

Exploring Health Managers' Views of Factors Influencing Their Acceptance of Electronic Health Services in Aseer Province, Kingdom of Saudi Arabia: A Qualitative Study

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Keywords

Kingdom of Saudi Arabia · Aseer Province · eHealth acceptance · Health managers · Unified theory of acceptance and use of technology

Abstract

Introduction: The Kingdom of Saudi Arabia (KSA) is a country with one of the largest land masses and difficult geographical terrain in the Middle East. Health services across the country are accessible through three categories of providers. The Ministry of Health (MOH) which is the dominant health provider responsible for 60% of all health services and facilities. Private health sector and other government run health authorities are the providers for the remaining 40%. The accessibility to advanced health services, especially for people in rural areas, has been considered one of the main health challenges. Utilising Information and Communication Technology (ICT) including Electronic Health (eHealth) as an innovative approach to healthcare delivery was suggested by recent studies. This study aimed to explore the views of health managers in Aseer Province towards factors that influence their acceptance of eHealth services in the KSA. **Methods:** In-depth face-to-face and telephone interviews with health managers from Aseer province,

KSA were conducted. The Unified Theory of Acceptance and Use of Technology (UTAUT) was employed as a theoretical framework in this qualitative study. The UTAUT model consists of four domains: performance expectancy (PE); effort expectancy (EE); social influence (SI); and facilitating conditions (FCs). All factors identified in the interviews were mapped against the UTAUT domains. Microsoft Excel and NVivo were used for the data analysis. Ethical approval had been gained. **Results:** Twenty-one health managers in Aseer province, KSA were interviewed. The most influential factors that influence health managers acceptance of eHealth services were clustered under four UTAUT domains. Three domains out of four showed significance: PE, SI, and FCs. **Conclusion:** This study confirmed the influence of some factors on health managers' acceptance of eHealth services in Aseer province, KSA. Original findings have been generated by exploring eHealth practice in the province which is part of KSA that has not previously been explored in the published eHealth literature. Identifying key challenges in accepting eHealth services may help in clarifying the better utilization of technology and making successful and positive transformational and sustainable change to the delivery of healthcare.

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Introduction

The Kingdom of Saudi Arabia (KSA) is a country with one of the largest land masses and difficult geographical terrain in the Middle East [1]. The accessibility of advanced health services, especially for people in rural areas, has been considered one of the main health challenges. One of the ways suggested to boost healthcare services was utilising Information and Communication Technology (ICT) with Electronic Health (eHealth) considered as an innovative way of healthcare delivery [2]. Many studies showed that healthcare industry in the KSA has made significant progress in the past few decades especially in introducing health technology in practice which results in ranking many healthcare institutions in the country among the best healthcare institutions in the Middle East region for the quality of health services provided [2]. Health services across the country are accessible through three categories of providers. The Ministry of Health (MOH) which is the dominant health provider responsible for 60% of all health services and facilities. Private health sector and other government run health authorities are the providers for the remaining 40% [3]. Many healthcare organizations took steps to benefit from the health technology revolution. Two studies reviewed the status of eHealth in KSA and concluded that the eHealth field in the country is promising with significant growth [1, 4]. However, eHealth studies remain limited to only a few geographical provinces and healthcare organisations which could affect the overall picture of eHealth status in the country as findings would not be generalised countrywide [4, 5]. Improved communication flow between patients and healthcare providers, increased patient safety, cost reduction, and easier access to patient's information are some benefits that eHealth can bring to the healthcare system. However, some key challenges with regard to the privacy and confidentiality of using electronic systems should be addressed [6, 7].

The Unified Theory of Acceptance and Use of Technology (UTAUT) has been adopted as a theoretical framework in this study. Figure 1 shows that the UTAUT has three direct constructs to behavioural intention; performance expectancy (PE); effort expectancy (EE); and social influence (SI) and two direct determinants to actual use which are facilitating conditions (FCs) and behavioural intention (BI) moderated by four variables which are: gender, age, experience, and voluntariness of use [8]. It is referred to in the literature as one of the most predictive models of technology acceptance that can explain up to 70% of the variance of technology

acceptance [9, 10]. The aim of this study was to explore the views of health managers in Aseer Province towards factors that influence health managers' acceptance of eHealth services in the KSA.

This study sought to answer the following three research questions:

1. What do health managers in Aseer Province know about eHealth services in the KSA?
2. What advantages do health managers in Aseer Province think that eHealth services can bring to the healthcare system in the KSA?
3. What factors do health managers in Aseer Province think are of significance to influence the acceptance of eHealth services in the KSA?

Methods

Study Design

Given the aim of this study, a qualitative phenomenological methodology was adopted. This methodology was considered appropriate to provide in-depth and rich information from the views and experiences of health managers towards eHealth services in Aseer Province, KSA.

Both face-to-face and telephone semi-structured interviews were employed to reach participants across the province. This was the most practical method of data collection in consideration of the job responsibility level of the targeted population (health managers) and geographical spread. Open-ended questions allowed participants to express freely and openly their views about factors that have been found to be influential to acceptance of eHealth services in the previous phases of this study [1, 4].

Interview Guide Development

The initial draft of interview questions was informed by the findings from the two previous phases [1, 4]. Questions were focused on the eHealth knowledge, eHealth services availability, easiness of using eHealth services, challenges and barriers to using eHealth, eHealth benefits, resource availability, training requirements, and factors found to be of importance from the participants' perspective. The draft of questions was built in English and Arabic by a team member then reviewed by the other team member for credibility. Face and content validity of the questions were tested by two external health managers who work for the MOH, KSA. Minor wording changes and combining some questions were suggested prior to confirming the final interview guide. The study information sheet, participation consent form, and interview questions were translated into Arabic language. Translation was then checked for accuracy by an independent health professional.

Inclusion and Exclusion Criteria

Inclusion

All professionals from multiple disciplines such as health professions, information technology (IT), and administration that work for MOH healthcare facilities in Aseer province were eligible to participate if involved in a managerial role.

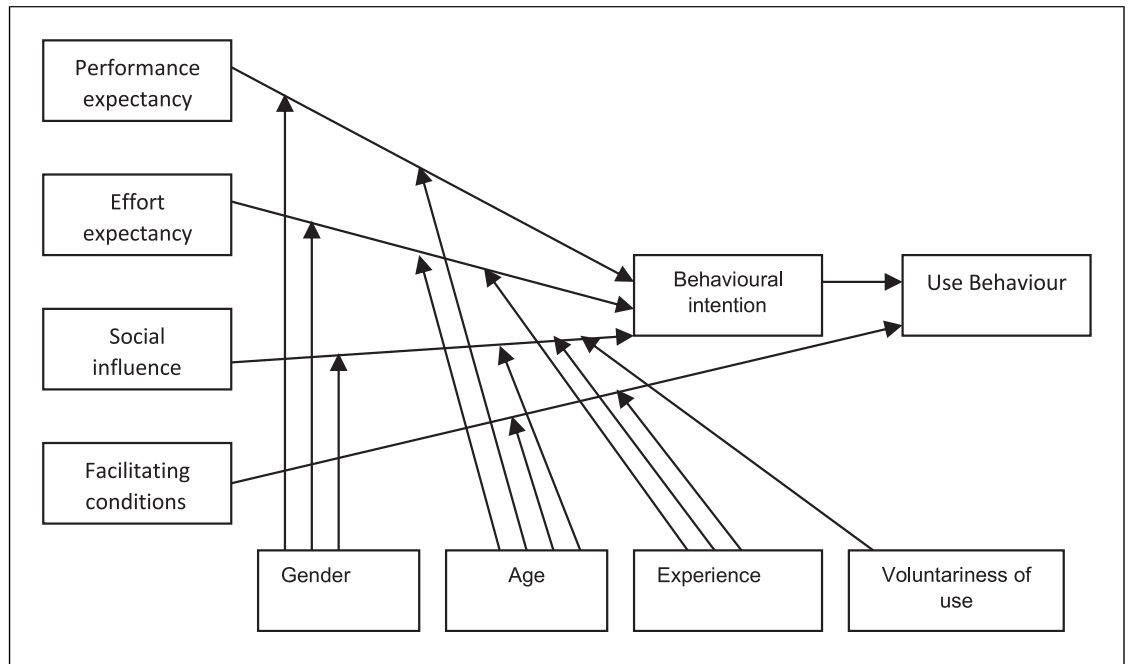


Fig. 1. Unified Theory of Acceptance and Use of Technology (UTAUT) [8]. In 2003, Venkatesh et al. [8] introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) which focused on “the intention” and “the usage” as dependent variables to explore individuals’ acceptance of technology. The UTAUT is a combination of eight technology theories namely: (i) Social Cognitive Theory (SCT); (ii) Innovation Diffusion Theory (IDT); (iii) Model of Personnel Computer Utilisation (MPCU);

(iv) Theory of Planned Behaviour (TPB); (v) Technology Acceptance Model (TAM); (vi) Motivational Model (MM); (vii) combined TAM-TPB; and (viii) Theory of Reasoned Action (TRA). The structure of the UTAUT which consists of four constructs: performance expectancy (PE); effort expectancy (EE); social influence (SI); and, facilitating conditions (FCs). These constructs are to predict the behavioural intention (BI) and actual use behaviour (UB) of technology.

Exclusion

Professionals that work for other healthcare providers such as the private sector.

Sampling and Recruitment of Participants

Purposive sampling techniques have been employed in this qualitative study to gain rich information of the views and lived experiences of a range of participants. In order to consider population characteristics, five stratification elements were employed for selecting participants:

1. Gender (male or female)
2. Managerial level (top, middle, or lower)
3. Healthcare settings (hospital, primary healthcare centre, or others such as regional health directorate office)
4. Geographical location (urban and rural)
5. Professional background (health profession, IT, or administration)

The initial agreed number of participants by the research team was 15 participants (5 participants for every managerial level or 5 participants for every professional background). However, the stopping point in recruiting further participants in phenomenological studies is usually determined by approaching the saturation point, which means, to continue sampling until no new themes are emerging.

Two pilot interviews were conducted (first was with a health manager from an IT background and the second with a health manager from a health profession background). Pilot interviews concluded that the questions were well understood; however, it was suggested to start the interview by giving an oral overview of previous findings of the study before starting the audio-recording session. Duration for interview was estimated at around 30 min.

Data Analysis

Five stages of qualitative data analysis were followed [11]: familiarisation, themes identification, indexing, charting, and mapping and interpretation. A Microsoft Excel document was created with separate rows for interviewees’ responses and separate column for initial themes. NVivo was used in the analysis procedures.

First Stage: Familiarisation

Familiarisation was done independently by Abdullah Alshahrani as it involved listening carefully to the audio-recorded interviews, reading transcripts thoroughly, and highlighting key ideas and themes.

Table 1. Profile of the interviewees

No.	Code	Managerial level	Managerial experience (in years)	Professional background
1	T1	Middle	6–10	IT
2	H1	Middle	1–5	Health profession
3	M1	Middle	11–15	Administration
4	H2	Middle	1–5	Health profession
5	H3	Middle	1–5	Health profession
6	T2	Middle	1–5	IT
7	H4	Lower	6–10	Health profession
8	H5	Lower	6–10	Health profession
9	H6	Middle	1–5	Health profession
10	H7	Lower	11–15	Health profession
11	H8	Lower	1–5	Health profession
12	M2	Middle	11–15	Administration
13	H9	Lower	6–10	Health profession
14	H10	Top	6–10	Health profession
15	T3	Top	1–5	IT
16	M3	Top	16–20	Administration
17	T4	Middle	1–5	IT
18	H11	Middle	11–15	Health profession
19	M4	Middle	1–5	Administration
20	T5	Middle	1–5	IT
21	M5	Top	6–10	Administration

Second Stage: Themes Identification

All themes were set deductively from the previous phase of this study [1]. Four preset umbrella domains were based on the four constructs of UTAUT (refer to Fig. 1):

Domain 1: PE.

Domain 2: EE.

Domain 3: SI.

Domain 4: FCs.

Seventeen themes identified in a systematic review were pre-defined with scope for any additional themes emerging to be added [4].

Third Stage: Indexing

All potential extracts representative of the theme in the transcripts were indexed and highlighted in colours. If the texts encompassed more than one potential theme, a short comment was added to notice that this issue contains double coding.

Fourth Stage: Charting

All texts related to a specific theme were placed together in a separate sheet for further analysis.

Fifth Stage: Mapping and Interpretation

All theme-related texts were mapped against the pre-defined themes. Quotes that best represented themes were selected. Translation of quotes from Arabic to English was done by Abdullah Alshahrani. Back-translation was performed by an independent researcher. After translation, all analysis steps including selecting best representative quotes were discussed

between Abdullah Alshahrani and Katie MacLure to promote data credibility. A full data analysis report with interpretation was presented.

Results

Interviewee Profiles

Twenty-nine participants agreed to participate. Data saturation point was reached after conducting twenty-one interviews. Table 1 shows the profile of the interviewees. Table 2 displays their characteristics for the stratification consideration.

Thematic Analysis

Eighteen themes were identified from the interview data. Of which, seventeen themes were pre-defined from the quantitative phase [1] mapped against domains as shown in Table 3 with one new theme, “eHealth benefits” added under the PE domain.

Domain 1: Performance Expectancy (PE)

PE means “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” [8]. Five themes were agreed by Abdullah Alshahrani and Katie MacLure to be relevant to this

Table 2. Interviewee characteristics

Characteristics/participant	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Gender																					
Male	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female				✓			✓														
Managerial level																					
Top												✓		✓	✓	✓					✓
Middle	✓	✓	✓	✓	✓				✓								✓	✓	✓	✓	
Lower						✓	✓	✓		✓	✓		✓								
Healthcare setting																					
Hospital	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓				✓
PHCC																		✓	✓		
Other												✓	✓	✓	✓						✓
Geographical location																					
Urban	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						✓
Rural																✓	✓	✓	✓		✓
Professional background																					
Health professional		✓		✓	✓		✓	✓	✓	✓	✓		✓	✓				✓			
IT	✓					✓									✓		✓			✓	
Administration			✓									✓				✓			✓		✓

Table 3. Domains and themes

Domains	Themes
Performance expectancy	<ul style="list-style-type: none"> • eHealth benefits • Privacy, confidentiality, and security of health information • Connectivity of information systems • Customisability of systems functions according to users' needs • Willingness to utilise technology
Effort expectancy	<ul style="list-style-type: none"> • Complexity of technology
Social influence	<ul style="list-style-type: none"> • Stakeholders' voice upon planning and feedback on preferences • Uncooperative behaviour and resistance to change
Facilitating conditions	<ul style="list-style-type: none"> • Availability of information and knowledge about eHealth services • Government legislation and constraints • Educational factors • Availability of operational resources • Organisational factors • Financial factors • Technical ability and work experience • Quality of eHealth systems and applications • Availability of adequate qualified human resources • ICT infrastructure and readiness

domain: eHealth benefits; privacy, confidentiality and security of health information; connectivity of information systems; customisability of systems functions according to users' needs; and, Willingness to utilise technology.

eHealth Benefits. This theme refers to the perceived usefulness that helps individuals to accomplish their work. Health managers in Aseer province commented on benefits that eHealth could bring to

their daily job. EHealth was thought to be beneficial in terms of saving time and effort for both staff and patients,

“It makes life easy, it is confidential and trustable. I don’t need to run all over the hospital looking for old files, or going to the lab taking previous results or duplicate tests that have already been done. I can find all information I need electronically without leaving my room and while sitting on my chair”

H2, Health manager (Health profession background)

Privacy, Confidentiality and Security of Health Information. These are major concepts of protection in which access to personal information is controlled. Confidentiality of patient’s information is important and should be given priority. Some health managers were concerned about this issue,

“You cannot persuade the patient of the importance of eHealth services until he is convinced that his information is kept safe. When he trusts that the information will only be seen by authorized health professionals, he will feel comfortable dealing with it. There must be clear confidentiality policies that are strictly adhered”

H6, Health manager (Health profession background)

Connectivity of Information Systems. This usually describes the communication between devices, systems, and applications either within the healthcare facility or with outside entities and facilities. Health managers showed awareness of the importance of connectivity of health systems,

“The patient has the right to have a unified Electronic Health Record. If any health problem occurred outside the province where he lives, he still can receive treatment in any other province”

H7, Health manager (Health profession background)

Customisability of Systems Functions according to Users’ Needs. This means adjusting them to give the best available experience to meet the needs of end-users. Some health managers found it difficult to change the system functionality due to the copyright of the electronic systems,

“Before implementing, we must take the opinion of health professionals in the system as they are the ones working on it. It is very important that health professionals are aware that electronic systems is designed to facilitate their work not to keep an eye on them”

T3, Health manager (IT background)

Willingness to Utilise Technology. This is the positive engagement of individuals in using technology once they perceive its advantages. The awareness of utilising eHealth services starts from the point of perceiving the

benefits that technology can bring. Willingness to utilise technology is strongly connected with the eHealth benefits theme,

“When explaining the benefits of using eHealth services and how can they save time and effort, as well as their benefits to the patient as facilitating access to health services and increase the quality of healthcare. The higher this awareness, the greater the acceptance of eHealth services”

H9, Health manager (Health profession background)

Domain 2: Effort Expectancy (EE)

Defined as “the degree of ease associated with the use of the system” [8]. Only one theme was found of relevance to this domain which is complexity of technology.

Complexity of Technology. This means the degree to which systems and applications are difficult and complicated to operate without prior experience or training. Some of health managers thought that the difficulty is not in the technology itself but is an issue with users, especially older generation users, that were accustomed to paper-based work,

“Technology is supposed to be easy, but our culture makes it difficult. If we notice, we work with two generations. A generation that believes in the importance of technology and an old generation that resists it”

H5, Health manager (Health profession background)

Health managers in Aseer province believed that complexity of technology was not a core issue in accepting and using eHealth services and can be solved by proper training prior to using any electronic system. Training was suggested to make technology easy to use and well-accepted,

“To the best of my knowledge, nothing is difficult but training is most important before using any system. Training should cover topics based on staff needs”

M2, Health manager (Administration background)

Domain 3: Social Influence (SI)

This refers to “the degree to which an individual perceives that important others believe he or she should use the new system” [8]. Two themes were found of relevance to this domain: stakeholders’ voice upon planning and feedback on preferences; and, uncooperative behaviour and resistance to change.

Stakeholders’ Voice upon Planning and Feedback on Preferences. This refers to the active participation and involvement of stakeholders in planning the necessary services. Health managers showed that sharing their needs for electronic services and eHealth strategy made them ready to accept and use these systems when they were launched,

“Front line staff should share views on eHealth strategy. When you listen to the needs of staff, you can plan your strategy based on what they need”

M2, Health manager (Administration background)

Uncooperative Behaviour and Resistance to Change.

This is the action taken by some employees when they perceive that technology can be a threat to them. Health managers believed that some health professionals tend to reject utilising technology at the workplace for several reasons such as work load,

“Yes, some physicians resist using eHealth services, but personally I do not blame them. When you are supposed to see 40 patients in your clinic within four hours, using paper notes is easier and faster than using electronic system”

H1, Health manager (Health profession background)

Domain 4: Facilitating Conditions (FCs)

This refers to “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” [8]. The following pre-defined themes were found of relevance to this domain: availability of information and knowledge about eHealth services; government legislation and constraints; educational factors; availability of operational resources; organisational factors; financial factors; technical ability and work experience; quality of eHealth systems and applications; availability of adequate qualified human resources; and, ICT infrastructure and readiness.

Availability of Information and Knowledge about eHealth Services. This refers to the awareness of eHealth services information which include plans for implementation, strategy, and policies and procedures of the practice. Some health managers were knowledgeable on eHealth and aware of its importance in their daily work,

“I began hearing about eHealth services 5 years ago, but the term has been focused on for the past 3 years. I think eHealth aims to archive the patient’s data and convert it into an electronic version”

H5, Health manager (Health profession background)

Government Legislation and Constraints. These are the plans, laws, rules, and regulations imposed by governmental bodies such as the national eHealth strategy. Health managers think that top management teams, headed by the Minister of Health, encourage utilisation of technology. However, there are several unexpected consequences that hinder progress such as lack of clarity of plans and standards that should apply on all healthcare facilities, continuity and follow-up of implementation, and lack of resources,

“The health vision is still not clear with regards to the unified health record, but we hope that within 2 or 3 years we will be able to reach the desired goal”

H7, Health manager (Health profession background)

Educational Factors. These are related to the level of education, training, and proficiency required to feel confident in performing the job. Lack of training in eHealth services was an important issue raised by most of the health managers but it was not clear what training courses were needed. There was a need for awareness promotion courses to keep health managers updated and boost their eHealth acceptance,

“I think we should have a separate training program for each stakeholder’s group based of what they need from the system. IT should be the ones conducting these training courses in order to improve the end user’s experience”

H2, Health manager (Health profession background)

Availability of Operational Resources. Operational resources are the tools that are used to handle daily work such as computers, laptops, printers, print papers, and ink. Health managers agreed that operational resources are essential in healthcare facilities. PCs, printers, and scanners were the resources that should be adequately provided in order to perform the job,

“We have only two computers in every admission ward. Do you think this number is enough for daily use by nurses and physicians? If enough resources are available as well as an easy and well-designed system. This will motivate us to use eHealth services”

H5, Health manager (Health profession background)

Organisational Factors. Organisational Factors are those factors that influence behaviour at work such as the mission, vision, size, and type of the healthcare facility. Absence of plans and clear goals was raised by health managers as an obstacle,

“It is very important that we work based on clear foundation, clear plans, and clear goals. It is also very important to keep a continuous development and update our policies and standards that are of relation to the practice”

H7, Health manager (Health profession background)

Financial Factors. Financial resources are the funds secured to establish, operate, and maintain infrastructure, systems, and applications. Financial factors were focused on as one of the most important resource needs. Health managers emphasised that without adequate financial resources, eHealth systems will be at serious risk of failure,

“No project can be done, developed or improved without financial support”

T1, Health manager (IT background)

Table 4. Answer directions of the research questions

Research question	Answer directions
What do health managers in Aseer Province know about eHealth services in the KSA?	Health managers in Aseer Province showed different levels of knowledge about eHealth services. This knowledge was gained from many sources such as universities of undergraduate or postgraduate studies as well as continuing professional development through training courses. However, while they know which eHealth services are in use in Aseer province, and other services that are available elsewhere in KSA, their knowledge was limited to the guidance of current eHealth practice. Nothing was clear to them with regard to eHealth future plans
What advantages do health managers in Aseer Province think that eHealth services can bring to the healthcare system in the KSA?	Health managers in Aseer Province believe that eHealth services can bring a number of advantages to the healthcare system in the KSA. These advantages include but not limited to: <ol style="list-style-type: none"> 1. Improve efficiency of healthcare delivery 2. Improve communication flow between patients and healthcare providers 3. Reduce costs 4. Enhance patient experience through providing patients with access to their health medical records and making it easier for them to book appointments and request teleconsultations
What factors do health managers in Aseer Province think are of significance to influence the acceptance of eHealth services in the KSA?	Health managers in Aseer Province believe that factors of relevance to performance expectancy, social influence, and facilitating conditions were of significance to influence the acceptance of eHealth services in the KSA

“If you do not have enough budget for electronic services, it will only be on paper”

T5, Health manager (IT background)

Technical Ability and Work Experience. Technical ability and work experience refer to the competency in carrying out the technical tasks without help from others such as using eHealth systems and applications. A health manager believed that the more the manager was good at using computers and has good technical ability, the more their staff will follow and accept utilising technology,

“I imagine if my technical ability was not good, I would definitely resist and refuse electronic services and go for paper work”

H3, Health manager (Health profession background)

Quality of eHealth Systems and Applications. This means smooth and efficient performance with no technical crashes, failures, or frozen screen difficulties. A health manager believed that the variation in the quality level of health systems can be attributed to the companies that provided eHealth systems,

“As an end-user, I care about my time, if access to the system takes a long time, I would probably not use it”

H6, Health manager (Health profession background)

Availability of Adequate Qualified Human Resources. These are skilled professionals that manage systems and provide technical support. Healthcare facilities are in need for eHealth specialists,

“The availability of highly qualified human resources in eHealth is great support for two reasons. The first is to ensure ideal and professional handling of the eHealth systems, and the second is to train other staff to use and benefit from these systems”

M1, Health manager (Administration background)

ICT Infrastructure and Readiness. This is the physical structure of the healthcare facility including buildings, internet connection, network points, and power supplies. When a question was asked about, “How important was the infrastructure?” Health managers answered,

“Even if you have a very good eHealth system but your hospital infrastructure is not good, that will lead to the failure of the project”

T2, Health manager (IT background)

Discussion

Findings Discussion

The aim of this study was to explore the views of health managers in Aseer province, KSA towards factors that influence health managers’ acceptance of eHealth services. The discussion of the interview findings is presented based on the research questions and the UTAUT model. Table 4 shows the three research questions with brief answer directions.

What Do Health Managers in Aseer Province Know about eHealth Services in the KSA?

Health managers in Aseer province showed different levels of knowledge about eHealth services. That can be seen as inevitable given the variation in the level of education and personal preference towards accepting technology as stated in the literature of eHealth in KSA [12–14]. This knowledge was gained from many sources such as universities of undergraduate or postgraduate studies as well as continuing professional development through training courses. From a policy perspective, few health managers knew about the eHealth National Strategy [15], which indicated a gap in communication of intention between the policy makers and front line staff that work in the field. So while they know which eHealth services are in use in Aseer province, and other services that are available elsewhere in KSA, their knowledge was limited to the guidance of current eHealth practice. Nothing was clear to them with regard to eHealth future plans.

Lack of eHealth knowledge was evidenced to be one of the main challenges in accepting healthcare technology from the views and experiences of health professionals and health managers in several studies that were conducted in Saudi Arabian contexts [12–14]. A systematic review to study the relevant barriers and facilitators to eHealth services implementation had concluded that limited knowledge of eHealth is one of the top factors addressed in the literature [16]. Given the timeline evidenced in the literature, there appears to be a lack of progress in advancing the awareness of the revolution of eHealth services. This issue is of importance to concentrate on especially in planning training courses that aim to embrace technology in healthcare in line with the National Transformation Programme (NPT) 2020 which is part of the Saudi Vision 2030 [17]. More recently, the MOH has developed a vision for eHealth, an “E-Health Strategy and 5 year Roadmap” [18]. The eHealth strategy promises to support the primary MOH business goals to:

- Care for patients
- Connect providers at all levels of care
- Measure the performance of healthcare delivery
- Transform healthcare delivery to a consistent, world-class standard.

What Advantages Do Health Managers in Aseer Province Think that eHealth Services Can Bring to Healthcare System in the KSA?

The eHealth strategy supports the wide range of benefits of utilising eHealth services reported in this study by health managers in Aseer province [18]. The managers thought that eHealth benefited patients by enabling them

to book appointments remotely, request medical consultations, meet GPs virtually, reduce waiting time to receive healthcare services, and feel comfortable that their information can only be accessed by authorised professionals. Any violation or unauthorised access to this information is auditable so can be easily tracked and investigated. To the health managers, eHealth benefits include saving time and effort of professionals, minimizing human error such as in handwritten prescriptions and notes, providing accurate information and statistics for decision makers, interoperability, and increasing the confidentiality of health information. Health managers saw benefits to healthcare providers to promote the quality of healthcare services and delivery, save resources and reduce the spend on disposables, prevent wastage of medication and duplication of medical procedures, such as laboratory tests, and to exchange health information faster with other related authorised entities. These benefits were some of the advantages of using eHealth services in Aseer province from the perspectives of health managers. They were seen in a positive light to influence the services provided and that showed consistency with benefits cited by different stakeholder groups in many studies and the MOH eHealth Strategy [2, 12, 18–20].

What Factors Do Health Managers in Aseer Province Think Are of Significance to Influence the Acceptance of eHealth Services in the KSA?

As described in the result section, all themes were clustered under four domains which were derived from the UTAUT model [8].

Performance Expectancy. Five themes were considered to be related to this domain. Health managers in Aseer province showed the importance of this domain which confirmed the perceived usefulness of eHealth services. The findings provided an extension to what has been found in the literature of eHealth acceptance in the KSA. They were consistent with studies that found eHealth benefits including confidentiality, connectivity, customisability, and willingness to utilise technology, were of significance to different groups of professionals including health managers in many countries [6, 21–26]. This means that health managers perceive the importance of eHealth and believe that acceptance of eHealth can bring benefits to all stakeholders. The more they perceive this, the better they accept utilising technology in their workplace.

Effort Expectancy. Complexity of technology was the only theme that related to this domain which was found not to be an issue in itself. It was claimed to be similar to many other things in life that starts with some difficulty but, with time, things become clear. Two main factors were associated with

the complexity of technology from the views of health managers which were eHealth knowledge and technical training. Health managers did not see any difficulty in eHealth services if end-users had a good level of knowledge about eHealth and receive technical training and orientation on the system that will be used.

Three studies concluded that the three factors of association: complexity; lack of eHealth knowledge; and lack of training, were the main challenges to acceptance of technology [12, 13, 27]. These studies were quantitatively based and targeted health professional groups [4]. This current study targeted a different professional group in health managers and was conducted qualitatively. Findings showed that complexity of technology was not of concern to health managers and, by providing adequate knowledge about eHealth and conducting technical training on eHealth systems, the challenge of complexity would be overcome.

Social Influence. Two themes were of relevance to this domain: stakeholders' voice upon planning; and resistance to change. The consideration of stakeholders' voice upon planning eHealth projects was of significance to health managers in Aseer province. They reported that sharing their views was an important step in making them ready to accept any eHealth technology. This conclusion showed consistency with a study that was conducted in 2016 which focused on revealing how King Faisal Specialist Hospital and Research Centre in Riyadh took into account the views of multiple stakeholders to plan and implement a new ehealth record in the centre [7]. The new national eHealth Strategy suggests support will be available across all provinces of KSA [18].

Resistance to change also showed significance from the viewpoint of health managers and was attributed to the professionals' variation in eHealth knowledge, educational background, load of work, and technical skills. Uncooperative behaviour of professionals and resistance to change were reported. One investigated physicians' resistance to accept ehealth records [28] and another which reported health professionals' resistance of adopting telemedicine in Eastern province hospitals, KSA as one of the challenges facing eHealth acceptance [11].

Facilitating Conditions. Ten themes were of relevance to this domain. Health managers in Aseer expressed how significant these themes were in their context. The interviews showed different levels of eHealth understanding especially for the front line staff who said that they knew nothing about the national eHealth strategy. This issue can be associated with lack of communication of national policy and strategy between top management that work on making regional policies and strategies, and front line

staff that deliver health services while planning for eHealth progress. This communication gap was also reported in answers received about government legislations and constraints in which some health managers showed concerns about future eHealth systems and hoped they would be explained to end-users in a basic way that non-experts can understand [29, 30]. It is to be hoped that the latest eHealth Strategy has met with greater awareness and acceptance [18]. All themes showed significance; however, the top FC themes that were reported to play a crucial role in eHealth acceptance were: availability of operational resources; availability of human resources; ICT infrastructure; education and training; quality of eHealth systems and applications; and finally, financial factors. This result was consistent with other studies that reported the significance of the above-mentioned themes in the technology acceptance [31–35].

Strengths and Limitations

Strengths of this qualitative study include utilising one of the technology acceptance models, the UTAUT, as a theoretical approach to help analyse the findings. Another strength is the lack of other qualitative studies that explore technology acceptance in the Saudi Arabian healthcare context [6, 7]. Neither extended to explore a specific geographical setting while this study focused on the previously unexplored Aseer province.

As with every study, there were some limitations. Firstly, to apply caution upon interpreting the results as they may not necessarily represent other provinces. This is due to the differences in availability of advanced healthcare facilities, availability of adequate manpower, and the culture of the province itself. Another limitation is the sensitivity of talking about the support of top management as some thought that might reveal their identity. In addition, due to the small sample size of the study and the specific geographical setting explored, findings cannot be generalised across the community of health managers in the KSA. However, a definite strength is the timeliness of this article which can help inform the approach to adoption of the KSA-wide eHealth strategy in more rural provinces taking account of socio-demographic variations [18].

Conclusion

This qualitative study captured the eHealth related views and experiences of health managers, from different backgrounds, across Aseer Province. It presented their eHealth knowledge, their perceived advantages of eHealth and factors

which were believed to be significant in the adoption of eHealth. These findings, based on the socio-demographic characteristics of a remote province with some of the most challenging terrain in Saudi Arabia, hold policy implications for eHealth in KSA in both the National Vision 2030 and the eHealth Strategy [15, 17, 18].

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Statement of Ethics

Ethical approval to conduct the study was gained from both the Ethical Review Panel, School of Pharmacy and Life Sciences, Robert Gordon University, Aberdeen, UK with reference number: S72, 2017 and the Ethics Committee, MOH, KSA with an approval code IRB 18-259E. Written informed consent to participate was not directly obtained but inferred by signing participant consent form. In addition, all participants were assured that their confidentiality, anonymity and any personal information that could identify them

will be strictly protected before, during and after the research life cycle and the access to this information will be restricted to the research team.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

This paper was designed and written by A.A. A.A. conducted the interviews and data analysis. K.M. advised on data analysis and contributed to the methods, results, and discussion sections.

Data Availability Statement

Data generated and analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

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