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Review Article

An emperical analysis of the Role of Technology in Patient Empowerment: Challenges in Saudi Arabian's Healthcare

Aisha Mohammed Alotaibi
Department of Health Informatics
College of Applied Medical Sciences
Qassim University, Buraydah 51452,
Kingdom of Saudi Arabia
Email: 421201842@qu.edu.sa

Dr. Yasir Hayat Mughal
Department of Health Informatics
College of Applied Medical Sciences
Qassim University, Buraydah 51452,
Kingdom of Saudi Arabia

Email: y.hayat@qu.edu.sa

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Abstract

The purpose of this study is to investigate in the role and challenges of technology and patient empowerment faced in Saudi Arabia in healthcare. It also looks at the factors that encourage patient empowerment. It investigates the issues of low literacy, restricted access to technology, privacy problems, and patient-related issues including culture and aging. To direct the investigation, research questions and hypotheses will be created. The aims encompass evaluating the influence of technology and patient empowerment on healthcare results as well as comprehending their consequences on healthcare systems and communities. Survey approach was used to collect the first-hand data. Results revealed that instrument was found reliable and there was significant relationship between predictors and criterions. Likewise, predictors have positive and significant effects on patient empowerment. This implies that technology play an instrumental role in patient empowerment. Therefore, harnessing an adequate technology into the healthcare organizations can bring significant changes that empowers patient. This study was conducted with a small sample size because of the time constraints and wide spread of the population. However, in future researcher could conduct study with larger sample size in different regions. Future studies can add qualitative methods to have more deeper understanding of the problem.

Keywords: Technology, Patient Empowerment, Privacy and Security, Limited access to Technology, Lack of Literacy.

Introduction

The idea of patient empowerment began to take shape, grow, get better, and attract more attention in Saudi Arabia thanks to several governmental and regulatory bodies (Cowie, Chronaki, & Vardas, 2013). As a result, the Saudi Patient Safety Center is attempting to raise public awareness of the idea of patient empowerment.

The importance of empowerment in health care has increased over the past few decades, and a rising corpus of research has resulted from its applicability (Chatzimarkaki, *et al.*, 2018). There is no single definition for patient empowerment in the context of healthcare, despite the consensus among most writers regarding its significance. The World Health Organization proposed in September 2012 to define empowerment as 'a process through which people gain greater control over decisions and actions affecting their health'. This can be achieved through developing one's skills, gaining access to resources and information, and influencing factors that have an impact on one's health and well-being (World Health Organization, 2020).

Nonetheless, the intricacy of empowering patient and the broad range of its impacts across the healthcare process led several writers to explore the various aspects of this concept and to devise distinct methods for characterizing and defining its elements. A recent analysis (Cerezo *et al.*, 2018) of patient empowerment identified 10 potential dimensions for its expression, including patients' control over their illness, involvement in therapeutic decision-making, and knowledge acquisition, and discovered 17 distinct definitions for the concept. These components demonstrated how empowerment can be conceptualized as both an outcome and a process: as an outcome, by emphasizing the outcomes of this development; as a process, by considering all those elements that can influence participation in the various stages of the care process and shift the decision-making power towards the patient. To put it another way, this means that empowerment may be understood as an enabling process in which medical professionals work with patients to provide them with resources and knowledge; the result is a patient who is better equipped to manage their disease and make decisions based on their knowledge (Cerezo *et al.*, 2018).

One could argue that technology is essential to modernity. Modern technology is widely acknowledged to have the ability to make modern society's operations easier (Eysenbach *et al.*, 2001), and it permeates almost every aspect of modern civilization. The early support of eHealth in health systems made it abundantly clear how important technology is to patient empowerment. Saudi Arabia has launched many applications that have contributed to patient empowerment, such as Sihaty, medical consultations, digital health, telehealth, and health passports. Technology and patient empowerment are so closely related that the latter would not be possible without the former.

Being a modern concept, patient empowerment cannot exist without technology, but technology by itself cannot solve the problems associated with facilitating empowerment (Eysenbach *et al.*, 2001). Without efficient technology, it is impossible to fully utilize and effectively manage the conditions for patient empowerment, which include wide access to health information and knowledge, self-management programs, the creation of new health policies for patient involvement, the use of mobile and wearable devices, and more (Wadhwa *et al.*, 2013). However, concerns regarding the effectiveness of information and communication technologies (ICT) have started to arise due to the existence and escalation of obstacles to specific technical utilities, such as health information technologies (HIT) (Eysenbach *et al.*, 2001), particularly regarding patient empowerment. Encouraging patient empowerment is a fundamental component of contemporary healthcare systems and aligns with advancements towards increased autonomy (Halpern *et al.*, 2013).

Development and conceptualization of models and frameworks to facilitate the delivery of the empowered patient have advanced (Eysenbach *et al.*, 2001). These frameworks are designed, developed, and implemented with substantial use of technological goods that are incorporated into the process. However, in an increasingly technologically advanced healthcare environment, several patient empowerment frameworks and models are beginning to reveal their age due to unconnected elements that have obscured their expansion and strength (Funnell *et al.*, 1991).

In addition, the highly desired outcome of an empowered patient has not yet been achieved despite the extensive use of technology in patient empowerment discourse and modelling (Calvillo *et al.*, 2013). This research addresses patient empowerment and a few of its related difficulties.

Problem Statement

Patient-facing technologies face numerous obstacles, from a lack of knowledge among patients and providers to systemic difficulties in implementing the technology. The adoption data that is currently available indicates that patients continue to use health IT modalities at low rates (Bates *et al*., 2012). Inadequate computer skills, low health literacy, older age, lower socioeconomic status, and unfulfilled technical support needs are a few factors that may hinder patients' use of health IT (Rozenblum *et al*., 2015).

A number of these issues are connected to organizational strategies—or the absence of them—that encourage providers and patients to adopt patient-facing technologies like personal health records (Wells *et al*., 2015). By focusing on audiences and keeping an eye on their uptake, organizations should prioritize strategic investments in this area (Wells *et al*., 2015). Patient-facing mobile health applications (m Health apps) present another difficulty. Despite a significant increase in the quantity of m Health applications and smartphones available, research indicates that many of these apps lack safety and security and only a small number of them cater to the needs of patients who could benefit the most (Singh *et al*., 2016). Lastly, there are situations in which patient-facing health IT may bring up moral and privacy concerns for the patient; one such instance is when a patient is incapable of making decisions for themselves and their proxy decision makers use the tools on their behalf (Brown *et al*., 2016). Nevertheless, as their potential is better recognized and utilized by clinicians, patients, and policymakers, health IT solutions that facilitate patient participation are anticipated to gain significance.

Objectives

1- to investigate the effect of privacy and security on patient empowerment
2- to determine the negative significant association between lack of education and patient empowerment
3- to detect the impact of limited access to technology and elderly people on quality of patient empowerment

Research Questions

RQ-1 Are predictors and criterion variables are related?
RQ-2 Does predictors have direct effect on the criterion variables?

Literature Review

The Kingdom of Saudi Arabia's health system strives to guarantee that all residents have equitable access to comprehensive and integrated medical treatment. The Ministry of Health, acting as the state's representative, seeks to establish a comprehensive system of health care services that spans the Kingdom. The Ministry chooses where and how many of these services to provide, working with the regional councils to assess the demand.

The geographic, demographic, and disease trends that are prevalent in the area are taken into consideration when providing care. Citizens can receive free medical care in government-run hospitals in accordance with a strategic plan tailored to the needs of the healthcare industry (Ahern *et al*., 2011). The Ministry of Health has committed to elucidating the patient's rights and responsibilities towards the health facility under the Bill of Rights, in cooperation with the competent authorities in the field of providing health care services, while considering human, social, and national rights and duties. The Ministry of Health believes that the Kingdom's government has the right to empower the patient and involve him in decisions that support and improve the services provided. The system said people would raise the standard of care given, boost patients' trust in medical facilities, and strengthen the links of cooperative health and humanitarian work between providers and beneficiaries at all levels. Concerning the regulation of Saudi patients' and their companions' expenses, the Ministry of Health oversees handling such costs if a patient is referred for treatment outside of his or her area of residence (inside or outside the Kingdom). This is done in accordance with the organization of Saudi patients' and companions' expenses referred for treatment outside of their areas of residence (Bridges *et al*., 2010). The idea of patient empowerment has begun to take root, grow, develop, and attract increasing interest from several governmental and regulatory bodies in Saudi Arabia (Ahern *et al*., 2011). Moreover, the Jeddah Declaration declared in 2019 at the 4th Global Ministerial Patient Safety Summit held in Jeddah hosted by Kingdome of Saudi Arabia outlined a set of recommendations for international standards, guidelines, and actions to address patient safety issues of global significance. One of the Jeddah Declaration's recommendations is to "Promote Patient Empowerment & Community Engagement for Patient Safety" to encourage countries to adopt practical empowerment strategies for patients and families. For example, strategies highlighted co-production principles by strengthening health literacy and endorsing implementation and reinforcing Patient- Centred Root Cause Analysis (Patient - Centered RCA) (Jeddah *et al*., 2019).

Why is patient empowerment crucial?

1- Patients who are given meaningful interaction are better able to comprehend and take a more proactive role in their care.
2- Enhancing treatment compliance and adherence leads to better patient outcomes, which in turn increases patient satisfaction with their healthcare provider.
3- Studies indicate that patients who participate in healthcare decision-making are more likely to have improved results.
4- Patient empowerment enhances involvement between healthcare practitioners and patients, promoting improved communication that lowers the risk of misdiagnosis and decreases the frequency of hospital visits. It is not simply about health results.
5- Patients who feel empowered will interact with their providers more effectively. They will therefore probably have greater faith in their providers (Wadhwa *et al*., 2013).

What does an engaged patient do?

1. Recognize your personal health situation and how it affects your body.
2. It can influence decisions made by your medical professionals.
3. be able to choose a course of treatment with knowledge.
4. Recognize that altering your lifestyle will be essential to managing your illness.
5. be able to communicate with and query the medical staff who are attending to them.
6. The ability to take charge of your health and aggressively seek medical attention only when required.
7. proactively look for, assess, and apply information (Brown *et al*., 2016).

Blockchain and Security

Patients want new technologies that enable them to download their data at will and that tag and monitor it to provide them with more transparency over where, who, and why their data is used to enhance patient access to and control over it (Calvillo, Roman, & Roa, 2013). Additionally, to provide and revoke authorization for the use of their data, they require new technologies. Blockchain technologies are overhyped in the healthcare industry, but this is one area where they could help patients gain control over their data and transparency. When the blockchain is used correctly, patients will be able to see who has access to their data, who is requesting it, and why. They will also be able to approve or disapprove access to their data according to their own preferences and inclination (Cowie *et al*., 2013).

When used correctly, the blockchain would give patients the ability to know who has access to a copy of their data, who is requesting it and why, and whether to grant or refuse access based on their own personal preferences (Schulz *et al*., 2013). Patients require access to technologies that can enhance their health literacy, their understanding of their own diseases and the solutions available to them for control, to facilitate more knowledge and information (Cooper, LaSalle, & Wei, 2015). Physicians must have scalable and long-lasting methods to assess a patient's readiness for change to encourage patient autonomy and let patients take the lead rather than the other way around. To participate in shared decision-making with their patients, doctors also require the right tools (Brown *et al*., 2016). Additionally, patients require resources that will enable them to take an active role in their own self-care and comprehend their own motivations. To receive the greatest care in the most effective manner, patients and caregivers must also have access to technology that can guide them through the healthcare system. The blockchain and other data monitoring technologies may be crucial in enabling shareholding because they let businesses and patients monitor where patient data traveled, who used it, and what potential benefits the enterprise may have received (Cooper *et al*., 2015).

Challenges

Elderly People

The elderly frequently face significant challenges when it comes to learning new technologies and equipment, making it challenging for them to adopt and follow new practices (Brown *et al*., 2016). As a result, they tend to choose more traditional techniques. For instance, lack of digital literacy or other technological impediments may prevent older people from having full access to the internet (Wadhwa *et al*., 2013). Because of this, it may be challenging for individuals to remain up to date on their medical issues, available treatments, and other resources. For everyday tasks and medical decisions, some elderly people may rely significantly on caretakers, such as family members or medical professionals. Their sense of independence and control over their own lives may occasionally be restricted by this dependence. However, we might be able to solve this issue by promoting education. However, by promoting education and awareness campaigns that highlight ageism and the rights of senior citizens, we might be able to solve this issue. This can promote a more inclusive and polite society by lessening prejudice and preconceptions.

Patient Itself

Physicians must provide individualized patient treatment while also being mindful of any obstacles to participation. To empower their patients, doctors must not only communicate clearly but also make sure the patient is not overwhelmed by the amount of information being presented to them (Funnell *et al*., 1991). While some patients want all the information possible about their diagnosis, course of treatment, and anticipated prognosis, many patients are content to know just "the basics." Nevertheless, collaborative decision-making—which is influenced by several aspects, such as the following—should be the aim of interactions between a doctor and patient.

Patients may originate from a society that values medical advice without inquiry. Education level: Patients with low levels of education may not be able to comprehend the mechanisms underlying their diseases or available treatments (Rozenblum *et al*., 2015). Taking costs into account Expense can provide a significant obstacle to receiving the right care. Personal drive: Some patients might not have the drive or self-control to make the necessary changes to regain their health. In this case, doctors might want to consult friends and family and take care of any psychosocial requirements (Wadhwa *et al*., 2013). Physicians need to be aware of these possible obstacles and create plans to assist patients in overcoming them if they want to encourage shared decision-making.

Privacy and Security

Patients run the danger of having their private health information compromised when they use technology to manage their health. Hacking, data breaches, and illegal access to patient information are a few examples of this. This is a major problem since it can result in identity theft, financial fraud, or even worse outcomes for patients if private information is disclosed without authorization (Schulz *et al*., 2013). Healthcare providers must abide by all applicable rules and regulations to protect patient data to solve this challenge (Bridges *et al*., 2010). To safeguard patient data, this entails putting robust security measures in place like firewalls and encryption. In the event of a security problem, they must also have a plan for responding to data breaches. Healthcare professionals should also advise patients about safeguarding their personal health information and recognize and report any security breaches. Making sure patient data is used properly is another part of this difficulty (Singh *et al*., 2016). As a result, healthcare providers ought to guarantee that patient information is just utilized for the purposes for which it was gathered and that individuals could view, update, or remove their personal data.

Limited Access to Technology

Indeed, limiting access to technology presents another hurdle to patient engagement. Not all patients have access to technology, even though it can be a very useful tool for patient involvement (Wells *et al*., 2015). Disparities in care may result from this, leaving certain patients untreated. This is especially true for vulnerable groups, like the elderly, those with limited incomes, and residents of remote locations. This is a problem for healthcare professionals, who must figure out how to guarantee that every patient has access to the technology they require to manage their health (Brown *et al*., 2016).

This can involve giving patients gadgets like tablets or smartphones or educating them on how to use technology to manage their health (Ahern, Woods, Lightowler, Finley, & Houston, 2011). Healthcare professionals can also search for ways to lower the cost of technology or increase accessibility to it by offering subsidies or locating less expensive alternatives. Ensuring that all patients can participate in their care and take charge of their health requires addressing the issue of limited access to technology (Wells *et al*., 2015). Healthcare professionals need to discover ways to make technology accessible to all patients as it becomes more and more common and required in the healthcare industry (Jeddah *et al*., 2019).

Lack of Literacy

The focus of health literacy has been on this issue of the patient's ability to empower themselves (Bates & Wells, 2012). The focus of health literacy is "the extent to which people are able to access, process, and comprehend the basic health information and services required to make appropriate health decisions." maximizing their health results by effectively utilizing healthcare resources (Wadhwa *et al*., 2013). The other two cells demonstrate the necessity of taking empowerment and literacy into account. Insufficient knowledge and expertise may lead a psychologically empowered patient to take charge of their healthcare decisions and make risky judgments that obstruct their efforts to achieve optimal health. thus, patient participation in healthcare can be significantly impacted by illiteracy (Brown *et al*., 2016).

Individuals who have difficulty reading and writing may encounter a few obstacles that make it difficult for them to fully engage in their own care and comprehend crucial medical information (Rozenblum *et al*., 2015). Low literacy mostly impacts patient engagement by making it more difficult to understand health-related information. It may be difficult for patients with low literacy levels to comprehend written documents like prescription instructions, appointment reminders, or instructional materials.

Misunderstandings, uncertainty, and disregard for treatment regimens may result from this. Low literacy rates might also make it more difficult for patients and healthcare professionals to communicate. Patients may find it difficult to communicate their symptoms, worries, or inquiries, and medical staff may find it challenging to use the right words and language to adequately explain medical information. Patient engagement may be hampered because of misunderstandings and a lack of mutual understanding (Schulz *et al*., 2013).

Methods and Materials

The study has reviewed many research and methodological practices from many reliable sources such as Google Scholar and PubMed that contain information on patient empowerment, technology, and challenges associated with it. The survey was used to administer the questionnaire and collect firsthand data from the healthcare institutions in the Qassim region. The sample respondents were the administration staff, physicians, nursing staff and patients. The convenient sampling technique was employed to get the opinion of the sample respondents.

Ethical Consideration

In this research, I adhered to the guidelines of research ethics and documenting sources to support the integrity of the research results and contribute to the positive impact of the research on individuals and society.

Results and Analysis

Table 1

Reliability and Descriptive Statistics

S#	Variables	Mean	Alpha
1	Elderly people	3.91	0.721
2	Patient Itself	4.20	0.756
3	Privacy and Security	4.36	0.789
4	Limited access to technology	3.87	0.711
5	Lack of literacy	4.52	0.757
6	Patient Empowerment	4.1	0.710

Table 1 presents descriptive and reliability results for the instrument used for data collection. Highest mean value is scored by lack of literacy M= 4.52 and lowest mean value was scored by limited access to technology M = 3.87, respectively. The rest of the values fall between these two values. This implies that limited access to technology and elderly people must be given due consideration. Regarding reliability, the highest alpha score was recorded for privacy and security i.e., 0.789, and lowest was recorded for patient empowerment i.e., 0.710. However, all values met threshold i.e., 0.70 (Field, 2013). This means that our instrument was consistent and reliable in obtaining the responses objectively.

H_1: Predictors and Criterion variables are positively and significantly associated.

Table 2
Correlation Coefficient

Variables	1	2	3	4	5
Elderly people	1				
Patient Itself	0.347**	1			
Privacy and Security	0.452**	0.57**	1		
Limited access to technology	0.236**	0.584**	0.497**	1	
Lack of literacy	0.413**	0.613**	0.521**	0.727**	1
Patient Empowerment	0.568**	0.687**	0.669**	0.561**	0.699**

Table 2 shows the correlation results of all the variables. Variables were found mutually correlated positively and significantly against the p value 0.01. Based on this result we further proceeded to check the direct effect of the predictors on the criterion variable which is presented in table 3.

H_2: All predictors significantly and positively effects patient empowerment.

Table 3
Regression Analysis

DV	IV	R^2	F	β	p
PE	Constant	0.76	1210.36		0.000
	Elderly people			0.871	0.000
PE	Constant	0.639	560.36		
	Patient Itself			0.799	0.000
PE	Constant	0.583	761.25		0.000
	Privacy and Security			0.763	0.000
PE	Constant	0.487	686.369		
	Limited access to technology			0.697	0.000
PE	Constant	0.397	428.74		0.000
	Lack of literacy			0.630	0.000

Results in Table 3 highlight the direct effect of the independent variables on the dependent variables for which linear regression was performed. For patient empowerment and elderly people explained variance of $R^2 = 0.76$, i.e., 76% with one percent change in PE ($\beta=0.871$, $p<0.01$) and model was found to fit F= 1210.36. in addition to, patient itself explained 63.9% variance on PE with unit change of ($\beta=0.799$, $p<0.01$) and goodness of fit F = 560.36 level. Further analysis of results revealed that privacy and security explained 58.3% variance on PE with unit change of ($\beta=0.763$, $p<0.01$) and model fitness F= 761.25. Likewise limited access to technology predicts 48.7% change in PE with F = 686.369 and $\beta=0.697$, $p<0.01$. Similarly lack of literacy explained 39.7% variance on PE, with Model fit F= 428.74, $\beta= 0.630$, $p<0.01$ respectively. Hence based on the above results hypotheses 2 is substantiated and accepted.

Conclusion

In the end, patients have power despite these difficulties. A significant novel idea, it gives people authority over choices and actions pertaining to their medical care. To effectively implement patient empowerment, it is imperative that patients receive education from the outset to ensure they are well-informed about their illness. As a result, patients who are empowered are better able to navigate the healthcare system. Armed with this understanding, individuals can ask for the information they require with assurance. They will also grow more self-aware and treat their doctor as an equal partner in their healthcare. In the end, there isn't a single treatment strategy that works for everyone, so giving patients more control over their healthcare is crucial to improving their experience to improve a patient's stay in the hospital or achieve clinical outcomes, it is beneficial for both patients and healthcare providers to support patient empowerment.

Theoretical and Practical Implications

Theoretical Implications

We can summarize the theoretical implications that most of these challenges, including age, cultural background, limited access, lack of education, privacy, and data security, are not the only challenges that hinder patient empowerment. In addition, these challenges are not specialized in patient empowerment, as they are also the same challenges that reduce patient satisfaction and other services. Provided by health care

Practical Implications

What we can do is reduce the obstacles as much as possible and pave the way to empower patients, as it improves quality and health care

Recommendations

There are some recommendations that may address these challenges and improve the role of technology and patient empowerment, such as encouraging patients to be empowered and showing the importance of their role in improving the effectiveness of health care. Using easy and understandable language for the elderly so that age is not a hindrance to them. Facilitating access to information and teaching patients how to use technical tools effectively. In addition to understanding the cultural, intellectual, and environmental nature of the patient so as not to hinder effective communication, and clarifying the idea of data privacy, confidentiality, and importance to patients. These are some recommendations that may reduce the impact of the challenges.

Limitations and Future Research Directions

This study was conducted with a small sample size because of the time constraints and wide spread of the population. However, in future researcher could conduct study with larger sample size in different regions. Future studies can add qualitative methods to have more deeper understanding of the problem.

Declarations

Ethical Approval and Consent to Participate: This study strictly adhered to the Declaration of Helsinki and relevant national and institutional ethical guidelines. Informed consent was not required, as secondary data available on websites was obtained for analysis. All procedures performed in this study were by the ethical standards of the Helsinki Declaration.

Consent for Publication: Not Applicable.

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