IN A DAY	0	3	0	3
ONCE IN A WEEK	1	21	4	26
TOTAL	1	26	5	32
Pearson chi2 (4) = 1.5116; Pr= 0.825				

Table 3.1 shows that no significant relationship exists between the frequency of use of the DDS and the associated level of satisfaction (p-value: 0.825).

TABLE 3.2 - SYSTEM QUALITY: RESULTS OF SYSTEM QUALITY OF THE DDS UNDER THE TECHNOLOGY FIT.

EASE OF LEARNING WITH THE DDS	USEFULNESS OF THE AVAILABLE FUNCTIONS AND FEATURES OF THE DDS				TOTAL
	Neutral	Somewhat useless	Somewhat useful	Useful	
EASY	3	1	9	17	**30**
SOMEWHAT EASY	1	0	3	5	**9**
NEUTRAL	1	0	0	2	**3**
TOTAL	**5**	**1**	**12**	**24**	**42**
Pearson chi2 (4) = 2.6561; Pr= 0.851					

As illustrated in Table 3.2, there is no significant association between the ease of use and the usefulness of the system (p-value: 0.851).

TABLE 3.3 - ORGANISATIONAL SUPPORT IN THE SYSTEM IMPLEMENTATION AND UPTAKE: RESULTS OF THE LEADERSHIP SUPPORT DURING THE DDS IMPLEMENTATION AND COMES UNDER THE ORGANISATION FIT DIMENSION OF HOT-FIT FRAMEWORK.

EFFECTIVENESS OF THE COMMUNICATION BETWEEN THE LEADERSHIP AND THE PROJECT TEAM	SATISFACTION WITH THE LEADERSHIP SUPPORT FOR THE PROJECT				TOTAL
	Neutral	Prefer not to say	Satisfied	Somewhat satisfied	
DO NOT REMEMBER	2	0	2	0	4
EFFECTIVE	0	0	12	0	12
NEUTRAL	5	0	0	2	7
SOMEWHAT EFFECTIVE	1	1	3	10	15

SOMEWHAT INEFFECTIVE	3	0	0	0	3
TOTAL	11	1	17	12	41
Pearson chi2 (4) = 47.7328; Pr= 0.000					

By contrast, Table 3.3 presents interesting results (p-value: 0.00). There is enough evidence at 5% significance level to conclude that effective communication by the leaders is significantly related to the corresponding satisfaction level observed for the variable leadership support.

TABLE 4 - SURVEY RESULTS OF THE MEDICAL TRANSCRIPTIONISTS' (MTS) RESPONSES TO THE QUESTIONS ASKED ABOUT THE DDS.

User satisfaction: results represent the MTs satisfaction of the DDS under the Human fit dimension of HOT-Fit framework.

SATISFACTION WITH THE INITIAL TRAINING RECEIVED PRIOR TO USING THE DDS	**OVERALL SATISFACTION WITH THE CURRENT DDS WHEN COMPARED TO THE PREVIOUS**			**TOTAL**
	Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	
DISSATISFIED	0	1	0	1
SOMEWHAT DISSATISFIED	1	1	0	2
SOMEWHAT SATISFIED	1	0	2	3
TOTAL	2	2	2	6
Pearson chi2 (4) = 5.0000; Pr= 0.287				

As the sample size for MTs is small, the statistical power of the study is low. None of the tests yield any statistically significant results as seen in Table 4 with p-values greater than 0.05.

2. Organisational Fit

a.) Leadership support:

Clinicians were asked questions regarding the support from organisational leadership for the DDS implementation and results are mentioned in Section 3, Table 3.3 above. Analysis of the project implementation documents demonstrated that, of the 27 individuals invited to attend demonstrations of the DDS prior to selection, 74% (n=20) attendance was recorded. This included Senior leaders, MTs, Health Information Managers (HIMs) and some Clinicians. Invitations were broadcast widely with 15% (n=4) failing to reply and 11% (n=3) responded but did not attend the demonstrations.

Analysis of the project implementation documents also demonstrated early commitment to the system from senior leaders with 74% (n=20) of those invited, attending the initial vendor demonstrations of the DDS.

The role of leadership support in implementation success was reflected in respondent's comments that included 'resourcing the project adequately and ensuring passion and support from leadership to make the project outcomes useful', 'leading by example' and 'motivation of the clinical group when change is urgently needed or desired'.

b.) Organisational Culture:

Examination of project implementation documents revealed that there was an atmosphere of motivation and encouragement for the system implementation backed up by good communication with the stakeholders. The selection process for the new system involved end users in the whole process and the feedback received from the stakeholders who had attended the demonstrations. The document analysis also revealed that the DDS selected aligned best with current organisational IT strategies, was an easy fit with existing practices and enabled growth with Automatic Speech Recognition (ASR) technology and

integration with the Electronic Medical Records (EMR) system.

3. Technology Fit

a.) System Quality

Survey results for the DDS system quality revealed that, a majority of 78.57% (n=33) of the Clinicians use the DDS via computer followed by 16.67% (n=7) via mobile phone while only 4.76% (n=2) use the DDS via tablet. The detailed survey results are represented in Table 3, Section 2 above.

A qualitative thematic analysis of the emails raised to the support groups by the Clinicians and the MTs identified that the most common issues faced by users included printing errors, difficulties in resetting passwords, setting up new users and web-browser incompatibilities. Table 5 shows all reasons.

b.) Service Quality:

To determine service quality requests for support were analysed. Twenty-two issues were lodged by the end users over the period of four months via email to the support group. Based on the SLA's levels of impact on business, the issues were categorised as having a critical, significant, minimal or normal impact. Out of 22 issues lodged, 77.27% (n=17) issues met the SLA. Detailed results are shown in Table 6 below.

Results from the survey for Service Quality for the Clinicians and the MTs are shown in Table 7 below. There is no statistically significant association between a preferred mode of communication by the user groups and overall satisfaction of the quality of support they received (p-value: 0.163).

TABLE 5 - SYSTEM QUALITY: MOST COMMON ISSUES FACED BY THE END USERS WITH THE DDS.

Issue type: The most common and frequently occurring issues faced by the DDS end users.

ISSUE TYPE	ISSUE DESCRIPTION
PRINTING ERRORS	• - Dispatch documents not printing or printing blank; • - Double layering of jobs; • - Server password timeouts causing printing to cease completely.
LOGIN ERRORS	• - Forgotten login details by the users and unable to reset the password on their own.
NOTIFICATION ALERT ERRORS	• - Unnecessary email notifications for already completed jobs; • - Late notifications for pending jobs for e-sign.
OTHER MALFUNCTIONS	• - Change in work pool priority issues; • - Pending e-sign summary reports not available; • - Functions not available in selected web browsers.
NEW FUNCTIONALITY REQUESTS	• - Setting up issues for new user, priority work pool and work type code.

TABLE 6 - SERVICE QUALITY; ISSUES LODGED VIA E-MAIL TO THE SUPPORT GROUPS CATEGORISED ACCORDING TO THE SLA.

BUSINESS IMPACT	NUMBER OF ISSUES	PERFORMANCE STANDARD (DAYS ±S.D.)	ACTUAL TIME TAKEN IN DAYS (MEAN ±S.D.)	NUMBER OF ISSUES MET THE SLA
LEVEL 1: CRITICAL	13.63%*(n=3)*	0.3 ±0	1.11 ±1.63	2
LEVEL 2: SIGNIFICANT	9.1%*(n=2)*	3 ±0	18.5 ±18.38	0
LEVEL 3: MINIMAL	50%*(n=11)*	30 ±0	22.30 ±28.03	9
LEVEL 4: NORMAL	27.27%*(n=6)*	90 ±0	8.20 ±14.84	6

TABLE 7 - SURVEY RESULTS FOR THE QUESTIONS ASKED TO THE CLINICIANS AND MEDICAL TRANSCRIPTIONISTS (MTS) ABOUT THE SERVICE QUALITY PROVIDED BY THE SUPPORT GROUPS OF THE DDS

OVERALL SATISFACTION WITH THE QUALITY OF SUPPORT PROVIDED BY THE SUPPORT GROUPS	PREFERRED MODE OF COMMUNICATION WHEN CONTACTING THE SUPPORT GROUPS				TOTAL
	Face to face	Email	Mobile	Telephone	
NEUTRAL	0	3	2	6	11
SATISFIED	2	11	1	10	24
SOMEWHAT DISSATISFIED	1	1	0	0	2
SOMEWHAT SATISFIED	0	6	1	2	9
TOTAL	3	21	4	18	46
Pearson chi2 (4) = 13.0016; Pr=0.163					

DISCUSSION

This study confirmed the importance of post implementation evaluation of HIS and the significance of studying the human, organisational and technological dimensions when appraising such implementations. This study was necessary to understand and ensure the promised benefits from the DDS implementation are achieved.

HUMAN FIT

In terms of User satisfaction, the majority of the Clinicians used the system once in a week and reported an overall satisfaction with the DDS. Satisfaction with the mobile application of the DDS to sign off the letters electronically from anywhere, anytime and improvised system efficiency when compared with the previous access to DDS was noted in the Clinicians' responses. On the other hand, MTs used the DDS daily and demonstrated a mixed response in terms of overall user satisfaction. Frustration with the user interface was the most common reported cause of MTs discontent thus leaving opportunities for further improvement of the DDS in terms of user experience and user satisfaction.

System use was measured by system usage statistics extracted from the database and suggested that, the DDS is most commonly used for producing outpatient letters (high and medium usage) while least usage can be seen in operations and medico-legal reports. This suggest that the

DDS is fulfilling its purpose for which it was implemented leaving an opportunity for growth and further adoption in the organisation depending on the needs and demand.

ORGANISATION FIT

The implementation of the DDS was strongly supported by the senior leaders, middle managers and hospital staff as evidenced by the analysis conducted in this study. The active participation of the senior leaders, involvement of the staff and end users of the DDS with an atmosphere of motivation and encouragement led the successful implementation and smooth transitioning of the DDS in the organisation.

Although the implementation was smooth, end users experienced some setbacks when moving to the production environment. Good communication was reported with the internal stakeholders and the vendor but exchanges with Clinicians was challenging due to their clinical demands. Clinicians were encouraged to attend the training sessions to gain a better understanding of the features of the new system and how it could assist them. Additionally, the elimination of the backlog caused due to the previous DDS with the help of outsourcing services supplied by the new vendor proved to be helpful in gaining Clinicians' confidence in the new transcription service implemented.

TECHNOLOGY FIT

An overall satisfaction for the system quality by most Clinicians was reported; however, at the same time 'teething problems' were identified. The most common problems related to printing errors, malfunctions of the existing system, login and notification errors hampered the daily operational activities. Although Clinicians faced issues, MTs and the internal support groups were the most impacted. MTs, the vital end-users of the system expressed a desire for further functionality around advanced word processing features. This feedback provides a further opportunity for improvement in the DDS functionality. Other comments noted that the 'dictation system was a necessary and good system that was readily taken up' and 'the need and a simple solution made it a successful project'.

In terms of Service quality, most Clinicians reported satisfaction with the service quality but at the same time a mixed response from the MTs was identified. Results based on SLA categories suggest that, although most of the issues were solved by the vendor, the time taken to solve critical issues i.e. Level 1 & 2 issues according to the SLA was relatively high. While for standard conventional issues i.e. Level 3 & 4 according to the SLA, they were solved within the promised timeframes. This leaves a window of opportunity to improve the quality of services and technical support provided by the vendor.

CONCLUSION

This study utilised an existing comprehensive and validated evaluation framework, the HOT-Fit framework. A clear advantage of using the HOT-Fit framework was its flexibility and ability to be adapted, based on the context and relevance of the study along with stakeholders' expectations. Evidence and reporting of post implementation reviews and the lessons learnt has been scant. This study has demonstrated that a framework, such as the HOT-Fit can successfully be used to measure organisational fit post-implementation of health information systems and to identify where further refinements maybe desirable to ensure that the full benefits of the system are realised.

The overall findings of the study suggest that, the DDS was a good fit within the organisation with some issues on the end-user level. To overcome this and facilitate the smooth functioning of the DDS, communication is imperative so that end users i.e. the Clinicians and MTs understand the system, its functionality and their role in providing timely and high-quality information for clinical care. Although the purpose of this study was not to demonstrate the impact of the DDS on the organisation's business, for example, cost reduction and speeding up the process, this system can have a positive impact for clinicians, the Health Information Services department and the patients. Timely availability of documents in a digitised and shareable format will help in speeding up the patient journey by accelerating the TAT for discharge summaries, outpatient letters and other types of clinical communications. Timely communication to inform the ongoing management and care for patients is critical for continuity of care.

Despite the potential of the DDS in providing efficient administrative services to users and ultimately patients, this evaluation showed that the DDS and implementation process faced various challenges. If the ascertained shortcomings are addressed appropriately, there is a potential of the DDS to function more efficiently in the

organisation resulting an overall satisfaction and a good user experience with the DDS at the end user level.

COMPETING INTEREST AND RESEARCH FUNDING:

This research did not receive any funding, nor any competing interests have been declared.

REFERENCES:

1. Ammenwerth E, Gräber S, Herrmann G, Bürkle T, König J. Evaluation of health information systems—problems and challenges. Int j med informatics. 2003;71(2):125-35.

2. Yusof MM. A case study evaluation of a Critical Care Information System adoption using the socio-technical and fit approach. Int j med informatics. 2015;84(7):486-99.

3. Erlirianto LM, Ali AHN, Herdiyanti A. The Implementation of the Human, Organization, and Technology–Fit (HOT–Fit) Framework to Evaluate the Electronic Medical Record (EMR) System in a Hospital. Procedia Computer Science. 2015;72:580-7.

4. Marques A, Oliveira T, Dias SS, Martins MFO. Medical records system adoption in European hospitals. e J Info Sys Eval. 2011;14(1):89-99.

5. Kilsdonk E, Peute LW, Knijnenburg SL, Jaspers MW, editors. Factors known to influence acceptance of clinical decision support systems. MIE; 2011.

6. Yusof MM, Kuljis J, Papazafeiropoulou A, Stergioulas LK. An evaluation framework for Health Information Systems: human, organization and technology-fit factors (HOT-fit). Int j med informatics. 2008;77(6):386-98.

7. Mohamadali NAK, Garibaldi JM, editors. Understanding and Addressing the 'Fit'between User, Technology and Organization in Evaluating user Acceptance of Healthcare Technology. HEALTHINF; 2012.

8. Yusof MM, editor HOT-fit Evaluation Framework:: Validation Using Case Studies and Qualitative Systematic Review in Health Information Systems Evaluation Adoption. European Conference on Information Management and Evaluation; 2011: Academic Conferences International Limited.

9. Yusof MM, Papazafeiropoulou A, Paul RJ, Stergioulas LK. Investigating evaluation frameworks for health information systems. Int j med informatics. 2008;77(6):377-85.

10. Saparova D, Belden J, Williams J, Richardson B, Schuster K. Evaluating a federated medical search engine: Tailoring the methodology and reporting the evaluation outcomes. Appl Clin Inf. 2014;5:731-45.

11. Viitanen J, Nieminen M, editors. Usability evaluation of digital dictation procedure-an interaction analysis approach. Symposium of the Austrian HCI and Usability Engineering Group; 2011: Springer.

12. Publishing HH. Technology and Internet Assessment (TIA) scales; Use of Technology (UOT) scale. 2017 [Available from: http://www.hhpublishing.com/_assessments/TIA/scales.html#UOT

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

ASSESSMENT OF STAFF PERFORMANCE IN CSSD UNIT BY 360 DEGREE EVALUATION METHOD

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ABSTRACT

BACKGROUND:

360-degree evaluation is a method that an employee is evaluated by the others and given feedback to him/her. Considering the proper implementation of the sterilization process is important in the prevention of nosocomial infections and has a direct impact on the quality of performance of the surgical team in the operating room. This study was conducted to the Evaluation of CSSD Unit Personnel Performance in Sterilization Process using the 360 Degree technique.

METHODS:

This cross-sectional study was conducted in the educational hospitals of Gillan Province in IRAN, between 2018 and 2019. Assessment of staff performance in CSSD Unit was done by 360 Degree evaluation method in five different stages. The evaluators included the infection control nurses, Supervisors of the sterilization unit, the researcher and the staff of these units as self-assessors. Finally, the collected data were analyzed using SPSS version 20.

RESULTS:

The evaluation mean scores were as following: the researcher, 75.97 ± 18.9; infection control nurse, 87.62 ± 7.2; unit supervisor, 87.61 ± 7.8 and staff self-assessment, 88.01 ± 8.1; at different stages of the sterilization process. From all assessors view, the highest and lowest scores were related to the cleaning and Health dimensions.

CONCLUSION:

According to assessor's agreement in scoring of different stages of the sterilization process, the 360-degree evaluation method is a valuable tool in assessment of the staff performance in important tasks. By applying this method, it can be ethically prevented evaluators' individual judgments.

KEYWORDS

Sterilization process, 360-degree evaluation, staff performance

INTRODUCTION

According to the results of more studies in the operating room area, high levels of contamination on operating room equipment has been documented in numerous cases. For this reason, it is recommended that all health staff must be obeyed to standard guidelines for the prevention and control of nosocomial infections to reduce these infections effectively. [1] The heart of hospitals in infection control is the sterilization unit that Known as CSSD, CSR, SPD. This unit is responsible for providing sterile equipment and supply for operating rooms, inpatient and outpatients departments, transplant units, and other departments of hospital.[2] Sterilization refers to any process that removes and kills all forms of life , especially spores from surgical tools, and other critical equipment. [3] Tools, surgical instruments, fabrics, and gowns, and endoscopes are sterilized in this unit by sterilizer equipment like autoclave. [2] If medical supplies and instruments are not properly collected, disinfected and sterilized, they can spread the infection to patients and staff. it leads to the unfortunate consequences of surgery in the operating room. [4] Therefore, it is valuable to monitor the staff performance that they are responsible for the process of cleaning and decontamination, disinfection, packaging, sterilization, storage and transportation of instruments. There is no doubt that the staff qualification of the sterilization unit play an important role in completing the puzzle of the surgical team's performance quality. [5] The personnel of these units are responsible to guarantee non-transmission of infection through sterilized medical supplies and tools in their unit with proper procedures of sterilization and disinfection. Since it is not possible and cost-beneficial for doing environmental microbial cultures in a continuous and repeated manner to ensure that a sterile product leaves the sterilization cycle. Therefore, it is recommended to monitor the sterilization process cycle with an accreditation program. [6-8] Accreditation is a strategy to improve the quality of hospital services. It consists of three components: accreditation standard, accreditation method, and accreditation evaluators. Therefore, failures of each component of the accreditation system can lead to failure to achieve the accreditation goals. [9] According to Mossadegh rad studies, the deficiencies of accreditation system are including the lack of procedural unity among the evaluators, the same weight of accreditation indexes, Lack of transparency of the measures, the high number of standards, and the low skill of the assessors. [10] The American Medical Education Accreditation Council has said the 360-degree technique is the best method to evaluate interpersonal and communication skills. In this method, by surveying all the employee at the workplace, the qualification of the staff performance evaluate by different evaluators. [11] Joshi (2004), Saraf (2019), and Hadinejad (2016) have identified the 360-degree tool as a high-reliability tool for assessment of the competencies and communication skills in their studies. [12-14] Baradaran et al. used a 360-degree tool to assess midwifery students' performance. They stated that 360-degree method is a valuable method in clinical performance assessment and it can be consider in educational planning. [11] The 360-degree evaluation has numerous benefits including gathering members together, increasing self-awareness, clarifying behaviors, identifying opportunities for promotion and accountability and responsibility. [15] However, its limitations, including cost, insufficient skills of evaluators, failure to properly perform due to poor leadership of the evaluator's team has led most of the studies related to evaluate the performance of the hospital staff was done by interview or direct observation only by one person at one time. Therefore, given the benefits of this assessment method and the critical role of staff performance in sterilization unit for preventing nosocomial infections, which has unfortunately been overlooked in many centers by managers, this study was conducted to Assessment of staff performance in CSSD Unit by 360 Degree evaluation method.

MATERIAL AND METHOD

This cross-sectional study was conducted in the educational hospitals of Gillan Province in IRAN, between 2018 and 2019. The study samples were 30 personnel working in the sterilization unit of these hospitals who were included in the census. The evaluators included the infection control nurses (n=6), the supervisor of the sterilization unit (n=6), the researcher (n=1). and the staff of these units as self-assessors. The data collection tool was a researcher-made questionnaire. This questionnaire was made based on the questionnaire of the Infection Control Center of Infectious Diseases, and the Workplace Health Center Questionnaire of the Ministry of Health and Medical Education, and validation guidelines. Validity of questionnaire was confirmed by the content validity method and expert opinion in the specialized panel (nine expert), before we began collecting data. According to the Lavshe method, CVR was calculated to be 0.84 that is acceptable according to expert panel members. The questionnaire had 63 items in five stages of Health

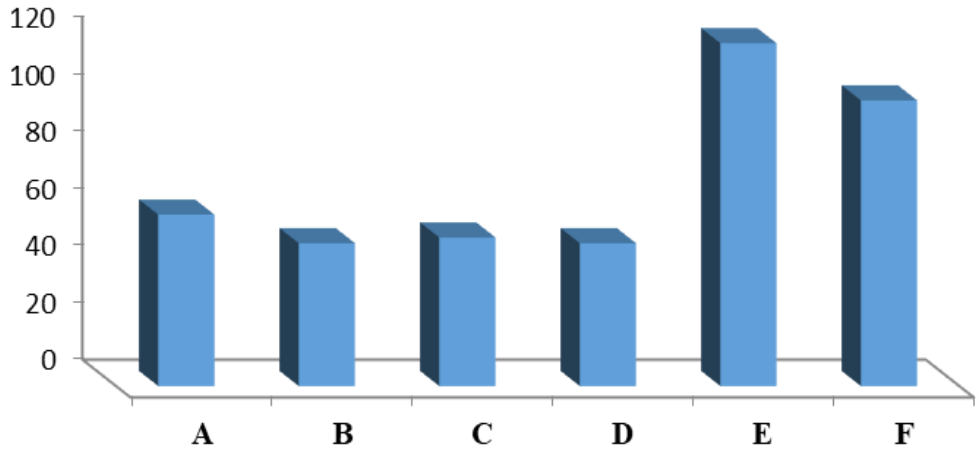
observance, Cleaning, packaging, Monitoring, and storage. It designed to evaluate the employees, scored on a scale 0-1. On this scale, any action was graded on scale of frequency: One= Yes and Zero= No. Questionnaire included "No observation" statement. In order to keep the score, these No observation statement were not considered and were reduced from the total number in the final evaluation by the agreement of the expert panel and the professor of statistics. To obtain the 360-degree evaluation data, we distributed questionnaires to the employee and evaluators. Completed questionnaire (n=120) were collected and coded data were entered into an Excel. The total score given by each evaluator was calculated for each employee. Then, a personnel statue was reported in the form of poor performance, acceptable performance, and good performance. Data were analyzed with SPSS statistical software (SPSS, Inc, version 20) by Kruskal -wallis H, Mann-whitney U test and Pearson correlation coefficient. Normalization of data was evaluated by kolmogorov - smirnov Z test.

RESULT

A total of 30 employee participated in this study. Fifty percent of employee (n=15) was female and fifty percent (n=15) was men. The mean year of employee was 43.63 years (minimum 25 years, maximum 57 years). Less than fifty percent (n=14) were nurses or surgical technologist, and the others were experimental technician or assistance without academic education. Over half of employees (n=19) had less than ten years of sterilization experience and about sixty percent (n=18) had passed in-service training. In total, hospitals sterilizer equipment's were; ethylene oxide set (n=3), plasma set (n=1), Dry heat oven (n=3) and autoclave set (n=13). All centers were equipped with an autoclave, but there was no other equipment in some hospitals.

According to the standard, all hospitals should be assigned 1m2 spaces per bed to sterilization units. In this study only two hospitals matched with standard (E and F). The space of the sterilization units compared to the number of hospital beds is shown in Figure1.

FIGURE1. THE SPACE OF THE STERILIZATION UNIT (M2) COMPARED TO THE NUMBER OF HOSPITAL BEDS IN DIFFERENT HOSPITALS



The highest mean score were as follows; infection control nurses (96.87±5.4), unit supervisor (96.07±4.9), self-assessment (97.14±6.5) in cleaning dimension and researcher (88.21±19.6) in storage dimension.

The lowest mean score were as follows; infection control nurse (67.4 ± 19.9), unit supervisor (74.81 ± 13.6), researcher (64.81 ± 29.3), and self-assessment (73.24 ± 15.3) in health dimension. Kruskal -wallis H Test showed a significant difference between storage and packaging dimensions and total mean scores in different groups (Table1). The highest and lowest score is given by the self-assessment and researcher, respectively. Unit supervisors and infection control nurses has been assigned the same score.

TABLE 1. STAFF PERFORMANCE ASSESSMENT SCORE IN CSSD UNIT

VIEWPOINT/DIMENSION		RESEARCHER	INFECTION CONTROL NURSE	UNIT SUPERVISOR	SELF-ASSESSMENT	P
HEALTH OBSERVANCE	Mean	64.81	67.4	74.81	73.24	0.43
	SD	29.3	19.9	13.6	15.3	
	Max	100	100	100	100	
	Min	11.11	22.22	55.56	33.33	
CLEANING	Mean	88.21	96.78	96.07	97.14	0.14
	SD	19.6	5.4	4.9	6.5	
	Max	100	100	100	100	
	Min	10	80	90	70	
PACKAGING	Mean	71.26	91.94	90.15	90.88	0.002
	SD	23.8	9.4	10.2	11.01	
	Max	38.46	100	100	100	
	Min	100	50	50	50	
MONITORING	Mean	81.96	87.69	88.07	90.62	0.089
	SD	22.2	21.2	21.1	21.9	
	Max	100	100	100	100	
	Min	0	0	0	0	
STORAGE	Mean	80.83	95.83	91.66	90.83	0.004
	SD	19.3	9.4	15.1	16.7	
	Max	100	100	100	100	
	Min	50	75	50	50	
TOTAL	Mean	75.97	87.62	87.61	88.01	0.029
	SD	18.9	7.2	7.8	8.1	
	Max	100	100	100	100	
	Min	22.56	69.57	66.03	71.79	

Mann-Whitney test (Two-group analysis) showed no significant difference in total scores and different dimensions score from the point of view of the self-assessment, the unit supervisors and the infection control nurses (P>0.05). But there was a significant difference in a total score (P=0.013), storage dimension (P=0.025), cycle control dimension (P=0.017), packaging dimension (P=0.002), and cleaning dimension (P=0.043) between self–assessment and researcher as an external assessment. The total score were as follows: the researcher (75.97 ± 18.9), infection control nurse (87.62 ± 7.2), unit supervisor (87.61 ± 7.8) and self-assessment (88.01 ± 8.1).

The total mean score obtained from evaluators was 84.80±10.54, that it was appropriate and acceptable level. The result of this study showed that male score is higher than female from a researcher's view. However, female have a higher score by the view of infection control nurse, unit staff, and unit supervisor. Mann-whitney U test did not show any significant difference between male and female from four viewpoints.

TABLE 2. STAFF PERFORMANCE ASSESSMENT SCORE IN CSSD UNIT IN DIFFERENT SEX (MEAN ± SD)

SEX/DIMENSION	RESEARCHER	INFECTION CONTROL NURSE	UNIT SUPERVISOR	SELF-ASSESSMENT
MALE	74.55±18.07	88.78±5.9	87.85±6.8	88.77±7.2
FEMALE	77.4±20.03	86.46±8.3	87.37±9.02	87.25±9.11
P	0.66	0.72	0.95	0.8

The Pearson correlation coefficient showed a negative relationship between age and evaluation score from the view of a unit supervisor (P= 0.045), infection control nurse (P= 0.001), and researcher (P=0.024). That is, older people had lower scores. But this relationship was not observed from the Self-assessment view (P=0.065). Spearman correlation coefficient showed no significant difference between work experience in sterilization unit and evaluation score obtained from different perspectives (P>0.05).

DISCUSSION

According to the findings, the highest and lowest mean score were in the Cleaning and Health observance dimensions, respectively. The self-assessment recorded higher scores for cleaning dimension, while the researcher has a different opinion as an external evaluator. In their opinion, self-assessment was given the lowest score in this dimension. All the evaluators gave the lowest score to the health observance dimension. Comparing the total scores in the evaluation, the highest score was obtained by the self-assessment, and the lowest score was obtained by the researcher. The scores of other internal evaluators (unit supervisors and infection control nurses) were the same as each other. self-assessment high scores than external evaluators are routine in the most evaluation, and this may be due to a variety of reasons, including poor knowledge and lack of appropriate training of evaluators, and concern for managers,' judgments about poor performance. Similarly to the present study, Yamani et al. evaluated the performance of emergency medicine by using a 360-degree evaluation method, the results showed that the highest score was given by the interns in self-assessment. [16]

Also, according to the results of the present study, the total score mean of different evaluators was 84.80 ± 10.54 which is acceptable based agreement of panel experts. Majidi et al. [17] found similar results in their study, they stated that observing the principles of infection control were acceptable by operating room staff, and sterilization process and their entry and exit controls. However, they only evaluated the process by one evaluator and observational method. No correlation was found between evaluation score and the work experience of the staff in the sterilization unit by the evaluators, which is consistent with the results of the Teymuri and Rostami studies. [18, 19] The findings of this study revealed no statistically significant difference between male and female evaluation scores regarding to different evaluators. The results of this study are different from the study of Yazdankhah. [20] They showed that male give more scores than female in the surgical department. Of course, the number of male was lower than female in the Yazdankhah study, whereas, the numbers of male and female are equal in the present study. This study reported the staffs' age was negatively correlated with performance evaluation scores (from the view of a unit supervisor, infection control nurse and researcher). It means older people has a poor performance, although the staffs don't believe it. The relationship between decreases of performance qualities and age increasing, and has been expressed in the study of Monika et al. [21] Malgorzata also emphasized that the quality of employee performance decreases in the passing of time and the managers need to consider this to maintain and enhance the efficiency of their organization. [22] According to this study, judgments and assessment of evaluators were the same in most dimensions. It is valuable in evaluating employee performance, especially in the units that it is restricted and there is a possibility of error by one person. As Chandler [23] stated in his study, a 360-degree assessment contains several points of view and can provide useful information for single assessment and needs to be repeated annually. According to the study of Kanaslan, [24] a 360-degree method have a more positive result than another traditional method. In addition, a 360-degree method is a useful method for development and also an effective tool

for performance evaluation. Although the practical implementation of the 360-degree method is not easy, if it is used correctly, its positive results are very satisfaying. [11] Therefore, the use of the 360-degree evaluation that introduced as a tool for evaluating performance in recent years, is a comprehensive solution to the problems of single decision and judgments.

CONCLUSION

The evaluating and deciding on staff performance is an ethical issue. Therefore, it is recommended to use alternative methods such as 360-degree evaluation to prevent individual judgments or decisions based on self-assessment. The results suggest that 360-degree evaluations that incorporate multiple perspectives on staff performance might provide additional useful information. In this way, choosing the right evaluators, and training them will undoubtedly lead to valuable results. The information obtained from 360-degree evaluations can guide feedback to staffs and may lead to improved staff performance.

ETHICAL CONSIDERATIONS

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or fal-sification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

LIMITATION OF RESEARCH

In situation that there was not physical structure or standard equipment in CSSD units, assessors were unable to evaluate staff performance. So they removed the related items from the questionnaires in these situations.

ACKNOWLEDGEMENTS

This article is part of a Master thesis with the permission of IR.IUMS.REC.1397-1024 Ethics from Iran University of Medical Sciences. The researchers are grateful for the spiritual and scientific support of the Iran University of Medical Sciences. Also, the authors would like to thank all the Evaluators, and staff of the teaching hospitals of Gillan province for their cooperation, that without whom we could not complete this project.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

Reference:

1. Jalalvand F, Teymouri B, Sohrabi N, Fakhri M, Shahsavari s, Jafari s. Microbial contamination of operating rooms equipment in selected hospitals in kermanshah. iranian journal of infectious disease and tropical medicine 2013;17(59):49-52.
2. Sangthong K, Soparat P, Moongtui W, Danchaivijitr S. Development of quality indicators for sterilization practices of the central sterile supply department. Journal of the Medical Association of Thailand = Chotmaihet thangphaet. 2005;10:128-32.
3. Forrester JA, Powell BL, Forrester JD, Fast C, Weiser TG. Surgical instrument reprocessing in resource-constrained countries: A scoping review of existing methods, policies, and barriers. Surgical infections. 2018;19(6):593-602.
4. Khamir chi R, Rezaei z, Yaghobifar MA, Rakhshani M. Quality control of sterlization in the hospitals of sabzevar in 2014 sabzevar university medical science (asrar). 2017;24(4):233-237.
5. Lawrence SA, McIntyre CA, Pulvirenti A, Seier K, Chou Y, Gonen M ea. Perioperative Bundle to Reduce Surgical Site Infection after Pancreaticoduodenectomy: A Prospective Cohort Study. Journal of the American College of Surgeons. 2019;228(4):595-601.
6. Basu D, Bag SC, Das A, Razario JD. The importance of paper records and their preservation period in a Central Sterile Supply Department: An experience from a oncology center in eastern India. J Infect Public Health. 2017;10(5):685-7.
7. Spry C. Understanding current steam sterilization recommendations and guidelines. Aorn J. 2008;88(4):537-50.
8. Weber DJ, Rutala WA. Assessing the risk of disease transmission to patients when there is a failure to follow recommended disinfection and sterilization guidelines. Am J Infect Control. 2013;41(5 Suppl):031.
9. YOUSEFINEZHADI T, MOSADEGHRAD AM, ARAB M, RAMEZANI M, SARI Aa. An Analysis of Hospital Accreditation Policy in Iran. Iranian Journal of public health. 2017;46(10).
10. Mosadeghrad AM, Akbari-Sari A, Yousefinezhadi T. Evaluation of hospital accreditation in Tehran: brief report. Tehran University Medical Journal. 2018;76(5):354-9.

11. Baradaran HR, Kheirkhah M, Keikhosravi F. Using a 360 Degree Feedback System for Performance Appraisal of Midwifery Students in Shahid Akbar Abadi Maternity Hospital. Journal of Development Strategies in Medical Education. 2016;3(1):73-80.
12. Sarraf N, Askkarkhah A, Sadati L, Hanani S. Investigating the Relationship between Compliance with Standards of Packaging of Surgical Instruments Packages and Demographic Characteristics and Length of Training of Personnel in Sterilization Centers of Guilan Educational and Medical Hospitals. 20th Annual Research Congress of Medical Students of Iran, Kermanshah. 2019; https://www.civilica.com/Paper-AMSMED20-AMSMED20_143.html.
13. Joshi R, Ling F, Jaeger J. Assessment of a 360-Degree Instrument to Evaluate Residents' Competency in Interpersonal and Communication Skills Academic Medicine. MAY 2004; 79(5):458-63.
14. Hadi Nejad F, Ahmad M, Ghasemi M. Designing a Student Performance Evaluation Model with 360 Degree Feedback Approach (Case Study: Student Performance Evaluation of Imam Ali Officer University). 2017;16(63):1-33.
15. Ece Kuzulu Kanaslan Cemal Iyem Is 360 Degree Feedback Appraisal an Effective Way of Performance Evaluation? International Journal of Academic Research in Business and Social Sciences. 2016;6(5): ISSN: 2222-6990. DOI: 10.007/IJARBSS/v6-i5/2124.
16. Yamani N, Moosavi SA, Alizadeh M, Khorvash F, Ghiasi M. A 360-degree performance evaluation of emergency medicine ward in Alzahra Hospital. J Pak Med Assoc. 2012;62(3 Suppl 2):S13-7.
17. S.A. M, Mehrabein F, R. T. Accomplish principles of infetion control by operation room s staff in the rasht hospitals Journal og gilan university of medical science. 2008;16(64):89-96.
18. Teymouri B, P. G, A. Vr, V. D, H. R, J. R. Surgery team members performance with regard to observingg infection control principle education center operation rooms of kums. Journal of kermanshah university of medical science (Behbood). 2004;8(1):51-61.
19. Rostaminejad A, Mobaraki A, Zahmatkeshan N. Performance of the Operating Room Personnel in following of the standards of Infection Control in the Educational Hospitals of Yasuj University of Medical Sciences in 2009. Armaghane danesh. 2011;16(1):90-9.
20. Yazdankhah A, Tayefeh Norooz M, Ahmadi H, Aminian A, Khorgami Z, Khashayar P, et al. Using 360-degree multi-source feedback to evaluate professionalism in surgery departments: An Iranian perspective. Med J Islam Repub Iran 2015;29(284):1-7.
21. Monika E. von Bonsdorff, Le Zhou MW, Sinikka Vanhala, Mikaela B. von Bonsdorff. Taina RantanenEmployee Age and Company Performance: An Integrated Model of Aging and Human Resource Management Practices. Journal of Management. 2018;44(8).
22. Malgorzata Rembiasz. Impact of employee age on the safe performance of production tasks. . MATEC Web of Conferences 94 0700, DOI: 101051/matecconf/20179407009CoSME'16. 2017.
23. Chandler N, Henderson G, Park B, Byerley J , Brown WD, Steiner M J Use of a 360-Degree Evaluation in the Outpatient Setting: The Usefulness of Nurse, Faculty, Patient/Family, and Resident Self-Evaluation. Journal of Graduate Medical Education. 2010;2(3):430-4. DOI: 10.4300/JGME-D-10-00013.1.
24. Kanaslan Ece Kuzulu, Iyem Cemal. Is 360 Degree Feedback Appraisal an Effective Way of Performance Evaluation? International Journal of Academic Research in Business and Social Sciences. 2016;6(5):172- 82: DOI: 10.6007/IJARBSS/v6-i5/2124 URL: http://dx.doi.org/10.6007/IJARBSS/v6-i5/2124.

ACHSM Asia-Pacific Journal of Health Management

REVIEW ARTICLE

CARE BURDEN IN INFORMAL CAREGIVERS OF HEMODIALYSIS PATIENTS: A SYSTEMATIC REVIEW AND META-ANALYSIS STUDY

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ABSTRACT

BACKGROUND:

Correct assessment of care burden in informal care providers to hemodialysis patients such as family members has a crucial role in promoting their physical and mental health. This study was conducted to determine care burden in informal caregivers of hemodialysis patients.

METHODS:

This systematic review and meta-analysis was performed based on the systematic review meta-analysis and reporting system. To access relevant studies in the field, databases of Medline via PubMed, SCOPUS, ProQuest, SID, Embase and Magiran databases were searched with keywords assigned and using AND & OR operators until 1st August 2019. After eliminating duplicates and primary and secondary screening of the articles, finally 8 studies entered the meta-analysis process. Cochran test and I2 index were used to determine the heterogeneity of the studies. Random Effects Model was used to estimate pooled mean. Egger's tests were used to evaluate diffusion bias.

RESULTS:

The level of care burden in informal caregivers of hemodialysis patients varied from 1.7 to 54.01 in 8 studies with a sample size of 651. Most caregivers were spouses of patients and their mean age ranged from 32 to 51 years. Based on the cumulative graph, the mean total effect for care burden index in caregivers of hemodialysis patients in the studies was estimated to be 8.918 (14.3-454.381) with 95% confidence interval based on random effect model.

CONCLUSION:

Considering the care burden in caregivers of hemodialysis patients and its adverse effects, it is recommended to pay more attention to the health of caregivers as hidden patients and appropriate strategies should be considered to improve their quality of life.

KEYWORDS: Care burden, Caregiver, Hemodialysis, Review

INTRODUCTION

End-Stage Renal Disease (ESRD) is one of the ten most common causes of public health and one of the ten leading causes of death in the world and people with it, need alternative treatments including hemodialysis to survive. [1, 2] Although hemodialysis is one of the main treatment modalities in patients with advanced renal failure, it can be a source of stress for these patients. [3] The need for dialysis and treatment process in these patients leads to significant changes in individual functioning, lifestyle and job loss. [4] Decreased energy levels, repeated need for dialysis and associated health problems affect the ability to perform daily activities and disrupt the usual life of the patient and their caregivers. In fact, due to the chronic nature and long-term treatment of chronic progressive kidney failure, changes in family function are unavoidable. [5] Various needs in these patients, including medication administration, accompanying the patient for dialysis, the need for lifelong dialysis, daily check-up, maintenance of personal hygiene and appropriate renal diet, as well as frequent hospitalization affect the social, economic and psychological status of caregivers, so that, unfortunately most informal caregivers of hemodialysis patients feel a heavy burden because they have to play an important role in supporting these patients. [6-7]

In one study, the relationship of caregivers to hemodialysis patients was reported as 43.9 percent of their children, 28.10 percent of spouses, 8.8 percent of parents and 19.29 percent others. [8] Care burden includes psychological, physical, and social distress that occurs in caregivers who are most involved in caring of chronic patients. According to the results of some studies, the level of care burden in informal caregivers of hemodialysis patients was mild to moderate. [9] and moderate [10], and in some studies moderate to severe [11] has been reported.

Care burden can have many unpleasant complications in caregivers such as impaired social activity and communication, illness, family relationships disorder, burnout, anxiety, and depression. Therefore, timely identification of these pressures in caregivers has a crucial role in promoting their physical and mental health. [12-13] To date, several descriptive studies have been conducted to assess care burden in caregivers of patients undergoing hemodialysis, with reported levels of caregiver burden varying from mild to severe. [5, 13-16] Given the importance of timely and accurate assessment of caregiver burden and prevention of its adverse effects, it seems that a more comprehensive and accurate study to assess caregiver burden in informal caregivers of patients undergoing hemodialysis is useful. Therefore, the present study was conducted in a systematic review and meta-analysis with the aim to determine the care burden in the caregivers of hemodialysis patients.

METHODS

This systematic review and meta-analysis were conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) in 2019. All steps of the study, such as search, selection of studies, qualitative evaluation and extraction of information were also conducted by two researchers independently. In case of disagreement on the results, the third researcher was used.

SEARCH STRATEGY

To access relevant studies in the field, databases such as Medline via PubMed, Scopus, ProQuest, SID, Embase and Magiran were searched with keywords included "Burden", "Informal Caregiver ", "Hemodialysis" and "Renal Dialysis" by using the Boolean operators (AND & OR) from 1970 to 1th August, 2019 (Figure1).

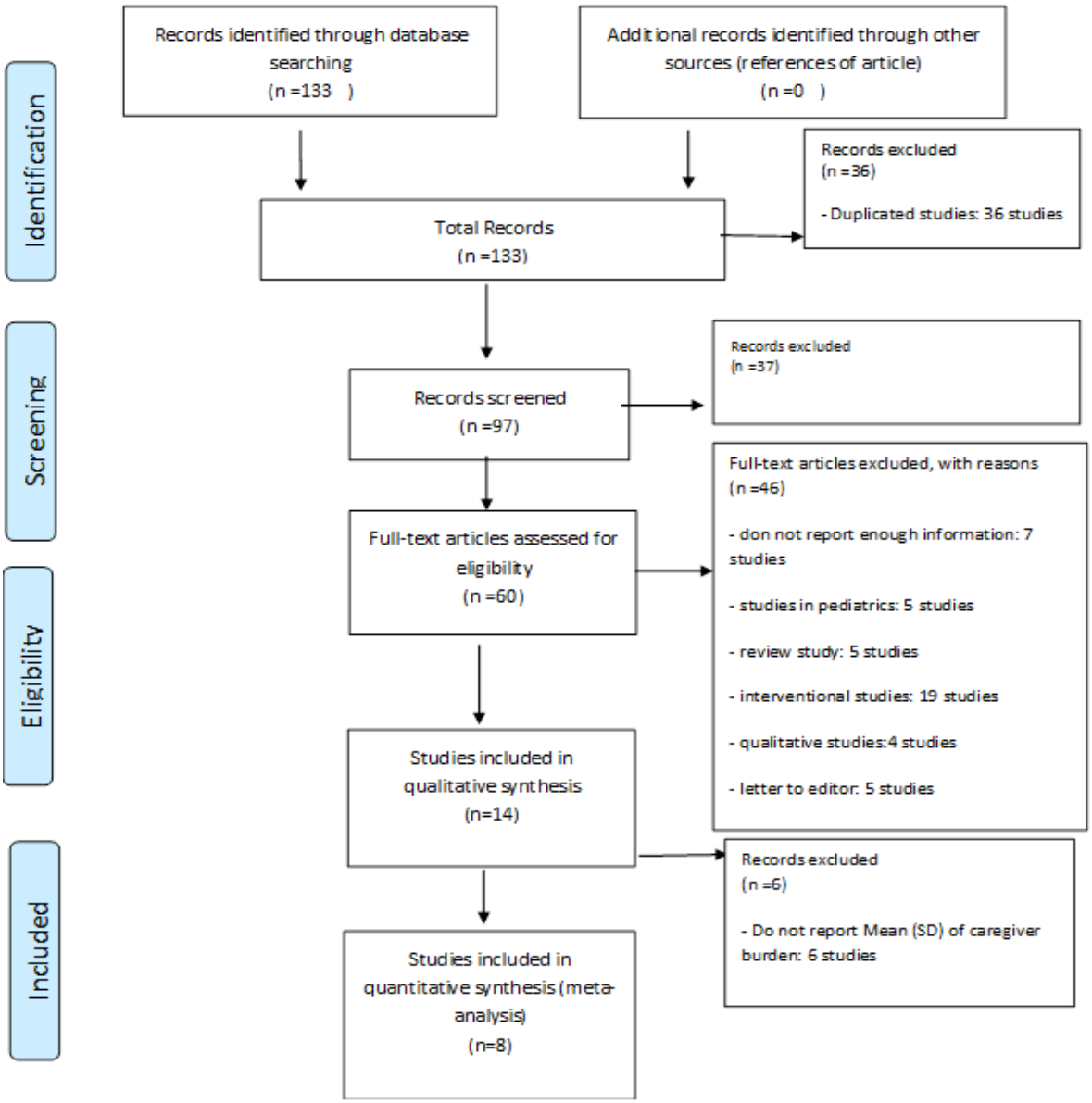
INCLUSION & EXCLUSION CRITERIA

Inclusion criteria of studies included: a) keywords listed in the title or abstract of the articles; b) relevant observational studies published in Persian or English. This was after reviewing studies which had conditions such as: a) lack of access to Persian or English full-text, b) incomplete reporting of results and inadequate data.

ARTICLE SELECTION

In a preliminary search by two researchers, 133 possible articles related to care burden in caregivers of patients undergoing hemodialysis were found. After eliminating duplicates articles, screening by titles, abstract and full text of articles and evaluating the quality of articles, 14 eligible studies entered the systematic review process. Also, 6 studies were excluded due to lack of mean care burden (care burden percentage report) and finally 8 studies were entered in the meta-analysis. Other details are listed in Figure 1.

FIGURE 1. FLOWCHART OF ARTICLES, SELECTION USING PRISMA



QUALITY ASSESSMENT

Quality of articles and risk of bias were assessed by using Newcastle-Ottawa scale. Two authors individually computed each article in terms of risk of bias by using the criteria examined that assessed the study design, sampling method, response rate, sample representativeness, objective and reliable determinants of outcome, calculation of study power, and appropriate statistical analysis.

DATA EXTRACTION

Data from all final articles entered into the study process were extracted by a checklist. The checklist included first author, year of publication, type of study, number and mean age of participants, place of study, caregivers' relationship to patients and level of care burden.

ANALYSIS

Since the main index in this study was Mean and Standard Deviation, its variance was calculated through normal distribution and 95% confidence interval. Cochran test and I2 index were used to determine the heterogeneity of the studies. Random Effects Model was used to estimate pooled mean. For estimating pooled estimator (coefficient mean), considering the significance (P <0.001) of index I2, Random Effects Model was used. Egger's tests were used to evaluate publication bias. According to the test (P <0.001), the estimation of homogeneity of the means was rejected,

so the random effects model was used to analyze the results.

RESULTS

According to the present review, all studies were performed in Pakistan [9], Iran [5, 8, 11, 12, 21], Turkey [22-24], Saudi Arabia [25, 7], Japan [26], Oman [27] and Canada. [28] The majority of caregivers were spouses of patients and their mean age ranged from 32 to 51 years. Other details were listed in Table1.

TABLE 1. CHARACTERISTICS OF INCLUDED STUDIES (N=14)

AUTHOR (YEAR)	STUDY TYPE	COUNTRY	INSTRUMENT	SAMPLE SIZE, N (%)	AGE, MEAN (SD)	CAREGIVERS' RELATIONSHIP TO PATIENTS*	DURATION OF CAREGIVING (YEARS), MEAN (SD)	CAREGIVER BURDEN, N (%)
Usman Shah (2018)	Cross sectional study	Pakistan	Zarit Burden Interview (ZBI)	Male:97(59) Female: 67(41)	45(11.23)	Spouses	2.2(0.96)	Little or no burden: 33(20) Mild to Moderate:107(65 %) Moderate to Severe:21(13%) Severe :3(2) Mean(SD)=31.39(12.31)
Jafari (2018)	Descriptive -Analytical Study	Iran	ÂNovak & Guest to measure objective and subjective care Burden	Male: 153(62.2) Female:165 (67.2)	42(15)	-	-	Low: 49(19.9) Moderate: 105(42.7) High: 80(32.5) Very high: 12(4.9)
Mashayek hi (2015)	Descriptive study	Iran	Caregiver burden questionnaire	Male: 29 (56.1) Female: 22 (43.1)	42.11(14.78)	-	-	Low: 14(27.5) Moderate: 25(49) High: 12(23.5) Mean (SD)= 54.01(13.41)
Talebi (2016)	cross-sectional study	Iran	Zarit caregiver burden	Male: 42(27.3) Female: 112(72.7)	43.7	Children	5.20(5.09)	Mild or no burden: 1(0.6) Moderate: 38(24.7) Severe: 115(74.7)
Abbasi (2011)	descriptive and analytical study	Iran	Caregiver Burden scale-24	Male: 71(59.5) Female: 49(41.5)	42.22(13.09)	-	-	Mild: 2(1.7) Moderate: 29(24.2) Severe: 89(74.2)
Khiyali (2018)	Descriptive -analytic cross-sectional study	Iran	Zarit caregiver burden	Male: 14(24.57) Female: 43(75.43)	48.03(14.23)	Children	-	Mild or no burden: 2(3.50) Moderate: 17(29.80) Severe: 38(66.70) Mean (SD) = 49.24(16.19)
Avsar (2015)	Cross sectional study	Turkey	Zarit Burden Interview (ZBI)	68 HD	Male: 46.0(6.7)		4.0(3.7)	Low: 31(45.6) Moderate: 27(39.7)

					Female: 43.1(11.4)			Severe: 10(14.7)
Cantekin (2016)	Descriptive study	Turkey	Zarit Caregiver Burden Scale (ZCBS)	Female :31 Male :24	Female: 38.24(12.3) Male: 4.4(3.08)	-	4.4(3.08)	Low: 7(13) Intermediate: 23(53.7) High: 18(33.5)
Alnazly (2015)		Amman and Irbid	Oberst Caregiving Burden Scale (OCBS) difficulty subscale	Male: 65 (47) Female: 74 (53)	32.23 (11.78)	Son/daughter	4.93 (4.47)	Mean = 2.79
Alwakeel (2016)	Cross sectional study	Saudi Arabia	Caregiver Burden Interview (CBI)	Male: 23 (46) Female: 27 (54)	46.6(14.0)	Spouse/children	-	Mean (SD) = 43.3(21.7)
Washio (2012)	Cross sectional study	Japan	Zarit careburden interview (J-ZBI)	108	heavily burdened caregivers: 64.0(12.0) lightly burdened caregivers: 61.7(12.5)	Spouses	-	Mean (SD) = 29.3(19.2)
Bayoumi (2014)	cross-sectional	Saudi Arabia	Caregiver Burden Interview (CBI)	Male: 15 (30) Female: 35 (70)	40.6 (11.0)	Spouse/children	-	Mean (SD) = 43.3(21.7)
Rioux (2012)	Cross-sectional	Canada	Caregiver Burden scale	Male: 11(34) Female: 21(66)	51(11)	Spouse	-	Mean (SD) = 1.7(0.5)
Kilic (2017)	Descriptive	Turkey	Zarit Caregiver Burden Scale	210	-	Spouse	-	Istanbul: 31.62(11.38) Northern Cyprus: 45.77(13.19)

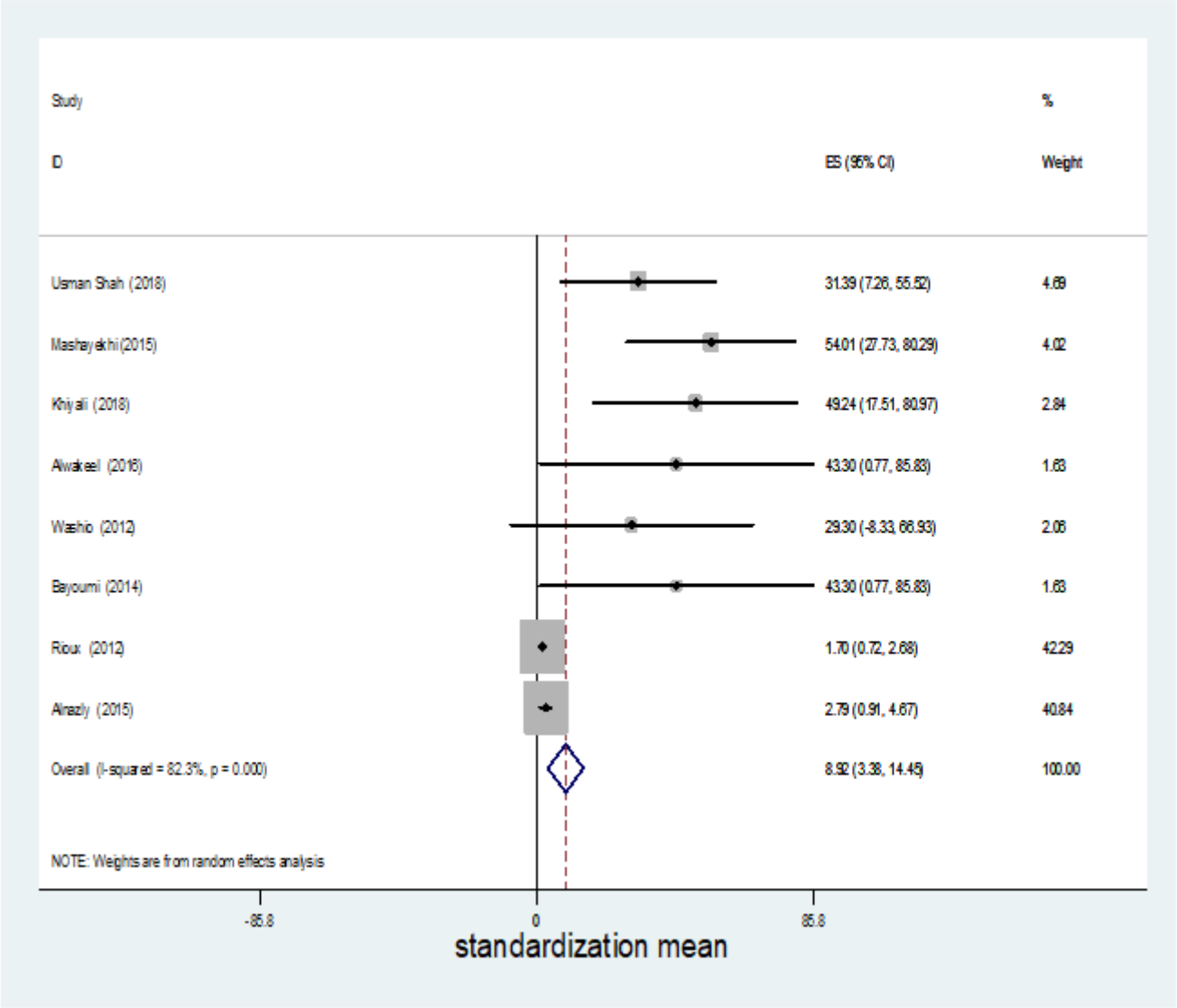
Note: * Most percent

META-ANALYSIS

The level of care burden in informal caregivers of hemodialysis patients varied from 1.7 to 54.01 in 8 studies with a sample size of 651. also, the lowest care burden was in the study of Rioux et. al in 2012 with an average of 1.7 and the highest care burden was related to the study of Mashayekhi et al. [11] In 2015 with an average of 54.01.

Based on the cumulative graph, the mean total effect for care burden index in caregivers of hemodialysis patients was estimated to be 8.918 (95% confidence interval) and based on randomized effects model was 8.918 (14.445-3.381). The heterogeneity index for this study was obtained $I^2 = 82/3\%$. Other details were listed in Figure 2.

FIGURE 2. CARE BURDEN OF CAREGIVERS OF PATIENTS UNDERGOING HEMODIALYSIS



DISCUSSION

The results of the reviewed studies in this study showed that the level of care burden in most caregivers of patients undergoing hemodialysis was mild to severe, and the levels were varied in different studies. The results showed that informal caregivers of hemodialysis patients in the studies which were conducted in Iran [5, 8, 11, 14, 21] experience more care burden than the caregivers in other studies in other countries (Japan [26], Oman [27], Pakistan [9], Canada [28], Turkey [22-24], Saudi Arabia [25,7]), In fact most of the caregivers in the studies in Iran reported moderate to severe care burden, while in the other countries, the rate was mild to moderate. One of the possible causes of the differences in the results of these studies may be the location of study and cultural diversity among the subjects studied. Also, the role of causes such as the number of hemodialysis sessions per week, insufficient attention given to caregivers by the members of healthcare team to meet their needs, patients' psychological and financial problems and their effects on caregivers' burden is undeniable, which unfortunately, these possible causes have not been reported in these studies to be evaluated in detail. Difference of the tools used to measure care burden in studies may also be one of the possible causes of differences in the results of these studies.

The results of the meta-analysis also showed that caregivers in the study of Mashayekhi et al. [11] had the highest level of care burden, and caregivers in the study of Rioux et al. [28] suffered the least amount of care burden. The differences in the results of studies can be mentioned that the study of Rioux et al [28] was performed on caregivers of hemodialysis patients at home that it causes hemodialysis to be less interfering with the daily activities of caregivers and caregivers experience less care burden, While in the study by Mashayekhi et al. [11], patients were treated at the hospital with hemodialysis, which makes caregivers more likely to take care of patients and spend more time for caring and transportation of the patient and ultimately, they suffer from more care burden. Other possible reasons for the different results of these two studies [28, 11] were the place of study and cultural diversity. The study by Mashayekhi et al. was conducted in Iran [15] and another study performed in Canada. [28] Perhaps the different support resources provided by health care systems for patients and their caregivers and different needs of caregivers have affected the caregiver burden of hemodialysis patients' caregivers. Also, differences in gender for most of the people in two studies could be one of the possible reasons for the differences in the results. Most of the participants in the study of Mashayekhi et al. [15] was male, while the majority of population in the other study were female.

LIMITATION

One of the limitations of this study is that the search was conducted in only two languages (Persian and English) that could prevent access to all studies in this field, Therefore, more studies are suggested to be conducted on this important issue in future.

CONCLUSION

Considering care burden in caregivers of hemodialysis patients and its adverse effects, it is recommended that more attention be paid to the health of caregivers as hidden patients when planning by health care team members, and appropriate strategies such as educating the patients and their caregivers, counseling, support resources and referral services to be considered to reduce care burden of caregivers and improve their quality of life. It is also recommended that studies be conducted to investigate effective strategies to reduce the care burden in hemodialysis patients so that by improving the health of caregivers, the quality of care provided to patients and their quality of life can improve. Also, performing systematic review and meta-analysis studies to properly and timely assess the level of care burden and prevent the unpleasant effects of it can be useful in other diseases such as Alzheimer.

ACKNOWLEDGMENT

Student Research Committee of the Mazandaran University of Medical Sciences is sincerely appreciated for their financial support of this project. This study was approved by the Student Research Committee of Mazandaran University of Medical Sciences (Grant No: 5969 approved in 2019).

DISCLOSURE

The authors report no conflicts of interest in this work.

References

1. Sarmento LR, Fernandes PFCBC, Pontes MX, Correia DBS, Chaves VCB, Carvalho CFA, et al. Prevalence of clinically validated primary causes of end-stage renal disease (ESRD) in a State Capital in Northeastern Brazil. J Bras Nefro. 2018;40(2):130-5.
2. Beizaee Y, Rejeh N, Heravi Karimooi M, Tadrisi SD, Bahrami T. The Effect of Mind-guided Imagery on Decreasing Fatigue in Patients Undergoing Hemodialysis. Iranian Journal of Nursing Research. 2017;12(1):16-22.
3. Pron K, Abdollah Zadeh F, Ghouja Zadeh M, Ahangar R. The stressors and adaptability methods for patients undergoing peritoneal dialysis. Nursing & Midwifery Journal of Tabriz. 2010;5(17):34-41.
4. Rezai R, Hejazi SH, Shahnazarian J, Mahmoudi M, Andi SS. Comparing the body-image in patients undergoing hemodialysis with kidney transplant. Payesh Journal. 2009;8(3):279-87.
5. Talebi M, Mokhtari Lakeh N, Rezasoltani P, Kazemnejad leili E, Shamsizadeh M. Caregiver Burden in Caregivers of Renal Patients under Hemodialysis. Journal of holistic Nursing and Midwifery Sciences. 2016;25(80):59-68.
6. Murtagh FE, Addington-Hall J, Higginson I. The prevalence of symptoms in end-stage renal disease: a systematic review. Advances in chronic kidney disease. 2007;14(1):82-99.
7. Bayoumi M. Subjective Burden on Family Carers of Hemodialysis Patients. Open Journal of Nephrology. 2014; 4:79-85.

8. Khiyali Z, Khani M, Dehghan A. Survey of Caregiver Burden and its related factors in Caregiver of hemodialysis patients referring to Shahid Mohammadi Hospital in Bandar Abbas, 2016. nursing of the vulnerable journal. 2018;5(16):35-46.
9. Usman Shah HB, Atif I, Rashid F, Babar MW, Arshad F, Qamar W, et al. Assessment of caregiver burden of patients receiving dialysis treatment in Rawalpindi. J Pak Med Assoc. 2017;67(10):1498-501.
10. Cagan O, Unsal A, Celik N, Yilmaz AT, Culha I, Eren H. Care Burden of Caregivers of Hemodialysis Patients and Related Factors. International Journal of Caring Sciences. 2018;11(1):279-85.
11. Mashayekhi F, Pilevarzadeh M, Rafati F. The Assessment of Caregiver Burden in Caregivers of Hemodialysis Patients. Mater Sociomed. 2015;27(5): 333-6.
12. Ali Abbasi, Hamid Asayesh, Hossein Rahmani, Alireza Shariati, Seyed Abedin Hosseini, Ghanbar Rouhi, et al. The Burden on Cargivers from Hemodialysis Patients and Related Factors. JGUMS. 2011;8(1):26-33.
13. Rahim A, Alhani F, Ahmadi F, Gholyaf M, Akhoond M. Effects of a continuous care model on perceived quality of life of spouses of haemodialysis patients. Eastern Mediterr Health J. 2009;15(4):944-50.
14. Farzi S, Farzi S, Moladoost A, Ehsani M SM, Moieni M. Caring Burden and Quality of Life of Family Caregivers in Patients Undergoing Hemodialysis: A Descriptive-Analytic Study. IJCBNM. 2019;7(2):88-96.
15. Mashayekhi F , Pilevarzadeh M, Rafati F. The Assessment of Caregiver Burden in Caregivers of Hemodialysis Patients. Mater Sociomed. 2015;27(5):333-6.
16. Sajadi SA, Ebadi A, Moradian S. Quality of Life among Family Caregivers of Patients on Hemodialysis and its Relevant Factors: A Systematic Review. IJCBNM. 2017;5(3):206-18.
17. Panic N, Leoncini E, De Belvis G, Ricciardi W, Boccia S. Evaluation of the endorsement of the preferred reporting items for systematic reviews and meta-analysis (PRISMA) statement on the quality of published systematic review and meta-analyses. PloS one. 2013;8(12): e83138.
18. Ioannidis J. Interpretation of tests of heterogeneity and bias in meta-analysis. J Eval Clin Pract 2008; 14:951-7.
19. Higgins JP, Thompson SG, Deeks JJ, Altman D. Measuring inconsistency in meta-analyses. BMJ Open. 2003;327(7414):557–60.
20. Sterne JA, Harbord R. Funnel plots in meta-analysis. Stata J 2004; 4:127–41.
21. Jafari H, Ebrahimi A, Aghaei A, Khatony A. The relationship between care burden and quality of life in caregivers of hemodialysis patients. BMC nephrology. 2018;19(1):321.
22. Avşar U, Avşar U, Cansever Z, Yucel A, Cankaya E, Certez H, et al., editors. Caregiver burden, anxiety, depression, and sleep quality differences in caregivers of hemodialysis patients compared with renal transplant patients. Transplantation proceedings; 2015: Elsevier.
23. Cantekin I, Kavurmacı M, Tan M. An analysis of caregiver burden of patients with hemodialysis and peritoneal dialysis. Hemodialysis International. 2016;20(1):94-7.
24. Kilic HF, Kaptanogullari H. A Bicommunal Study: Burden of Caregivers of Hemodialysis Patients. International Journal of Caring Sciences. 2017;10(3):1382-90.
25. Al Wakeel JS, Bayoumi MM. Caregiver burden among peritoneal dialysis and hemodialysis family in Saudi Arabia. Kuwait Med J. 2016;48(3):197-201.
26. Washio M, Yoshida H, Ura N, Ohnishi H, Togashi N, Sakauchi F, et al. Burden among family caregivers of patients on chronic hemodialysis in northern Japan. International Medical Journal. 2012;19(3):221-3.
27. Alnazly EK. Burden and coping strategies among J ordanian caregivers of patients undergoing hemodialysis. Hemodialysis International. 2016;20(1):84-93.
28. Rioux JP, Narayanan R, Chan CT. Caregiver burden among nocturnal home hemodialysis patients. Hemodialysis International. 2012;16(2):214-9.

ACHSM Asia-Pacific Journal of Health Management

RESEARCH ARTICLE

HEALTH AS AN ECONOMIC DIMENSION: A COMPARATIVE STUDY OF INDIA AND CHINA

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ABSTRACT

In modern era, human resource is a crucial factor for economic development. Several studies reveal that rapid economic growth of developed countries has been linked with investment in human capital. Efficient and proper management of the workforce is an important factor in development of a country. The importance of human capital formation is now fully recognized because healthy and skilled people, along with physical capital, help in capital formation and raising economic growth. Therefore, large scale investment in human capital is required for the full and optimum use of natural resources. Improvement in the health of masses increases their productive capacity and leads to quantitative improvement in human capital. This paper examines the role of health facilities in human capital formation as well as in economic development. The current study analyzes the trends of current health expenditure as percent of GDP in India and China. An effort has been made to compare the impact of health expenditure on value added per worker in agriculture and its allied sectors in India and China by employing multiple regression model using data from 2000 to 2017. Findings reveal that independent variable (current health expenditure) explains the variation in dependent variable (value added per worker) to an extent of 37.9% and 56.9% in India and China, respectively.

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KEYWORDS

Health, Expenditure, GDP, Value added, Regression, India, China,

INTRODUCTION

The concept of human capital formation is of recent origin. Traditionally, more importance has been placed on the accumulation of physical capital to achieve economic development. Earlier economists like Adam Smith, Veblen, and Marshall had also emphasized the criticality of human capital formation in the production process. The UN charter on Human Rights (1948), envisages the right of primary education and primary health as a human right. It follows, therefore, that every child born in the country must have an assurance of good health, education, and prosperity. Education and health are the primary inputs in the development of human resource. Education helps in developing necessary skills and abilities, thus boosting productivity. Health is an equally important constituent of well-being and foundation of prosperity. Good health is central to human happiness. It also contributes to economic progress, as healthy populations live longer, are more productive, and save more (WHO).[1] In developing and underdeveloped countries like India and other BRICS (Brazil, Russian Federation, India, China and South Africa) nations , the population is illiterate, unskilled, disease-ridden, and superstitious, which acts as a barrier to growth rather than a facilitator. Ill health is considered as a huge financial burden, and it is the major cause of 50 percent of the growth differential between developed and developing countries. [2]

According to WHO's health score (2016), India's position (43) is the lowest among low income South Asian countries like Nepal, Bangladesh and Sri Lanka. Among BRICS nations, it is placed after Brazil (78) and China (72).[3] There are major differences in the ability of the BRICS nations to

increase the investment on health, China saw an increase of 2% in its devoted share of GDP to health in the period extending from 1995 to 2013, whereas India saw it contract from 4.06 % to 3.97 %.[4] It has been evidenced that there is a positive relation between investment in human capital and GDP growth rate, countries which had spent more on human capital during 1990-2016 recorded 1.1% higher annual growth rate in comparison to others. This positive correlation suggests that nations failing to invest in health and education are at risk of stagnating economies and lower per capita income.

Therefore, large scale investment in human capital is required for the full and optimum use of natural resources. Improvement in the health of masses increases their productive capacity and leads to quantitative improvement in human capital. Mainstream economists, therefore, consider expenditure on health services as a significant means to enhance productive capacity and productivity of human beings. Investing in people is the best way to achieve sustainable development goals. [3] The repercussions of meagre health conditions on workers productivity are well recognized. India has the highest population of children stunted (low height for age) due to malnutrition, at 48.2 million. Stunted children will be less healthy and productive for the rest of their lives, and countries with high rates of stunting will be less prosperous.[5] Thus, investment in social infrastructures like education and health becomes essential in promoting growth and standard of living. It is the quality of human resource that ultimately determines the success of all development policies. Healthier population is a major source of capital accumulation which boosts savings and enhances productivity. [6]

REVIEW OF LITERATURE

Ullah Saif.et.al. (2019) examined the role of health status on workers' productivity (1980 to 2010) by employing Auto Regressive Distributed Lag (ARDL) approach by Pesaran and Shin (1999) and Pesaran et al. (2001) for Pakistan. For every 1% improvement in health status, 13.39 % increase in workers' productivity was noted. In comparison, the coefficient of education indicates that worker productivity will increase by 0.18% for every 1% increase in education. Furthermore, the study found "Inflation has negative relationship with worker productivity whereas the association between worker productivity and Foreign Direct Investment, being proxy of technology transfer, is positive but statistically insignificant". [7]

Mohammadzadeh, et.al. [8] examined the relationship between gross domestic product (GDP) and labor productivity in Iran using time series data for the period of 1951-1994. Due to the long-term nature of the effect of health expenditure on labor productivity, Johansson-Juselius co-integration has been used. The results indicate that one percent increase in per capita expenditure of health improves 0.36 percent productivity of labor force. Furthermore, the study found that with coefficients of 0.41 and 0.09, expenditures on education and physical per capita also have a positive and significant effect on labor productivity. [8]

Wang [9] examines the optimal level of health expenditure for maximizing economic growth for Organization for Economic Co-Operation and Development (OECD) countries, using the data from 1990 to 2009. The analysis was carried out by employing Generalized Method of Moments (GMM). The study confirmed that when the ratio of health spending to gross domestic product (GDP) is less than the optimal level of 7.55%, increase in health spending effectively leads to better economic performance. Additionally, the study suggests that any expenditure over and above this optimal level is not associated with better care or an improved economic performance. Therefore, appropriate spending on health care supports economic development.

Feng Wei, et.al. [10] evaluate the effect of government health spending on labor productivity of agricultural and non–agricultural labor from the perspective of brain cognition in China, using the data from 2007-2013. The findings advocate that public health expenditure is helpful in improving labor productivity and plays a significant role in promoting productivity of both agricultural and non-agricultural workers. It also shows that in less developed areas, increased public health expenditure can improve mental health of the people and enhance efficiency by improving people's thought-process. It is highlighted that in rural areas with scarce infrastructure, excessive health investment can squeeze out physical capital investment. This is particularly important as adequate infrastructure is a necessity for the effective utilization of public health expenditure.10

Serge, M. et.al.[11] have analyzed the association between health status and growth rate (from 1995 to 2015)

for African countries. Results show that there is co-integration between health expenditures and economic growth. The findings suggest that the countries should try to increase their revenue by raising taxes on cigarettes and other products of ostentation, in order to increase investment in health services.

Dormont, et.al [12] investigates the association among health care expenditure, medical innovations, health status, growth and welfare. The study also investigates empirically the relation between GDP growth and health spending for the US, EU-15 and Japan, employing a projection method. It estimates an amount of total aggregate expenditure for that could be channeled to the health sector up to 2050. Results examines that health spending triggers technological progress, which is a potential source of better outcomes in terms of longevity and quality of life. Which later contributes to GDP per capita through higher participation of labor force and higher labor productivity.[12]

Ercelik G.[13] examines the relationship between health expenditure and economic development (from 1980 to 2015) in Turkey. The researcher has used Autoregressive distributed lag bound test model to analyze the association between health care expenditure (% of GDP) and GDP per capita. The results reveal that the variables are cointegrated and in the long run there is a significant relationship between health care expenditure and GDP per capita.[13]

Sarkar, et.al. [14] identified the impact of ill health on the productivity, earning, and health expenditure of the informal sector workers in Bangladesh. A cross-sectional survey was conducted among three occupational groups of informal workers (rickshaw pullers, shopkeepers and restaurant workers) that were generally found in all urban areas in Bangladesh. A total of 557 informal workers were surveyed for this study. About 90% of the workers included in the study were below 45 years of age, representing a population spending little on their healthcare. These costs would be much greater in higher age groups, since healthcare costs increase with higher age. Results shows a high correlation among health and productivity of the workers. The study estimates an overall loss of 28.5 % earnings in all three groups, whereas, due to sickness absenteeism, the losses of shopkeepers and rickshaw pullers were 30.5% and 30.2%, respectively.[14]

Isreal, A. et.al. [15] have analyzed the impact of health capital on Total-Factor Productivity (TFP) in Singapore from the period of 1980-2013. The finding from the Autoregressive Distributed Lag (ARDL) bound test shows that there is stable and long run co-integration between TFP, health capital, and education. The long run estimate shows that health capital and education make a positive and substantial contribution to TFP. This indicates that the TFP of Singapore could be substantially improved if spending on health capital and education are increased accordingly.[15]

Mathew & Neumayer [16] have illustrated the link between poor health and total factor productivity for 52 developed and developing countries, from 1965 to 1996. For the investigation, the author selects three main indicators: the proportion of undernourished within a country, the incidence of malaria and other waterborne diseases, and life expectancy. Findings of the study show a negative relation between the ill health and total factor productivity of the workers.[16]

Arun & Kumar D. [17] in their research 'Public health expenditure in BRICS countries- an empirical analysis' discuss, that while per capita public health expenditure increases significantly (from Rs. 24.26 to Rs. 157.18) in between 2000-01 to 2010-11, the percentage share of health expenditure to the GDP shows but a small increase (from 0.13 percent to 0.26 percent) in the same period, not stepping up with public health requirements. Many studies claimed a highly significant and positive relation between per capita public health expenditure and per capita GDP, the health care facilities remain inadequate whereas the access to them varying across countries. The study further concludes that BRICS nations need to increase their budgetary allocation on health to catch up with high-level health standards of developed countries.[17]

Isaksson [18] (2007) studied the relationship between health status and total factor productivity, particularly in developing countries between 1990 to 2005.The study identifies many factors viz. education, health, infrastructure, imports, institutions, openness, competition, financial development, geographical predicaments and absorptive capacity, which influence total factor productivity. It was observed that TFP is influenced directly by health and indirectly by labor productivity, savings and investment. Findings advocate increasing investment in human capital.[18]

Bekedam [19] WHO Representative addressing health Sabha in 2016, said that without commensurate progress in human development achieving a high growth rate is a dream for any nation. Among the BRICS group, India spends nearly 2.5 times less than other nations. Due to this low expenditure, India's health indicators such as life expectancy are even lower than less developed economies. Many factors are responsible for the grim status of these health indicators, but the leading cause is a low-level investment in health. In 2016, with a health score of 43, India was placed at the bottom among low income South Asian countries like Nepal, Bangladesh and Sri Lanka. Among BRICS nations, its place comes after both Brazil (78) and China (72). It is envisaged that "Investing in Health is Investing in India's Growth." Thus, health expenditure is crucial to increasing labor productivity which further induces growth and development.[19]

Muysken et.al. [20] investigate the relationship between per capita income and health status in U.K. This study shows a positive relationship between health status and per capita output using the standard neo-classical growth framework where the health status is exogenously given. The study also examines the effect of 'optimal expenditure on health care' on steady state growth and transition dynamics.[20]

OBJECTIVES

The primary purpose of this research is to examine the trend of current health expenditure in India and China (2000 to 2017). The study also tries to establish the relationship between current health expenditure (as percent of GDP) and value added per worker in agriculture and its allied sectors in both the countries.

METHODOLOGY

This article uses secondary data collected from the World Health Organization website (www.who.int/gho/health-financing), Global Health database (apps.who.int/nha/database) and World development indicators, World bank. Data relating to current health expenditure (as percent of GDP) and value added per worker in agriculture and its allied sectors in India and China has been studied through regression analysis (2000 to 2017).

TRENDS OF CURRENT HEALTH EXPENDITURE (AS PERCENT OF GDP) IN INDIA AND CHINA:

The importance of human capital formation is now fully recognized because healthy and skilled people, along with physical capital, help in capital formation and inducing economic growth. Suboptimal health facilities, skills and knowledge deficit limit the capacity to utilize the available stock of physical capital resulting in a lower growth rate in underdeveloped and developing countries.

FIGURE 1 TREND OF CURRENT HEALTH EXPENDITURE AS PERCENT OF GDP

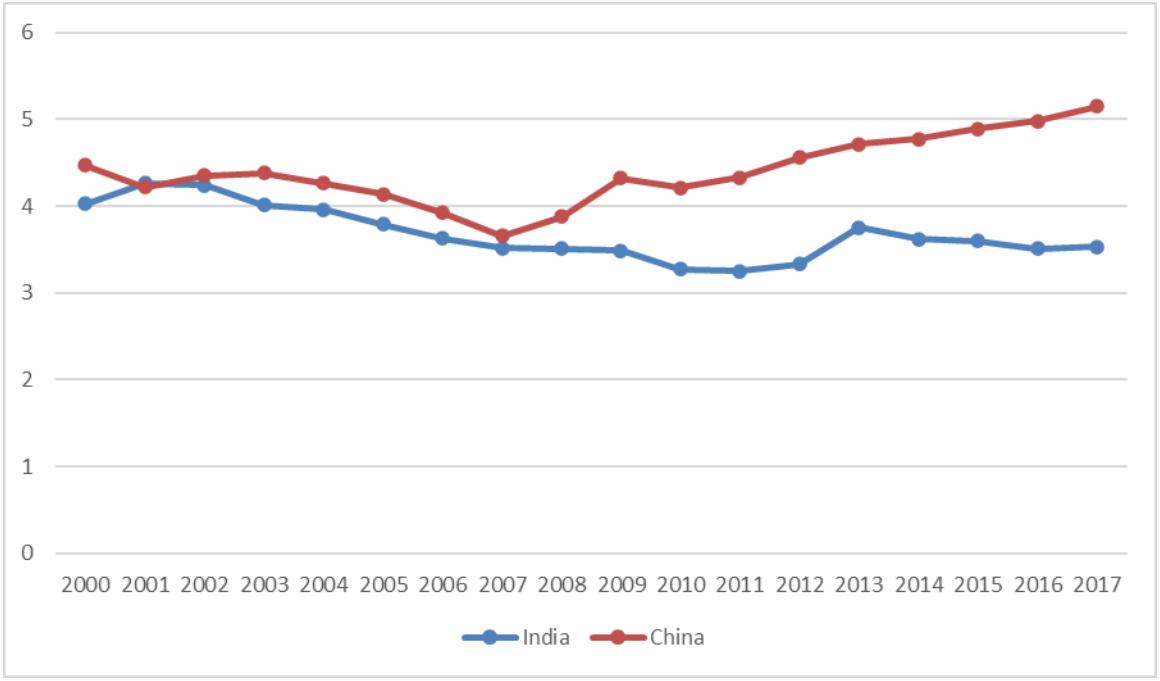

TABLE 1. TREND OF CURRENT HEALTH EXPENDITURE AS PERCENT OF GDP IN INDIA AND CHINA.

YEAR	INDIA	CHINA
2000	4.03	4.47
2001	4.26	4.22
2002	4.24	4.35
2003	4.01	4.38
2004	3.96	4.26
2005	3.79	4.14
2006	3.63	3.92
2007	3.52	3.66
2008	3.51	3.88
2009	3.49	4.32
2010	3.27	4.21
2011	3.25	4.33
2012	3.33	4.56
2013	3.75	4.71
2014	3.62	4.77
2015	3.6	4.89
2016	3.51	4.98
2017	3.53	5.15

Source: Global Health Observatory Data Repository, WHO (apps.who.int/nha/database)21

Table -1 & Figure -1 shows an increasing trend in current health expenditure in China, 4.47% to 5.15% during the period 2000 to 2017. In India, the current health expenditure decreased from 4.03% to 3.53% in the same period. Until 2007, China also has a decreasing trend from 4.47% to 3.66% but the current health expenditure in China has risen steadily since 2008 from 3.88% of GDP to 5.15% of GDP in 2017. India's health expenditure, on the other hand, is continuously decreasing with a minor variation.

Asia Pacific Journal of Health Management 2020; 15(4):i445. doi: 10.24083/apjhm.v15i4.445

TABLE 2. TRENDS IN AGRICULTURE, FORESTRY, AND FISHING, VALUE ADDED PER WORKER (CONSTANT 2010 US$)

YEAR	INDIA	CHINA
2000	936.4	1075.99
2001	978.39	1104.24
2002	901.23	1129.15
2003	971.43	1170.89
2004	963.93	1288.55
2005	999.81	1408.49
2006	1037.72	1541.45
2007	1106.86	1658.08
2008	1113.61	1798.21
2009	1121.72	1943.05
2010	1239.99	2097.23
2011	1374.92	2294.87
2012	1453.3	2475.27
2013	1520.5	2739.17
2014	1505.8	3024.81
2015	1506.65	3236.34
2016	1589.11	3442.24
2017	1662.34	3678.32

Source: World Development Indicators, World Bank.[22]

FIGURE 2. TRENDS IN AGRICULTURE, FORESTRY, AND FISHING, VALUE ADDED PER WORKER (CONSTANT 2010 US$)

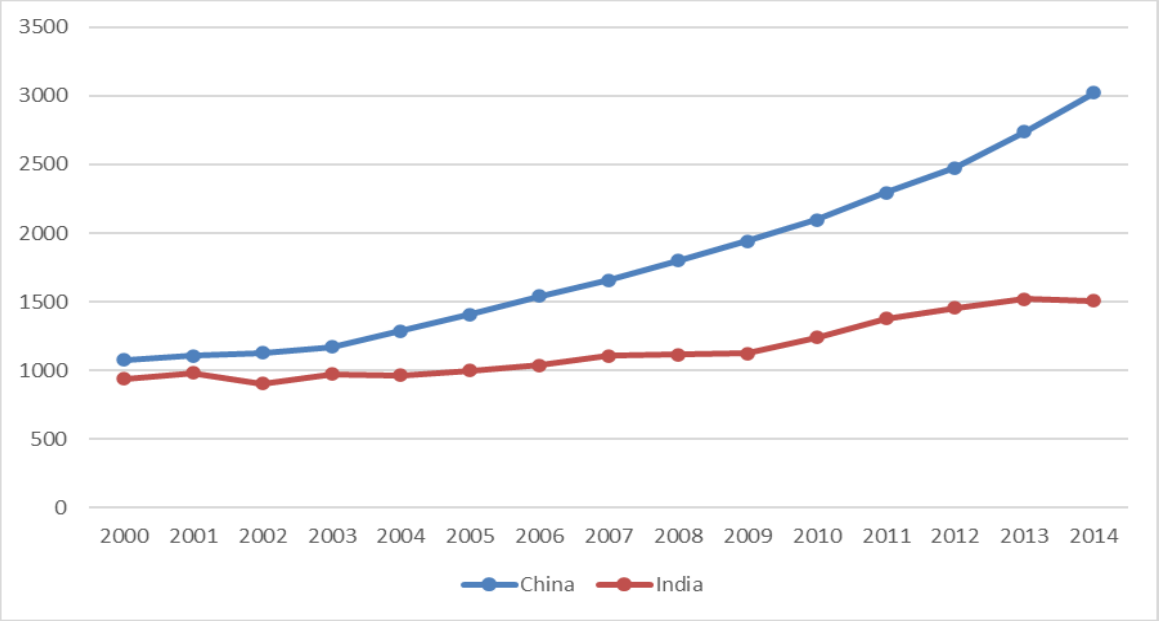

Table -2 and figure – 2 display the trends of value added per worker in agriculture and its allied sectors in India and China, showing a significant relation between health expenditure and value added per worker. In the year 2000, value added per worker was 936.4 and 1075.95 for India and China, respectively. Value added per worker shows an increasing trend during the entire period for both nations, but the rate of growth is relatively higher in China when compared to India where it rises more than threefold, jumping from 1075.95 to 3664.76 during 2000 to 2017 whereas India's sees only a less than twofold increase during the same period.

This indicates that better public health ecosystem in a country increases the productivity of its people. China, where current health expenditure is higher, houses healthier people who work more efficiently when compared to India. Therefore, expenditure on health is essential for building and maintaining a productive labor force. The general health of the workers in India is feeble resulting in a lower working efficiency. The main reasons for poor health in India are lack of nutritious diet, inadequate medical care and subpar sanitation facilities.

HYPOTHESES:

H01: - current health expenditure as percent of GDP does not have any relation with value added per worker in India and China.

TESTING OF HYPOTHESES:

For testing this hypothesis, data related to current health expenditure as percent of GDP are collected from Global Health Observatory Data Repository, World Health Organization and data linked with value added per worker (constant 2010 US$) in agriculture, forestry, and fishing from World bank development indicators, World Bank. Furthermore, data relating to current health expenditure (as percentage of GDP) and value added per worker (constant 2010 US$) in agriculture, forestry, and fishing, for the period from 2000 to 2017 was placed to regression analysis.

TABLE 3: RESULT SUMMARY

REGRESSION STATISTICS / COUNTRIES	INDIA	CHINA
OBSERVATIONS	18	18
MULTIPLE R	0.616	0.754
R SQUARE VALUE	0.379	0.569
F VALUE	9.782	21.139
P VALUE	6.49E-03	2.97E-04
REMARKS	Significant	Significant

Source: Author's calculation

The result table (Table-3) reveals that India and China both have a significant relationship between current health expenditure and value added per worker. In India and China, the correlation coefficient is .616 and .75, respectively.

In the regression analysis, the independent variable (current health expenditure) explains the variation in dependent variable (value added per worker) to an extent of 37.9% and 56.9% in India and China, respectively. P value for India (.006) and China (.0002) are less than alpha value (.05), which shows significant relationship between the two

variables. Hence, the null hypothesis that there exists no relation between current health expenditure and value added per worker is rejected for both countries.

On the basis of F test, which says if F*(tabled value)> F (calculated value) we accept the null hypothesis, we accept that the difference between the means is significant. From this evidence we may infer that the populations, from which the samples are drawn, do differ. In this model calculated F value is 9.782(India) and 21.139(China) which is more than the critical value (4.49), we reject the null hypothesis. We can say that current health expenditure (% of GDP) predict a significant amount of variance in labor's productivity in both the countries and the overall model is significant.

Thus, the increase in health expenditure needs to be on par with that of developed nation and needs to be supported by responsible governance and transparent handling of the public sector health funds, efforts to increase the wage levels of the population and finally, improvement of sanitation by government and private initiative.

CONCLUSION

The human capital formation is associated with the investment in man and his development as a creative and productive resource. Hence, human capital formation is a vital requirement for underdeveloped and developing countries if they want to achieve rapid progress. The recent literature in development economics demonstrates the increasing trend of developing countries starting to invest heavily in social sector programs, namely health, fertility control and education. The shifts in the patterns of public health expenditure represent one of the most effective techniques within the state power to improve the condition of the poor. Thus, for a nation to develop faster, it needs to provide primary health care services, along with adequate focus on secondary and tertiary health sectors. Several studies claim that in underdeveloped and developing countries like India, most of the people are uneducated or have a low literacy rate, majority of them being unskilled and untrained and their general health feeble. Thus, as is obvious from the above discussion, for the development of the country's vast human resources and in improving the quality of the life of the people, health is a necessary input.

REFERENCES:

1. Health and Development. World Health Organization.www.who.int
2. Rahman M.M., Khanam R.& Rahman M. "Health care expenditure and health outcome nexus: new evidence from the SAARC-ASEAN region." Global Health.2018 Nov. 14(1):113. DOI: https://doi.org/10.1186/s12992-018-0430-1
3. Sanghera T." Underinvesting in health, education is now risking India's economic future."2018 www. business-standard.com>Economy & Policy>News.
4. Jakovljevic M. Potapchik E. Popovich L. Barik D.& Getzen T.E. "Evolving Health Expenditure Landscape of the BRICS Nations and Projection to 2025".2016 National Council of Applied Research, https://mpra.ub.uni-muenchen.de/77221/
5. Yadavar S. "Budget 2018: India's Healthcare Crisis Is Holding Back National Potential." India Spend. www.indiaspend.com>budget-2018-indias-healthcare-crisis-is -holding.
6. Murty, S. "Education, Health and Housing in India, some aspects." 2004, RBSA Publishers, Jaipur
7. Ullah S. Malik M.N. & Hassan U.M. "Impact of Health on Labor Productivity: Empirical Evidence from Pakistan." European online Journal of Natural and Social Sciences, 2018, 8(1), pp 139-147. http//www.european. science.com > Home > Vol 8, No 1 (2019) > Ullah
8. Mohammadzadeh Y. Moradi M.& Khezrian A. "Investigating the long –term relationship between health expenditure and labor productivity in Iran." Iran occupational health journal, 2019,16(2), 22-32. https://orcid.org/0000-0002-4364-5832.
9. Wang F. "More health expenditure, Better Economic Performance? Empirical Evidence from OECD Countries." Inquiry, 2015. www.ncbi.nim.nih.gov>pmc>articles>PMC5813635
10. Wei F.I. Xia Y. & Kong Y. "Public Health Expenditure and Labor Productivity: A Tentative Interpretation Based on the Science of Brain Cognition".2018. DOI:10.14704/nq.2018.16.5.1274.
11. Serge M. P. & Tieguhong J.C. "Health Expenditure and Economic Growth-a review of the literature and an analysis between the economic community for central African states (CEMAC) and selected African countries." Health Economic Review, 2017. DOI:10.1186/s13561-017-0159-1.

12. Dormont B.S. Pelgrin F. Oliveira J. & Suhrcke M. "Health Expenditures, Longevity and Growth."2008 DOI:102139/ssrn.1130315 and http://ssrn.com/abstract=1130315

13. Ercelik G. "The Relationship between Health Expenditure and Economic Growth in Turkey from 1980 to 2015." Journal of Politics, Economy and Management (JOPEM),2018, 70(5), 129-157.doi:10.1086/258730; OECD

14. Sarkar A. R. Sultana M. Mahumud R.A. Ahmed S. and others. "Effects of Occupational illness on labor productivity: A socioeconomic aspects of informal sector workers in urban Bangladesh." Journal of Occupational health,2016, 58(2),209-215. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5356

15. Isreal A. I. O. Kalippan S.R. & Hamzah H. Z. "Impact of Health Capital on Total Factor Productivity in Singapore." Journal Ekonomi Malaysia, 2019, 53 (2),1-17 http://dx.doi.org/10.17576/JEM-2019-5302-7

16. Matthew, A.C. & Neumayer, E. "The impact of poor health on total factor productivity." Journal of Development Studies, 2006, 42(6), 918-938 DOI:10.1080/00220380600774681.

17. Arun J. V.& Kumar D. "Public health expenditure of BRICS countries – an empirical analysis." International Journal of Medical Science and Public health, 2016,5(11), 2212-2216.DOI: 10.5455/ijmsph.2016.130

18. Isaksson A." Determinants of total factor productivity: a literature review." Research and Statistics Branch, Staff Working Paper, United Nations Industrial Development Organization,2007.

19. Bekedam H. "Investing in health is investing in India's growth." Health care Sabha 2016.www.who.int

20. Muysken J., Yetkiner I.H. & Ziesemer T. "Health, Labor Productivity and Growth. Research Memorandum" 028, 1999, Maastricht University, Maastricht Economic Research Institute on Innovation and Technology (MERIT)

21. Global Health Expenditure Data base- World Health Organization, World Bank (2019) WHO (apps.who.int/nha/database)

22. World Development Indicators, Country comparable data on Development World Bank.wdi.worldbank.org.

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COMMENTARY

INFODEMIC MONIKERS IN SOCIAL MEDIA DURING COVID-19 PANDEMIC

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ABSTRACT

Social media is a common platform that enables its users to share opinions, personal experiences, perspectives with one another instantaneously, globally. It has played a paramount role during pandemics such as COVID-19 and unveiled itself as a crucial means to communicate between the sources and the individuals. However, it also has become a place to disseminate misinformation and fake news rapidly. Infodemic, a plethora of information, some authentic some not makes it even harder to general people to receive factual and trustworthy information when required, has grown to be a major risk to public health and social media is developing as a trendy platform for this infodemic. This commentary aims to explore how social media has affected the current situation. We also aim to share our insight to control this misinformation. This commentary contributes to evolving knowledge to counter fake news or health-related information shared over various social media platforms.

KEYWORDS

COVID-19, Pandemic, Infodemic, Social Media

INTRODUCTION

The Coronavirus disease (COVID-19) is an infectious disease transmitted primarily through respiratory droplets or contact with the contaminated surface, caused by newly discovered coronavirus. The number of confirmed cases infected with this novel disease is expanding rapidly. The pandemic has changed people's regular lifestyles. Developed countries have slowly started to move back to their new normal life with various public health measures whereas the underdeveloped and developing countries are still heavily relying on lockdown along with the various public health measures. [1]

Globally, the Internet is an increasingly valuable forum for acquiring the information on the novel coronavirus (COVID-19) pandemic. [2,3] Online and social data analysis approach is termed Infodemiology. [4] 'Infodemic monikers' are described as significantly inaccurate information that results in errors of perception, false news, racial episodes or any other types of misleading information circulated on the Internet. [5] Such monikers may have a major impact on dialog about public health and even relate to xenophobia. [5, 6]

SOCIAL MEDIA AND HEALTH INFODEMIC

Unlike in past pandemics, the population of developing countries now has widespread access to the internet. At present, 4.5 billion people worldwide have internet access with 7.1 % annual growth in the number of global internet users. Amid the pandemic and subsequent lockdown and with unemployment, people tend to spend more time on the internet and there has been a surge in social media usage such as YouTube, Facebook, Twitter, Instagram, Tik-Tok, WhatsApp etc. In a recent study, people when asked from where they got the news/information, 36 percent

Asia Pacific Journal of Health Management 2020; 15(4):i513. doi: 10.24083/apjhm.v15i4.513

named a news organization website or applications; 35 percent said social media; 20 percent recalled a search engine; 15 percent indicated a news organization email, text, or alert; 9 percent said it was another source, and 7 percent named a family member email or text. [7] The sources of the information are varied, not limited to popular search engines, and recognized health database resources, but also include social media. However, it may also contain fake news, fabricated stories, and disinformation, this can spread through social networks even faster than true information. For example, the anti-vaccine discourse on social media has been referred to as one of the major factors for parents' refusal to vaccinate their children [8]. Rumors spread through social media during the Ebola outbreak in West Africa were one of the forces that hindered disease control efforts. [9, 10]

Social media has become an indispensable medium to communicate between the authorities and the people. In the middle of this pandemic, social media are deluged with COVID-19-related content. Hoax or fake news about COVID-19 relayed in social media is currently termed as health misinformation. World Health Organization (WHO) mentioned it is concentrating its effort to curtail the spread of the COVID-19 outbreak. But a global epidemic of misinformation—widening briskly via social media platforms and other outlets—introduces a major obstacle for public health. "We're not just fighting an epidemic; we're fighting an infodemic", said WHO Director-General Tedros Adhanom Ghebreyesus. [11, 12]

Recently WHO has cautioned people against infodemic i.e. a situation when 'misinformation' spreads rapidly thereby affecting thinking and leading to panic, stigma, along with irrational behavior. For instance, within a week after the identification of the first case of the novel coronavirus in December 2019 in China, conspiracy theories about the origin of the virus began to spread through every social media channel: that the virus was a leaked bio weapon of the Wuhan Institute of Virology, that the government of China planned the outbreak, that the locals' habit of eating bat soup was the cause of the outbreak. [13] This fake fabricated news contributed to heightened racism, xenophobic violence, and discrimination against Chinese people worldwide. With the current increase in the number of new cases, misinformation is making the work of health professionals more difficult. When the WHO declared apublic health emergency of international concern, the WHO also launched the WHO Information Network for Epidemics (EPI-WIN). The goal of EPI-WIN is to share customized information with specific target groups, yet the WHO encountered a massive 'infodemic'.[14] In February 2020,at the Munich Security Conference, WHO Director-General Tedros Adhanom Ghebreyesus said: "Fake news spreads faster and more easily than this virus, and is just as dangerous" and urged prominent social media firms to act on false information and rumors about the pandemic. [14]

Additionally, it is difficult to identify which pages and media have credible health information. The most frequently accessed website is Google, and most Google search queries are all related to coronavirus, with keywords such as coronavirus tips, updates, symptoms, news, prevention. [15] A quarter of videos viewed on YouTube had various misleading information, yet most of these videos reached millions of viewers globally. [16] In Venezuela, people received false WhatsApp messages stating, "Stay home, the UN will bring you food". Immediately the UN released a press release denying the information. [17] In India, after the Tablighi Jamaat gathering, Muslims were blamed for spreading the virus, and eleven people were hospitalized after consuming a poisonous plant in Andhra's Chittoor district after watching a Tit-Tok video that claimed the plant to be a homemade remedy for COVID-19. [18] Moreover, some information about COVID-19 provided on the social media platform might be difficult to understand, while misleading claims from politicians, head of states, religious leaders and commentaries based on the assumptions but not scientifically proven facts and evidence may lead to disaster and a massive surge in the risk of COVID-19 in the population. [19]

CONCLUSION

It is crucial to address the issue of fake news without undermining the benefits of social media. Governments should promote news literacy and strong professional journalism in their societies. Social media platforms should invest in technologies that spot fake news and ban or delete false news immediately which has not been published or denied by an authentic source. The platforms should stop financial benefits for those who gain from disinformation. Awareness programs focused on myths about COVID-19 must take place regularly. People must be encouraged via various traditional media like radios, television, SMS alert to only trust information shared by their health ministry and other genuine platforms. Helpline numbers for people to clarify their doubts and concerns

about COVID-19. Public figures need to think carefully before posting any content as people believe their instruction.

The infodemic is as real as Covid-19. Hence, an accurate information-seeking behavior during this pandemic is vital for health-related behavior change and may strengthen infection prevention and control. Individuals should follow a diversity of news sources and be skeptical of what they read and watch. Everyone should be critical while looking at social media, should report the false information to the platform, check the fact and verify the information before sharing, ask the person who shared the false news to remove it and finally make more noise than people who share false information.

REFERENCES

1. Sharma S, Bhatta J. Public health challenges during the COVID-19 outbreak in Nepal: a commentary. Journal of Health Research. 2020 Jun 5..
2. Bento AI, Nguyen T, Wing C, Lozano-Rojas F, Ahn Y-Y, Simon KJPotNAoS. Evidence from internet search data shows information-seeking responses to news of local COVID-19 cases. 2020;117(21):11220-2.
3. Rovetta A, Bhagavathula ASJm. Global Infodemiology of COVID-19: Focus on Google web searches and Instagram hashtags. 2020.
4. Eysenbach GJAjopm. Infodemiology and infoveillance: tracking online health information and cyberbehavior for public health. 2011;40(5):S154-S8.
5. Abd-Alrazaq A, Alhuwail D, Househ M, Hamdi M, Shah ZJJomlr. Top concerns of tweeters during the COVID-19 pandemic: infoveillance study. 2020;22(4):e19016.
6. Rovetta A, Bhagavathula ASJJph, surveillance. Covid-19-related web search behaviors and infodemic attitudes in italy: Infodemiological study. 2020;6(2):e19374.
7. Mitchell A, Gottfried J, Shearer E, Lu K. How Americans encounter, recall, and act upon digital news. Pew Research Center. 2017.
8. Bode L, Vraga EKJHc. See something, say something: Correction of global health misinformation on social media. 2018;33(9):1131-40.
9. Broniatowski DA, Jamison AM, Qi S, AlKulaib L, Chen T, Benton A, et al. Weaponized health communication: Twitter bots and Russian trolls amplify the vaccine debate. 2018;108(10):1378-84.
10. Jones B, Elbagir NJCW. Are myths making the Ebola outbreak worse. 2014.
11. Zarocostas JJTL. How to fight an infodemic. 2020;395(10225):676.
12. COVID W. PHEIC Global research and innovation forum: towards a research roadmap. 2019.
13. Monitoring BJBT, Producer) Retrieved. China coronavirus: Misinformation spreads online about origin and scale. 2020;5(02):2020.
14. Adhanom-Ghebreyesus T, editor Munich security conference. Munich: World health organization https://www who int/dg/speeches/detail/munich-security-conference; 2020.
15. Morahan-Martin JMJC, Behavior. How internet users find, evaluate, and use online health information: a cross-cultural review. 2004;7(5):497-510.
16. Li HO-Y, Bailey A, Huynh D, Chan JJBGH. YouTube as a source of information on COVID-19: a pandemic of misinformation? 2020;5(5):e002604.
17. UN News. First Person: Countering COVID-19 misinformation in Venezuela. [Online].2020 [cited 2020 June 15]. Available at: https://news.un.org/en/story/2020/06/1065682
18. The News Minute. 11 in AP hospitalised after following TikTok poisonous 'remedy' for COVID-19. [Online].2020 [cited 2020 June 15]. Available at: https://www.thenewsminute.com/article/11-ap-hospitalised-after-following-tiktok-poisonous-remedy-covid-19-122136
19. Tangcharoensathien V, Calleja N, Nguyen T, Purnat T, D'Agostino M, Garcia-Saiso S, et al. Framework for managing the COVID-19 infodemic: methods and results of an online, crowdsourced WHO technical consultation. 2020;22(6):e19659.

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RESEARCH ARTICLE

COMMUNITY PEOPLE PREPAREDNESS AND RESPONSE ON PREVENTION AND CONTROL OF COVID-19 BEST PRACTICE IN BANGLADESH

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ABSTRACT

PURPOSE:

The major objectives of the study were to assess the knowledge, attitude & practice (KAP) towards community preparedness and response on prevention of COVID-19 among the community.

METHOD:

A sample survey was conducted to collect data from people admitted in a district level tertiary hospital for treatment of various health complications during COVID-19 pandemic. A total of 300 randomly selected patients and their attendants were interviewed in the hospital setting.

RESULTS:

The mean knowledge score was 18.73 out of 24 and the main sources of information were TV (86.5%), radio (13%), newspaper (13%), social media (13.5%), friends/relatives (14%), formal healthcare providers (6%) and religious leaders (3%). Knowledge was significantly poor among aged people, women, less educated and those on low incomes. The Majority of participants (79%) suggested wearing facemasks as effective tools to prevent COVID-19 from spreading, 56% mentioned maintaining of physical or social distance as crucial to prevent the infection. We found strong relationship between monthly total family expenses and wearing of facemasks by gender to prevent the COVID-19 (x2= 18.405; Cramer's V= .17, df = 8; sig; P= < .018). Similarly maintaining physical/social distance to prevent COVID-19 is also related to respondents' economic strata (x2= 43.741; Cramer's V= .14, df = 20; Sig; P= < .002).

CONCLUSIONS:

An awareness program on COVID-19 is very important to prevent the spread of the virus. Effective communication intervention with increasing treatment facilities is essential

for prevention and control of COVID-19. Government and development agencies should prioritize the COVID-19 response program with regular health care services.

KEYWORDS

COVID-19, KAP, community mitigation, preparedness, response, Bangladesh

INTRODUCTION

Poor hygienic practices, inadequate water supply and poor sanitary conditions play a major role in the spread of infectious diseases. Lack of Knowledge, Attitude and Practices (KAP) on Water, Sanitation and Hygiene (WASH) is one of the most imperative causes for transmission of diseases. Population density, poor health systems and unpredictable COVID-19 made the situation worse for a lower-middle income country like Bangladesh. Active surveillance, early detection, isolation and case management, contact tracing and prevention of onward spread and overall people's knowledge about preparedness and response are very crucial to control an infectious disease such as COVID-19. Evidence shows that ability to effectively respond to unpredictable infectious diseases mostly depends on people's knowledge about it and preparedness for prevention and mitigation measures.[1] Community engagement and practical knowledge on preparedness planning are vital factors to reduce the burden associated with the health threat in terms of mortality and morbidity, hospitalizations and demand for health care goods and services; to maintain essential services, protect vulnerable groups, minimize economic loss and social disturbance and enable a quick return to normal conditions. [2]

Bangladesh is a country with high population-density. Around 63.4% of total population in 2018 lived in rural areas. [3] About 3% of Bangladesh's GDP is spent on health, out of which the government contribution is about 1.1%. In term of dollar, the total health expenditure in the country is about US$ 12 per capita per annum, of which the public health expenditure is around US$ 4. [4] A large number of Bangladeshi people work abroad and as a result Bangladesh faces the risk of virus importation and its onward transmission. So the goal of the study is to understand the level of KAP on COVID-19 among the community people residing in and around Noakhali district regarding their preparedness and response on prevention and control of COVID-19.

MATERIALS AND METHODS

A cross-sectional descriptive study was conducted to collect data from patients and their attendants at Abdul Malek Ukil Medical College and Hospital in Noakhali district in the southern part of Bangladesh. The study was conducted in May and June 2020. Following a standard formula for determination of a representative sample size, and our desired sample size was 291 and we acheived 300. Initially we had planned to collect data from one government hospital and one private hospital but due to the severity of COVID-19, we had to change our plan and collect data only from the government-run medical college and hospital.

We interviewed patients and their attendants aged 18 years or above who visited the hospital in May and June 2020 during COVID-19 pandemic. In order to get our desired respondents from the hospital setting during COVID-19 pandemic we had arranged a formal session for intern doctors. There was a high refusal rate of response due to panic situation of COVID-19 and finally, a total 300 respondents were interviewed. Sampling includes both males and females.

DATA COLLECTION, QUALITY CONTROL, DATA PROCESSING AND ANALYSIS:

A structured interview schedule was prepared incorporating the following variables: socio-economic and demographic conditions of respondents, and their KAP, preparedness and response about COVID-19. The interview schedule was filled-in by trained interviewers chosen intern doctors. There were both open and close-ended questions in the interview schedule. A total of 36 questions in four parts were asked to collect data from respondents.

In section C10 questions were asked regarding Knowledge, Attitude and Practice (KAP) related to COVID-19 prevention and control. In this section, each question was scored as '0' for incorrect answer and '1' for correct answer. Those who received scores of 0-5 were classified as having "poor" knowledge; those with scores of 6-8 were classified as "moderate", while those scoring 9-10 were graded as "good". Same techniques were also applied to measure respondent's attitude and practice on COVID-19 pandemic. [5]

A technical research team headed by an associate professor at the same medical college and hospital led the process of development of research instruments and data

collection. The developed interview schedule was tested for reliability and validity. The item objective congruence technique was used for detecting validity. We remained alert about the quality of data. There was a one-day virtual session with all persons involved with the study for clear understanding of the study goal and every question of interview schedule.

Consistency of data was checked by a public health expert. The study format and interview schedule were given to an expert team (epidemiologist, public health practitioner and medical doctor) for determining content validity. Their comments were incorporated in final research instruments. The respondents were asked to participate in the study voluntarily. Those who agreed to participate in the study were requested to sign the consent form. The filled-in schedules were checked and edited immediately after the collection. Again, data were cleaned before analysis. Both univariate and bivariate tables are generated during analysis. Statistics used are frequency distribution, measurement of central tendency (mean, median, and mode) measures of dispersion (Standard deviation), and non-parametric tests (Chi-square, Cramer's V). The level of significance used was at 0.05.

ETHICAL CONSIDERATION:

The ethical review committee at the Dr. Abdul Malek Medical College & Hospital approved the proposal.

RESULTS

SOCIO-DEMOGRAPHIC CHARACTERISTICS:

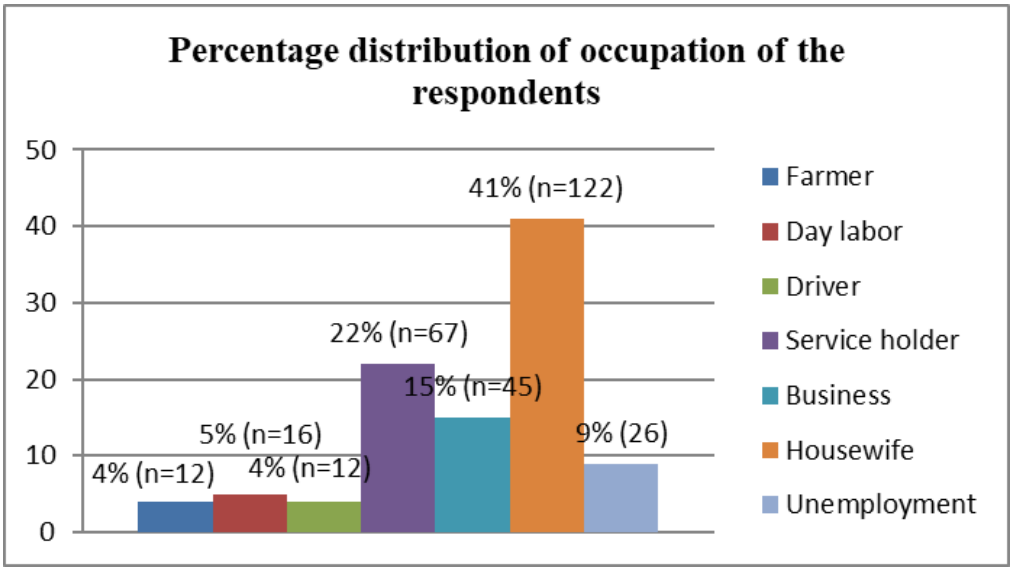
The study revealed that apparently a large number of patients and their attendants aged between 18 to 35 years, nearly two-thirds (76%) visited the hospital to get admitted for treatment as patients or their attendants during COVID-19 pandemic. Among them, 83% were female and 66% were male. 17% of the total patients and their attendants aged between 36 and 45 years - male 27.5% and female 9%. Only a few (7%) of the total patients and their attendants (male 6% and female 8%) visited hospital for same reasons. The mean age of total patients and their attendants interviewed were 30.52 years (male 30 years and female 31 years) but median age was around 28.80 years for both, which indicated a large number of patients and their attendants were young adults and few were elderly. The most interesting fact is that majority respondents (around 90%) of the total interviewed were in young adults ranging from 18 and 40 years (Table-1), which means that young adults are more enthusiastic than elderly peoples to visit hospital for treatment or taking care of family members during health emergency such as COVID-19 pandemic.

TABLE1: PERCENTAGE DISTRIBUTION OF AGE OF THE RESPONDENTS BY GENDER

Age Categories	**Male** **n= 140**	**Female** **n= 160**	**Total** **n= 300**
	Percentage	**Percentage**	**Percentage**
18-22 years	8.5%	30%	20%
23-30 years	34%	39%	37%
31-35 years	24%	14%	19%
36-40years	20%	6%	13%
41-45 years	7.5%	3%	4%
46-90 years	6%	8%	7%
Total	100.0	100.0	100.0
Mean	30.01	30.96	30.52
Median	28.90	28.70	28.80
St. deviation	9.76	8.91	9.33
x^2= 31.183; Cramer's V= .48, df = 6; Sig; P= < .001			

Respondents age differences by gender was found statistically significant at .001 level (x2= 31.183; Cramer's V= .48, df = 6) (Table-1). The study included both male and female respondents but the number of female respondents was slightly higher (53%) than the male respondents (47%) which indicate that females are more inclined in visiting hospital as patients or their attendants compared to their male counterparts.

FIGURE 1: PERCENTAGE DISTRIBUTION OF OCCUPATION OF THE RESPONDENTS



The study also revealed that around 9% respondents were illiterate, 11% completed up to primary level, 21% up to secondary level and only 11% completed their graduation level (x2= 31.183; Cramer's V= .48, df = 6; Sig; P= < .001). Most common occupations among the respondents were housewife (41%), service holder (22%), businesspeople (15%), unemployment (9%), farmer (4%) and day laborer (4%) (Figure-1). Most of the respondents were married (88.4%) and 11% were single while 97% of the household heads were male and 3% female.

The average monthly total income was 22,752 BDT (274 US dollar) whereas total monthly expenses were 17,378 BDT (210 US dollar). This figure is slightly higher compared to national average household income. Possibly it was because of the fact that data was collected from district level hospital and sub-urban location, where middle-class and upper class people live in and the majority of the respondents' household heads work as immigrants outside the country. Patients and their attendants seemed to have come for services on an average from a distance of 12 kilometres and median distance indicates that more than half of the patients and their attendants came to hospital from within 7 kilometres. This means a large percentage of inner-city patients utilize the hospital services compared to those from outside the city during COVID-19 pandemic.

PATTERN OF PREPAREDNESS AND RESPONSE TO COVID-19:

The persisting COVID-19 is a big public health concern all over the world and Bangladesh is facing catastrophic health problem due to inadequate and unplanned health system. There is ongoing debate whether government measures are adequate for the control of COVID-19 pandemic or not.

Bangladesh has confirmed it first COVID-19 case on March 8, 2020, though many experts speculated that the virus might have entered the country much earlier but had not been detected due to inadequate monitoring. [6] The government of Bangladesh has taken many measures to prevent COVID-19 and the country has been under lockdown (general holidays) for 66-days since March 26, 2020.

In response to a question on perception of the COVID-19, around 99% of the respondents heard about COVID-19 while 86.5% knew it from television followed by radio (13.1%), newspaper (13.1%), social media (13.5%), religious leaders (3.1%), friends/relatives (14%) and formal healthcare providers (6%) as described in Figure-2 below. A strong relationship is found between age of respondents and sources of information. The formal sources of information obtained by respondents progressively

increase with the increase of their age (x2= 72.068; Cramer's V= .42, df = 45; Sig; P= < .006). Possible reasons could be that relatively older people chose to stay at home due to COVID-19 and were more likely to watch TV, follow radio programs and read newspaper to get updates on COVID-19 pandemic while passing time at home. A positive relationship is also found between the total monthly family income & expenses, respondent's gender, occupation, gender of household head, marital status, ownership of home and getting updates on COVID-19 (x2= 111.08; Cramer's V= .43, df = 70; Sig; P= < .001).

FIGURE 2: PERCENTAGE DISTRIBUTION OF SOURCES OF INFORMATION ABOUT COVID-19

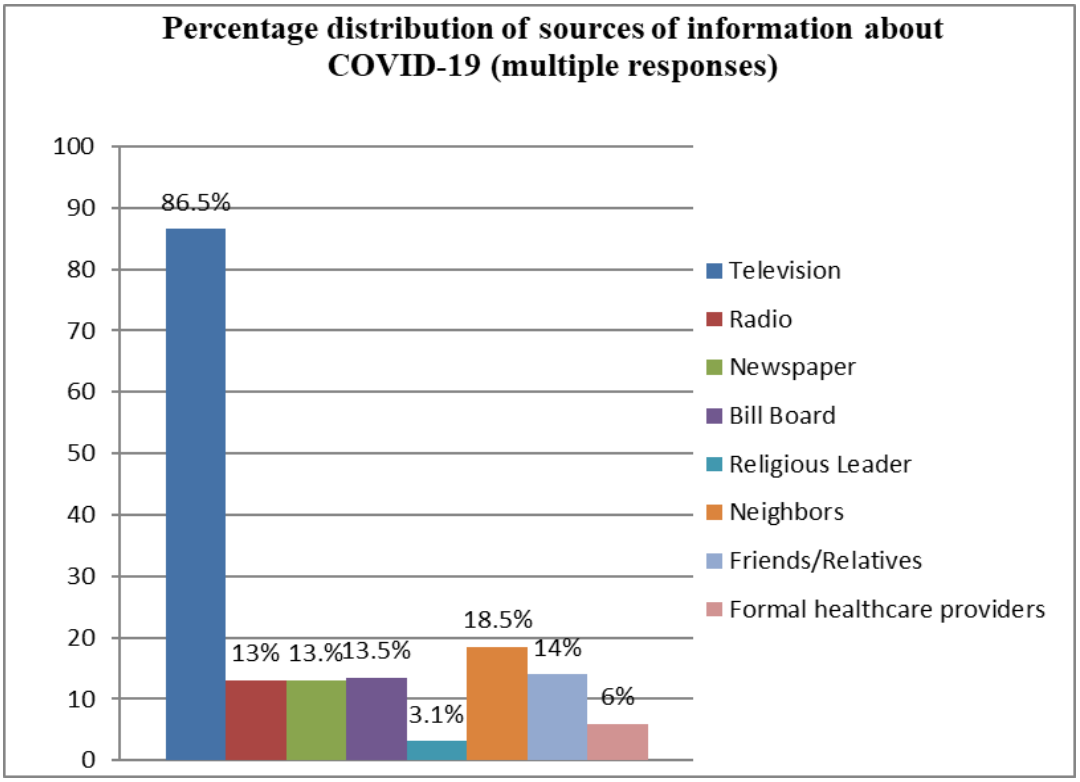
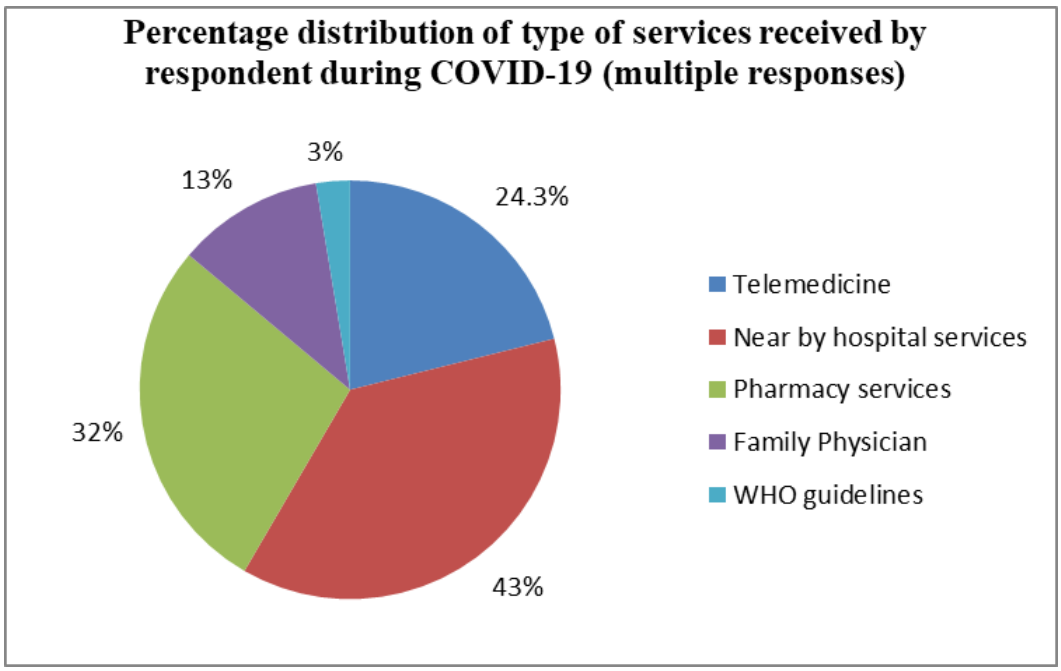


FIGURE 3: PERCENTAGE DISTRIBUTION OF TYPE OF SERVICES RECEIVED BY RESPONDENTS DURING COVID-19



The striking feature here is that about 79% of the respondents wear facemasks as an effective tool to prevent COVID-19, whereas 63% preferred maintaining physical distance or social distance and 15% home quarantine.

The World Health Organization (WHO) has released an updated version [7] which includes a section on advice to decision makers on the use of facemasks for all people in community setting and we found strong relationship between monthly total family expenses and using of facemasks to prevent the COVID-19 (x2= 18.405; Cramer's V= .17, df = 8; Sig; P= < .018). We found that the use of facemasks by respondents increases with their economic condition and irrespective of gender. Similarly maintaining physical distance to prevent COVID-19 is also related to respondents' economic strata (x2= 43.741; Cramer's V= .14, df = 20; Sig; P= < .002). The most interesting fact is that maintaining physical distance or social distance to prevent COVID-19 is strongly correlated with respondents' religion (x2= 13.719; Cramer's V= .12, df = 6; Sig; P= < .008).

Interestingly, we have observed poor knowledge of respondents about actual distance recommended for maintaining the physical distance. Around 88% respondents said that they have to keep distance of 1-2 metres to prevent COVID-19 whereas 12% had mentioned 3 metres' distance. However, majority of the respondents (77%) had good knowledge on systematic way such as following doctor's advice, and WHO guidelines and rules of isolation for preventing COVID-19. About 26% of respondents had faced various difficulties in receiving treatment during COVID-19. Among them 65% faced difficulty in getting doctor's appointment, 32% had troubles in getting diagnosis of diseases, and 17% could not travel for treatment and 10% faced difficulty buying medicine as described in Figure-3. We observed relationship between type of treatment received during COVID-19 and respondent's level of education, distance from hospital, gender of household head and monthly total family expenses (x2= 16.537; Cramer's V= .32, df = 11; Sig; P= < .005).

DISCUSSION

The study had three goals; first to make a quick assessment of knowledge, attitude and practice, second to determine people's preparedness on COVID-19, and third to understand the level of response to COVID-19 at district level as well as sub-urban setting. Although we had interviewed both males and females, they significantly differed in age structure. The mean ages of male and female patients and their attendants were around 30 years, but median ages were only 31 years for both, which means a large number of respondents were young adults and few were elderly. The probable explanation can be that young adults are possibly more enthusiastic than the elderly to visit hospitals for receiving health related services or caring for their family members during COVID-19 pandemic. COVID-19 outbreak first identified in Wuhan, China in December [8] and in Bangladesh first COVID-19 case was identified at Satkhira district in Khulna division on March 8, 2020. [9]

The disease had spread in more than 210 countries with a mortality rate of about 5.7% whereas in Bangladesh it was 1.38. [10] Bangladesh is a country with high population-density. Around 63.4% of total population in 2018 lived in rural areas. The high density of population could be associated with a great risk of spread and mortality, especially during seeking treatment at district level hospital. For this reason we had conducted this study to understand the pattern of KAP of the community and their preparedness and response to COVID-19. The government of Bangladesh and other development partners are working together to improve the awareness of general people about the disease and reduce the mortality and morbidity. The people who live at district level of southern part of Bangladesh were very close to the spread of COVID-19 because most of the household heads work outside the country and that time they had frequently travelled from COVID-19 infected countries. As a result the family members and neighbors were become vulnerable to COVID-19 infection, particularly those who have poor knowledge, attitudes, and low preparedness skills to engage in COVID-19 prevention and control.

COVID-19 was very much an unknown disease to people of rural and remote areas, and World Health Organization changed their recommendations very frequently due to changing DNA of COVID-19. From this point of view KAP and preparedness and level of response of community people become an important issue in the context of public health. The WHO suggested it member countries to improve the knowledge of communities on the care and diagnosis of COVID-19, especially optimizing the use of protective equipment and other infection prevention and control measures in health care and community settings. [11] There is ongoing debate about government steps to control the COVID-19 in Bangladesh and the country

started it lockdown measures since March 26, 2020. As a result, people become aware about it and our study found that around 99% have heard about COVID-19.

Our result is supported by another online study conducted by Australian Western Sydney University and Begum Rokeya University, Rangpur, Bangladesh [12] and they found that around 99% Bangladeshi people have heard about COVID-19 and most of them heard about it from formal print and electronic channel such as TV and social media. [13] The interesting fact is that sources of information and people's knowledge have strong relationship, and as a result the mortality rate is low in Bangladesh compared to developed countries. [14] In our study we found that 79% respondents suggested the use of facemasks as effective tools to prevent COVID-19 and our study finding was strongly supported by WHO and other countries scientific publications. [15] We found that the use of facemasks by respondents increases with their economic condition and irrespective of gender. Similarly maintaining physical distance to prevent COVID-19 is also related to respondents' economic strata. The big concern is that 63% suggested for physical distance/social distance and 15% mentioned home quarantine. This figure indicates that a low socio-economic condition does not allow people to stay at home as they have to struggle daily in a poor resource setting. Our result shows that maintaining physical distance to prevent COVID-19 is strong correlated with respondents' religion. This was a very new finding for a KAP study of such infectious diseases.

The majority of community people have poor knowledge about physical distance and we found that around 88% had no clear idea about actual distance that will help to prevent COVID-19. The most important fact is that community people's level of education, poverty, gender of household head and economic strata still plays an important role on infectious diseases prevention and control strategy. [16] In COVID-9 pandemic situation people have to struggle for getting appointment of doctor, diagnosis of diseases, and travel for treatment and buying their daily medicine.

Our study observed that treatment received during COVID-19 and respondent's level of education, distance of hospital, gender of household head and monthly total family expenses are associated with difficulty of getting emergency health services like COVID-19. Social distancing is very crucial to prevent spreading the COVID-19 but our study found that only 12% people have correct knowledge about it. This could be because people in highly densely populated areas cannot afford social distance as poverty pushes them to visit their neighbors for receiving daily essential support during COVID-19 situation.

CONCLUSIONS

In general the knowledge, attitude and practice, preparedness and level of response of community people to COVID-19 are good. The people who attend at tertiary level hospital had a positive attitude toward protective measures such as using facemasks and maintaining physical or social distance, which is important to limit the spread of COVID-19. Coronavirus is global health problem and the WHO declared it a global health emergency. From this point of view, we believe that mass awareness and treatment are very important to prevent COVID-19 from spreading further in Bangladesh. An effective, accurate communication intervention with updated information is essential for prevention and control of COVID-19. Government and other development agencies should prioritize the COVID-19 response program with regular health care services.

ACKNOWLEDGEMENTS:

We like to thank to all respondents for providing essential information. We also would like to thank Abdul Malek Ukil Medical College and Hospital authority for their support in conducting this study.

References:

1. World Health Organization (2020): National Preparedness and Response Plan for COVID-19, Bangladesh Version 6. Available at; https://fscluster.org/bangladesh/document/national-preparedness-and-response-plan
2. World Health Organization (2020): Coronavirus disease (COVID-19) Weekly Epidemiological Update and Weekly Operational Update https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports
3. National Preparedness and Response Plan for COVID-19, Bangladesh; Government of the People's Republic of Bangladesh, Version 5, March 2020

4. Minhazur Rahman Rezvi (2019) Health financing in Bangladesh: scarcity and its impacts. South Asia Journal September 21, 2019 http://southasiajournal.net/health-financing-in-bangladesh-scarcity-and-its-impacts/
5. Srichan, Peeradone & Apidechkul, Tawatchai & Tamornpark, Ratipark & Yeemard, Fartima & Khunthason, Siriyaporn & Kitchanapaiboon, Siwarak & Wongnuch, Pilasinee & Wongphaet, Asamaphon & Upala, Panupong. (2020). Knowledge, Attitude and Preparedness to Respond to the 2019 Novel Coronavirus (COVID-19) Among the Bordered Population of Northern Thailand in the Early Period of the Outbreak: A Cross-Sectional Study. SSRN Electronic Journal. 10.2139/ssrn.3546046.
6. Anwar, S., Nasrullah, M., & Hosen, M. J. (2020). COVID-19 and Bangladesh: Challenges and How to Address Them. Frontiers in public health, 8, 154. https://doi.org/10.3389/fpubh.2020.00154
7. WHO interim guidance; 5 June 2020
8. Zhu, H., Wei, L., & Niu, P. (2020). The novel coronavirus outbreak in Wuhan, China. Global health research and policy, 5, 6. https://doi.org/10.1186/s41256-020-00135-6
9. World Health Organization situation report Bangladesh-18, June 29, 2020
10. Centre for Evidence-Based Medicine (2020) Global Covid-19 Case Fatality Rates. https://www.cebm.net/covid-19/global-covid-19-case-fatality-rates/
11. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). 16-24 February 2020. [Accessed 7 April 2020] Available at URL: https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf
12. Abir, Tanvir & Kalimullah, Nazmul & Levi Osuagwu, Uchechukwu & Dewan, & Nur A Yazdani, Dewan & Husain, Taha & Basak, Palash & Permarupan, P.Yukthamarani & Agho, Kingsley. (2020). Factors associated with the perception of risk and knowledge of contracting the 2019-CoV among adults in Bangladesh: Analysis of online surveys. 10.13140/RG.2.2.15130.67526.
13. 99pc Bangladeshi respondents aware of Covid-19: survey. https://tbsnews.net/coronavirus-chronicle/covid-19-bangladesh/99pc-bangladeshi-respondents-aware-covid-19-survey-64153
14. WHO situation report June 20, 2020
15. World Health Organization. Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations.
16. Day M. Covid-19: identifying and isolating asymptomatic people helped eliminate virus in Italian village. BMJ 2020; 368: m1165. doi:10.1136/bmj.m1165