

Adoption of M-Health Applications: The Saudi Arabian Healthcare Perspectives

Research in Progress

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Abstract

Despite the vital role that mobile applications will play in the implementation of healthcare plans in the Saudi Vision 2030, several factors may influence the process. Due to the conflict of interest, lack of exposure, resistance to change, as well as limited technical knowledge of the apps, the Saudi Arabian society may inadvertently impede the government's objectives. All the challenges could be related to individual perceptions, technical complexities, social influence, as well as organizational reliability and preparedness. The earlier the authorities identify the issues and respond to them, the faster it will be to succeed in the implementation of mobile health (m-health) and subsequent attainment of the Vision 2030 health goals. This study conducted a review of literature in this context. The proposed model and factors identified will be tested to understand patients' perceptions of m-health applications. The results will be beneficial to increase the adoption rates of m-health in Saudi Arabia.

Keyword Saudi Arabia, adoption, m-health, applications, vision

1 INTRODUCTION

Mobile applications will play an instrumental role in the delivery of efficient healthcare services around the world. Most countries have already implemented the technology since it is associated with positive outcomes. For example, Yousaf et al. (2019) find that the intervention is already proving its effectiveness in helping people with dementia to undergo cognitive training, screening processes, socializing, navigating, as well as monitoring of their conditions. As for Saudi Arabia, the achievement of the Vision 2030 requires the integration of such programs. The country has since adopted several health applications, although the prevalence has not reached the anticipated levels (AlBar and Hoque 2018). Even as the Saudi Arabian government strives for full penetration of mobile health (m-health) applications (MOH 2017), this paper argues that the adoption of such interventions would enhance the country's Vision 2030 health goals, but the authorities must first identify individual, technical, social, as well as organizational challenges that may hinder its plans. To understand and validate the adoption and acceptance of m-health applications, we conducted a review of literature in this context. Moreover, this paper explores the current state of m-health in Saudi Arabia by intensively searching for previous studies to lead why there is low adoption of such technology by patients. Moreover, a review of literature on m-health adoption remains poorly defined even though numerous studies on m-health that have published in the last few years. Such a review represents an essential discovery in the development of a research field that can help to achieve and assist the Saudi's Vision 2030. Therefore, this study aims to contribute to this growing area of research by exploring a detailed review of m-health adoption. Besides, to examine and analyse the current state of m-health and its adoption by patients living in Saudi Arabia.

This paper is organized as follows: Section 2 describes problem statements and research questions. Section 3 defines the aim and objectives of the research. Section 4 presents the literature review that explores mobile health definitions and indicate the current state of m-health applications in Saudi Arabia. Section 5 presents the findings and discussion, a conceptual research model, and all factors of the research model are also discussed. Lastly, the research is concluded by giving a conclusion and recommendation for future research contribution.

2 PROBLEM STATEMENT

Due to continuing growing number of patients in Saudi Arabia, there is a need for advanced technology solutions to improve and overcome patients' requests of healthcare services. The Saudi Ministry of Health (MOH) in 2018 designed a new application that performs online medical consultations with personal physicians and to book primary health care appointments (MOH 2018). However, according to the 2019 half-annual report by the National Digital Transformation Unit (2019), many people in the country are still unaware of its importance. There are various challenges of m-health and its adoption in Saudi Arabia. This includes technological challenges, infrastructural issues, and security concerns (Albaptain et al. 2014). Apart from these problems, there are many individuals, social, and organizational challenges. The challenges of adopting m-health raise the following questions:

- What is the current status of m-health applications in Saudi Arabia?
- What is the role of m-health apps in the Saudi' 2030 Vison?
- What are the factors that influence the implementation of m-health apps?

3 AIMS AND OBJECTIVES

The aims of this research are:

- To identify the current state of m-health applications in Saudi Arabia.
- To highlight and understand factors that influence patients' adoption and acceptance of m-health services.
- To validate the hypotheses developed in the next research stages.

The objectives of this research are:

- To provide the knowledge needed to ensure a successful implementation of m-health applications by a healthcare provider.
- To identify the main factors that need to be examined within Saudi patients in the next research stages.

- To provide a model that connects all factors related to m-health applications adoption.

4 LITERATURE REVIEW

4.1 Mobile Health (M-Health)

Over the past century, the marvellous spreading of mobile technologies and applications related to health concerns has boosted a new field of electronic health (e-health), known as mobile health (m-health) (Hoque 2016). The term m-health was invented by Prof. Robert Isteparian, who indicated that it involves the use of mobile technologies such as smartphones, tablets, and portable digital devices to improve health practices (Kariuki and Okanda 2017). M-health related applications have added the opportunity to save and help a wide range of targeted users with health issues. Compared to traditional health services, m-health applications have a lot of opportunities over general health since they allow patients to customize their health services (Zhang et al. 2017). M-health provides access to treatment and prescriptions anytime, health status, and rapidly obtain patients information, thereby removing long queues and waiting times (Crico 2018). M-health context involves the use of several mobile platforms that used by patients for health practices, including short text message services (SMS), video conferencing, as well as smartphone applications (apps) (O'Shea et al. 2017). Healthcare plans have been reformed in different developing countries, such as Malaysia, Thailand, Singapore, and India, to influence healthcare providers to use approaches in technology that can address health problems (Hussein et al. 2017).

4.2 Current State of M-Health Applications in Saudi Arabia

Despite the benefits associated with mobile-based applications, many people in the country are still unsure of its significance. In the study that examined the penetration and usage of m-health apps in Saudi Arabia, 46% of people with mental disability proved that they had between one and two healthcare applications on their cell phones (Atallah et al. 2018). Although the research focused on a small group of people, its findings portray the usage of such applications as substantially low. Therefore, the state agencies should educate the members of the public on the usefulness of the programs. Additionally, the Saudi government needs to work with healthcare practitioners to accept technology in all fields. Although the mobile-based programs have the potential of influencing every health department, some experts have not adopted it in full. For instance, m-health apps have not been widely used in addressing cardiovascular diseases (Abid 2019). Even in the mental health area, not everyone has fully embraced technology. Considering the morbidity of related diseases, it is vital that the authorities encourage all doctors as well as other primary stakeholders to sensitize patients and the public in general on the importance of the applications (Abid 2019). The incorporation of m-health into the Saudi Vision 2030 was considered and approved by the government to help in the realization of its objectives. In 2016, the Saudi government unveiled its plans to achieve various goals relating to the economy. The healthcare department was mentioned as an essential contributor due to emerging opportunities. Through the vision, the ministry of health envisages reformed and restructured primary healthcare, the partnership between the public and private healthcare, increased capacity and quality of related education, as well as improved collaborations with insurance companies. The government is committed to the initiative as affirmed by its ambitious plan to have as many as 70% of its citizens' records transferred and stored digitally (Abid 2019).

As a start point to follow the Saudi Vision 2030, the Ministry of Health (MOH) in 2017 developed its new smartphone applications that performs online medical consultations between personal physicians or appropriate specialists and patients remotely (MOH 2017). Even though there is a high percentage of mobile phone users in Saudi Arabia, the utilization of this indication by healthcare providers in both public and private sectors have little attention. Currently, most of the standard procedures, including doctor appointments and purchase of drugs, are conducted manually. Al-Hanawi et al. (2018) argue that such tedious processes contribute to the high cost of healthcare services in the country. Additionally, patients with chronic diseases have to visit health centres for treatment. In contrast, developed countries, such as the United States, provide care using different interventions, including mobile phone applications. The highlighted problems will possibly be addressed through technology because people will not have to visit doctors. Instead, they will contact the physicians using their mobile phone apps (Al-Hanawi et al. 2018). The integration of m-health could also facilitate efficient service delivery in healthcare. Like other countries, Saudi Arabia is always committed to maintaining effective public health since the factor is integral to economic growth (Alhowaish 2014). In recent times, the country has achieved significant goals, which will be improved under the m-health initiative. For example, unlike in the past when a high number of people did not have proper medications, Aljuaid et al. (2016) point out

that the access to reliable healthcare has increased in Saudi Arabia in the last three decades. While such improvements are commendable, recent studies show that the sector is still facing the problem of efficiency as evidenced by the low availability of drugs, long waiting times as well as tedious appointment processes (Al-Hanawi et al. 2018). Such challenges will possibly be addressed with the help of m-health since clients will book appointments via phone and access drug information using the same gadgets (Al-Hanawi et al. 2018). The prevalence of m-health will be instrumental in enhancing the Vision 2030 goal of improved health education. In its 2030 targets, the government intends to collaborate with the Ministry of Education to help young people to acquire pertinent information. The Saudi residents seem to be supportive of the idea judging by the high number of people who show interest with the applications. As previously indicated, more than 86% of doctors and 64% of other people have an app on their phones, which they use to access educative health-related information (Al Ghamdi 2018; Atallah et al. 2018). The increased knowledge will enhance the attainment of health goals on which Vision 2030 is predicated.

5 FINDINGS AND DISCUSSION

5.1 Factors and Challenges

Based on the problem statements and results from the literature review, this section examined more literature on factors, including individual perceptions, technical complexity, social influences and trends, and organizational reliability and readiness, to create hypotheses for testing.

5.1.1 Individual Perceptions

Perceptions refers to the feelings of users towards a system (Aiyebilehin and Omekwu 2019). Individual Perceptions are those that were discovered in the literature as crucial factors related to the role played by the individuals' adoption in this context (Talukder 2012). The perceptions of the members of the public towards technology will play a significant role in the implementation of m-health (Dutta 2015). Like people in other nations, Saudis' most considerable concern about the use of applications pertains to their security (Almubarak 2017). The government will have to mitigate such eventualities by insisting that mobile app companies adhere to strict principles of ethics and governance (Al Ghamdi, 2018). Currently, most Saudi nationals support the government's initiative to integrate mobile technology into health matters (Atallah et al., 2018). This trend is positive, but it will only remain that way if the apps are reliable in providing accurate and up-to-date data (Atallah et al., 2018). Members of the public are often seen as the only constituents that need sensitization and motivation to new technologies. However, group psychology may affect even the most unimaginable group in the healthcare sector, the doctors (Al-Ghamdi, 2018). The attitude may negatively influence patients and other practitioners if not solved as quickly as possible. Therefore, the following hypothesis is posited:

H1: Individual Perceptions have direct influences on users' adoption of m-health applications.

5.1.2 Technical Complexities

The success of m-health in Saudi Arabia will also be influenced by the exposure that people have to technical complexities that come with mobile apps. The technical complexities are those identified as most expected technical barriers to influence the adoption of m-health applications (Gagnon et al. 2015). On these factors, the current situation suggests that the authorities may not incur substantial cost or time in educating the public since most of them are already exposed to technology. For example, Al-Ghamdi (2018) established that at least 86.3% of the interviewed physicians used mobile phone apps without any challenges. Similarly, Atallah et al. (2018) confirmed that as many as 64% of the respondents could seamlessly use their medical apps. In essence, most of the residents will not have any problem using the applications if the relevant technology companies simplify them to match the current programs. However, Cajita et al. (2019) found that technical complexities such as poorly designed interface and technology cost have a negative influence towards m-health adoption. Consequently, the following hypothesizes are proposed:

H2: Technical complexities have negative influences on users' adoption of m-health applications.

5.1.3 Social Influences and Trends

Social influence is defined as "the extent to which consumers perceive that important others (e.g., family and friends) believe they should use a particular technology" (Venkatesh et al 2012). Executive innovation-decision created by a regularity authority will remove the optional decision to adopt an innovation by individuals (Rogers 2003). However, some studies indicate some negative attitudes of part of the social towards new health technologies (Gorini et al. 2018; Hoque and Bao 2015), other

highlights the importance and positivity of social member towards a technology (Hoque and Sorwar 2016; Tavares and Oliveira 2018). For that reason, the ministry of health should analyze and change the social impacts and patterns that tend to impede the penetration of m-health apps (Hoque and Bao 2015). Even though a high number of Saudis understand the usefulness of the applications, there is a culture of boredom that occurs to some of them. As an example, 86.3% of physicians possess and even utilize mobile applications, but only 50% of them want to access the app for only one time per day (Al-Ghamdi, 2018). The failure to respond to social influences and trends may hamper the plan to implement the technology and subsequently affect Vision 2030. Thus, the following hypothesis is proposed:

H3: Social Influences and Trends have direct influences on users' adoption of m-health applications.

5.1.4 Organizational Reliability and Readiness

Organizational readiness for change is described as the degree to which individuals of an organization behavioural and physiological willingness to perform the organizational transformation (Touré et al 2012). Despite the government's willingness, the implementation of m-health may encounter additional complications from the companies that will be used in the process. An obvious critical factor for m-health readiness is government plans and regulation (Khatun et al 2015). Introducing a new m-health app within an organization will affect and change work responsibilities; thus, healthcare providers and app developers should primarily consider job responsibilities while developing the app, which reflects a vital readiness of the organization (Feroz et al. 2018). The app developers should ensure that the applications do not have extended outages. Typically, the lack of reliability is one of the challenges that affect most app companies, with some of them failing to update the relevant information (Yousaf et al., 2019). While app developers bear the most significant responsibility, other insurance companies should also be prepared to support the policy. Without organization preparedness, reliability, and consensus, the implementation process will be hindered. The responsible government entities should start working with the relevant stakeholders early enough to avert such a possibility (Yousaf et al., 2019). As per the discussion, the following hypothesis is proposed:

H4: Organizational Reliability and Readiness has a positive influence on users' adoption of m-health applications.

6 PROPOSED MODEL

This study has developed a model that has been prepared based on a critical analysis of the literature relates to the adoption and acceptance of health-related technologies. The proposed model, shown in Figure 1, structured from four different perspectives that have been identified as crucial factors in the literature. Moreover, it contains one dependent variable: Adoption to use m-health applications, and four independent variables: Individual Perceptions, Technical Complexities, Organizational Reliability and Readiness, and Social Influence and Trends, The principal purpose of this model is to explore and investigate the adoption of m-health applications by patients in Saudi Arabia to increase the adoption rate of m-health applications and achieve the Saudi Vision 2030 in the healthcare area.

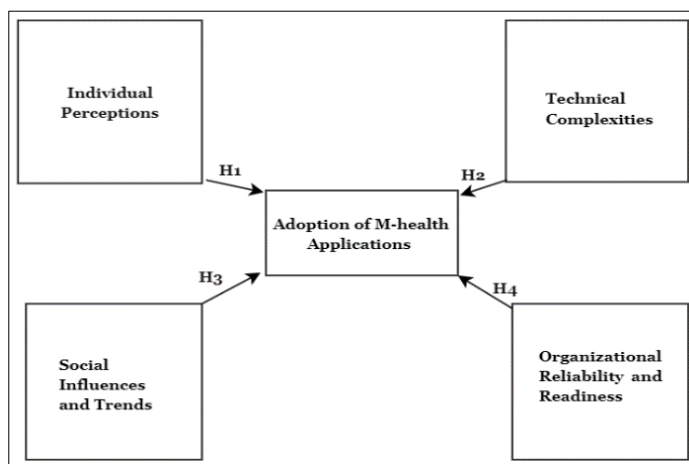


Figure 1: The proposed model

7 CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

Saudi Arabia's Vision 2030 health-related goals will require the integration of m-health applications. However, the government needs to solve individual perceptions, social influences, technical complexities, as well as organizational issues that may inhibit the process. Current problems should also be addressed for a successful implementation. Some of the common difficulties pertain to the penetration of mobile phone apps and unsupportive attitudinal issues. The authorities ought to encourage the members of the public to install and use the apps to access all the pertinent information. To overcome organizational issues, the relevant ministry should employ change efficacy and change valence. If the highlighted matters are sufficiently resolved, the Saudi Arabian government could inevitably achieve its Vision 2030 and the National Transformation Program that seeks to change the quality, accessibility as well as the cost of healthcare. The attainment of such goals would place Saudi Arabia on the same level as other developed countries and satisfy its citizens. The proposed model and factors identified will be tested in Saudi Arabia to understand and interpret patients' perceptions of m-health applications. The results will be beneficial to increase the adoption rates of m-health in Saudi Arabia.

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