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Assessing outpatients' attitudes and expectations towards electronic Personal Health Records(ePHR) systems in secondary and tertiary hospitals in Riyadh, Saudi Arabia.

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Abstract

This study investigates patients' attitudes and expectations regarding ePHRs in Saudi Arabia. It also gives insights about addressing the gap between the interest and the utilization of ePHRs by presenting information about patients' preferences for ePHR features and activities. The findings show higher interest rates (75%) in ePHR use compared to other studies in developed countries. They also indicate high levels of perceived usefulness of ePHRs on patients' health (88%) and healthcare (91%). Different levels of ePHR privacy concerns are reported by 67% of the patients. However, results show that more than 60% of the patients are willing to give their physicians and some designated family members and friends permission to view their ePHR. More research is needed to explore the ePHR privacy concerns of patients.

Keywords: ePHR; personal health records; health informatics; electronic health records; outpatients' attitudes; technology adoption.

1. Introduction

ePHRs are consumer health tools that have the potential to transform the current healthcare model that is disease focused to a new healthcare model that motivates patients' involvement and engagement (Greenhalgh et al., 2010). According to the Markle Foundation in its report in 2003, an ePHR system is "an electronic application through which individuals can access, manage and share their health information, and that of others for whom they are authorized, in a private, secure, and confidential environment" (Markle Foundation, 2003). ePHRs have shown positive results in improving and

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facilitating the delivery of quality healthcare to consumers (Bouri & Ravi, 2014; Genitsaridi, Kondylakis, Koumakis, Marias, & Tsiknakis, 2015; Shah et al., 2015).

There has been an increase in the number of ePHR studies that have investigated this rapidly expanding area since its origin in the 1990s. However, most ePHRs were not designed according to users' needs and preferences (Archer et al., 2011; Chomutare, Fernandez-Luque, Arsand, & Hartvigsen, 2011; Greenhalgh et al., 2010; Johansen & Henriksen, 2014). In fact, to be adopted by health consumers, it is crucial to understand the users' perspectives and attitudes towards ePHRs (Greenhalgh et al., 2010). Based on the Kaelber et al paper, there is a lack of research about health consumers' attitudes towards ePHRs and the adoption of such inventions (Kaelber, Jha, Johnston, Middleton, & Bates, 2008; Yau, Williams, & Brown, 2011). Moreover, a considerable number of studies have called for further research about assessing users' preferences regarding ePHR features and functions to address the gap between the interest and the utilization of these technologies. Although most studies showed a positive interest in using ePHRs, other studies found low utilization of the same technology (Greenhalgh et al., 2010; Johansen & Henriksen, 2014; Patel et al., 2012; Tang, Ash, Bates, Overhage, & Sands, 2006; Wagner et al., 2012). Understanding consumers' perceptions and preferences may help in increasing the use of ePHRs and enhancing the design and the functionality of these electronic records and hence alleviating the barriers to adoption (Curtis, Cheng, Rose, & Tsai, 2011; Johansen & Henriksen, 2014; Tang et al., 2006). This study intended to assess outpatients' attitudes and perceptions toward ePHRs in secondary and tertiary hospitals in Riyadh, KSA. It also investigated patients' preferences regarding features and functions of ePHR. Privacy concerns and patients' perceived usefulness of ePHR were also assessed.

2. Subjects and Methods

2.1 Study design

This cross-sectional descriptive study was conducted in four secondary and tertiary care hospitals in Riyadh, KSA. A survey was designed to assess adult outpatients' attitudes and perceptions toward ePHRs. The study took place in the waiting areas of the hospitals.

2.2 Study setting

2.2.1. Hospitals

The four hospitals included in the study were King Fahad Medical City (KFMC), King Khalid University Hospital (KKUH), King Abdulaziz University Hospital (KAUH), and King Saud Medical City (KSMC). These hospitals were selected to ensure responses and opinions from a variety of participants. These secondary and tertiary care hospitals serve a culturally and socioeconomically diverse patient population. Moreover, the hospitals accept referrals from various hospitals and centers from all regions of

KSA. All care, including medications, is free of charge for eligible Saudi patients.

KKUH and KAUH are part of, and managed by, King Saud University Medical City – The Ministry of Education, whereas KFMC and KSMC are managed by the MOH. Each of these hospitals had completely implemented an EHR system that is being used by its staff and professionals (KAUH, 2021; KFMC, 2021; KKUH 2021; KSMC, 2021).

2.3 MREB and hospital approvals

This study was approved by the McMaster Research Ethics Board. The document number is 2015 081. In addition, the investigator was approved by the Institutional Review Boards of each hospital to collect data from the outpatients in the waiting areas.

2.4 Survey design

The survey questions were developed based on a study about consumers' perspectives on health information exchange and personal health records by Patel in 2011 with permission from the author (Patel et al., 2011). A later version of the survey was designed in which some questions were deleted and others were added to investigate the sociocultural background of the participants. This version of the survey was reviewed by experts in electronic health and health informatics from McMaster University and King Saud University.

The survey was translated to Arabic and was piloted with 14 individuals who met the criteria of the study participants, except that the setting was not the hospital's waiting area. A newer version was produced after reviewing the comments and the recommendations of the pilot participants. Finally, the survey was back translated to English to assess the accuracy and consistency of the questions before administration.

2.4.1. Survey domains

The survey questions were divided into four sections or domains: general demographic questions, health-related questions, Internet use questions, and personal health record questions. The questions were multiple choice questions, yes/no questions, and 5-point Likert-like style questions.

The patients were asked to choose between two forms of self-administered questionnaires: online or paper-based surveys. QuestionPro was used to administer the online questionnaire through the iPad. It is an online survey platform that supports Arabic language. The only way to access the online questionnaire was through the iPad that was with the investigator. This would ensure that the participant was physically visiting the hospital at the time of the study and met the study inclusion criteria.

5.4.2. Privacy, confidentiality, and the security of data

This was an anonymous survey. No identifiable personal information or personal health information was collected, so the anonymity of participants was maintained during the data collection, storage, and dissemination. As a result, the collected data could not be linked to participants' identities. Moreover, the healthcare team including the participant's physician and nurse did not have any access to the collected data. Only the researchers could view and analyze the data. The data analyses were performed using a password-protected computer, and the data were analyzed collectively and not case by case, so the participant's identity could not be known during the data analysis since no one, even the researchers, knew which answers were for whom. The researchers kept the information that was collected confidential. Any data from this study, which will be shared or published, will be the combined data of all participants, thus protecting their anonymity.

2.4.3. Paper-based survey

The collected paper-based survey responses were kept in a locked cabinet until the researchers transferred the data on the papers to an Excel spread sheet in a password-protected computer. Only the researchers knew the password and had access to this computer and the locked cabinet. After transferring the data from the papers to the password-protected computer, these papers were destroyed using a paper-shredder.

2.4.5. QuestionPro and Online survey

The team that works on QuestionPro, the online survey platform, is committed to the confidentiality and integrity of all the information within the system. To ensure the platform's security, the data centers of QuestionPro are monitored twenty-four hours a day, seven days a week (QuestionPro, 2021).

2.5 Analyses

The responses were coded in the input phase to facilitate and speed up the data transfer from the paper forms to the computer. The listwise approach was used in cleaning the dataset in which the researcher took off or deleted the surveys that had missing values or unanswered questions. Once all the information had been entered and cleaned in Excel, the dataset was transferred to RStudio and decoded.

RStudio version 0.98.490, Java Gui for R (JGR) version 1.7-16, and Microsoft Excel version 14.4.9, and Apple® iPad were used for data collection, manipulation, and analysis. All the data manipulation and analysis were performed using MacBook Pro with Mac OS X version 10.6.8.

3. Results

The data collection took approximately 3 months.

3.1. Respondents

Out of 1296 individuals who were approached, 506 responded to the survey. Of these 506 responded surveys, 66 incomplete surveys were eliminated. Approximately 61% (n=790) of potential outpatients refused to participate in the study.

The survey analysis included 440 surveys. Of the 440 respondents, 119 were outpatients of KFMC, 116 were outpatients of KKUH, 101 were outpatients of KAUH, and 104 were outpatients of KSMC (Table 1). Approximately 15% (n=67) of the 440 participants used the iPad to respond to the electronic survey, while the other 85% (n=373) preferred to use the paper-based questionnaire.

Although the participants came from diverse locations, the majority (81.8%) came from the central region of KSA. Other participants came from the north region (8.6%), the south region (5.2%), the east region (2.5%), and the west region (1.8%). Over 84% of the study participants were less than 51 years old. Almost 16% were in their 50s or older (Table 1).

Approximately half of the participants (49.7%) had at least a university or a graduate degree, while the other half had no degrees or had only an elementary (13.4%), intermediate (7.3%), or secondary (29.5%) school degree. 39.2% of the participants had a monthly household income between 3,000 and 9,999 Saudi Riyals. About a quarter (25.7%) of the participants had a monthly income of less than 3,000 SR, and another quarter (27%) had an income between 10,000 and 19,999 SR a month. Only about 8% of the participants had an income of more than 20,000 SR a month (Table 1).

Table (1): Respondent demographic characteristics (n=440)

Characteristic	n	%
Hospital		
KFMC	119	27.0
KKUH	116	26.4
KAUH	101	23.0
KSMC	104	23.6
Region		
Central	360	81.8
North	38	8.6
South	23	5.2
East	11	2.5
West	8	1.8
Age		
18-30	194	44.1
31-50	176	40
51-60	47	10.7
61+	23	5.2
Education		
Elementary or less	59	13.4

Intermediate	32	7.3
Secondary	130	29.5
University	192	43.6
Graduate	27	6.1
Income in SR		
Less than 3000	113	25.7
3000 - 9999	173	39.3
10000 - 19999	119	27
20000 - 49999	26	5.9
50000+	9	2

The majority of participants (93%) rated their health status as excellent (18%), very good (45.9%), or good (29.1%); whereas less than the tenth of them (7%) believed they had fair or poor health status. Only 34.3% of the study sample reported having a chronic medical condition, and more than half of the respondents (64.1%) were taking prescribed medications (Table 2).

Table(2): Respondent's health-related characteristics (n=440)

Characteristic	n	%
Self-rated health status		
Excellent	79	18
Very good	202	45.9
Good	128	29.1
Fair	21	4.8
Poor	10	2.3
Chronic medical condition		
Yes	151	34.3
No	289	65.7
Taking prescribed medication		
Yes	282	64.1
No	158	35.9
Frequency of problems understanding doctor's verbal communication		
Always	4	0.9
Often	26	5.9
Sometimes	128	29.1
Occasionally	105	23.9
Never	177	40.2
Frequency of problems understanding written medical information		
Always	28	6.4
Often	40	9.1
Sometimes	135	30.7
Occasionally	103	23.4
Never	134	30.5
Satisfied with quality of health care received in past 5 years		
Very Satisfied	125	28.4
Somewhat satisfied	175	39.8
Neutral	58	13.2
Somewhat dissatisfied	56	12.7
Very dissatisfied	26	5.9

Over half of the participants (53%) stated that they sometimes or occasionally had a problem understanding their physician's verbal communication, while 40% of them did not report any such

difficulties. Similarly, half of the respondents (54.1%) reported that they sometimes or occasionally had difficulties in understanding written medical information. Almost 70% of the study sample indicated that they were very satisfied or somewhat satisfied with the quality of the healthcare received in the past five years (Table 2).

The study sample reported an average of 4.6 visits to primary care facilities, 3.6 visits to specialist healthcare providers, 2.1 visits to emergency rooms, and 0.8 admissions that lasted at least overnight in the hospital in the year 2014. Almost 75% of the respondents visited their primary healthcare providers less than 5 times, visited the specialist less than 4 times, and visited the emergency room less than 3 times during that time. The maximum number of visits reported by a participant in this study was 104 visits for the primary care facility, 60 visits for the specialist healthcare provider, 30 visits for emergency rooms, and 35 admissions to the hospital in 2014 (Table 3).

Table (3) Number of visits to healthcare providers in the past year 2014 (n=440)

Facility	Mean	St. Deviation	Minimum	Maximum	25 th Percentile	75 th Percentile
Primary care	4.6	8.9	0	104	1	5
Specialist	3.6	6.9	0	60	0	4
ER	2.1	4.1	0	30	0	3
Admissions	0.8	2.3	0	35	0	1

The majority of the respondents (88.9%) reported having Internet access, with more than three-quarters (78.4%) using the Internet once or several times a day. Less than half of the study sample (44.3%) revealed that they use the Internet to look for health information. Around 36% reported that they use the Internet for health purposes once a week or once a month, while around a fifth of the respondents (18.9%) claimed that they use the Internet for health purposes at least once daily (Table 4).

Table (4) Respondent Internet-related characteristics (n=440)

Characteristic	n	%
Internet access available		
Yes	391	88.9
No	49	11.1
Frequency of Internet use		
Several times a day	306	69.5
About once daily	39	8.9
Once weekly	21	4.8
Once monthly	11	2.5
Rarely or not at all	63	14.3
Frequency of Internet use for health purposes		
Several times a day	48	10.9
About once daily	35	8
Once weekly	80	18.2
Once monthly	82	18.6
Rarely or not at all	195	44.3

3.2. Outpatient attitudes and usage of personal health records

Approximately 70% of the respondents (n=297) showed an interest in using the Internet and the computer to manage their healthcare. Only 1.6% of participants expressed no interest in accessing their personal health information and regulating their healthcare through the Internet, while 3.9% of respondents were neutral about this matter (Table 5).

Table(5) Outpatients' interest in using ePHRs (n=440)

I am interested in using the computer to go online and use the Internet to manage my healthcare	N	%
Strongly agree	297	67.5
Agree	119	27.0
Neutral	17	3.9
Disagree	6	1.4
Strongly disagree	1	0.2

Almost three-quarters (75.7%) of the respondents stated that they would view their health information and use the services offered through ePHRs at least once a week (36.8%) or a month (38.9%). A fifth of the participants (21.4%) reported that they would manage their health information through an ePHR once every three to six months, while only 2.3% of the study sample revealed that they would use an ePHR once annually to view or manage their health information. Less than 1% of the subjects (n=3) stated that they would rarely or never use the services offered through ePHRs (Table 6).

Table (6) Frequency of potentially using an ePHR (n=440)

How often do you think you would view and manage your personal health record	n	%
Once a week	162	36.8
Once a month	171	38.9
Once every 3-6 months	94	21.4
Once a year	10	2.3
Rarely or not at all	3	0.7

3.3. Outpatient preferences related to content and features of ePHRs

The results showed that participants wanted to have access to different health-related information within their personal health records (Figure 1) (Table 7). There was a great interest in accessing test results such as blood tests and x-rays in an ePHR by the majority of the respondents (90.5%). Other types of health information that outpatients were highly interested in accessing included medical problems (81.8%), current and previous medications (73%), list of doctors and health care providers seen by the patient (61.4%), surgeries and medical procedures that the patient had (60.5%), medical visits (57%), and information from health monitoring devices (55.9%). Less than half of the respondents expressed an interest in accessing their allergy information (45%), immunization records (46.8%), and family histories (44.8%). Only 33.6% (n=148) of the respondents showed an interest in accessing information

about lifestyle choices such as exercise and smoking (Table 7).

Table (7) Outpatients' preferences of ePHR contents (n=440)

Which of the following types of health information would you like to have as part of your personal health record?	n	%
My allergies	198	45
Test results (e.g. blood tests, X-rays)	398	90.5
Immunization records	206	46.8
Medication I have taken or am currently taking	321	73
List of doctors and health care providers I have seen	270	61.4
Family history of health problems	197	44.8
Medical problems	360	81.8
Medical visits, including visits to the emergency room	251	57
Surgeries and medical procedures that I have had	266	60.5
Lifestyle choices (e.g., exercise, smoking history)	148	33.6
Information from devices that help me monitor my health (e.g., glucose from a diabetes meter)	246	55.9

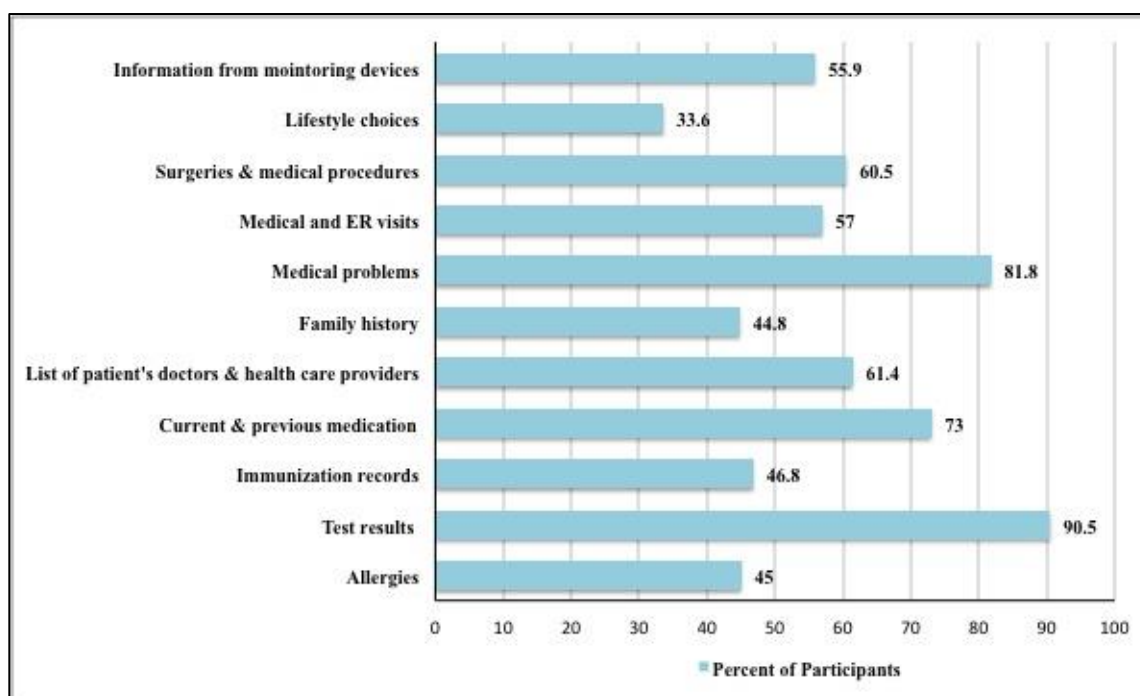


Figure (1) Types of health information that participants want in their ePHRs (%) (n=440).

Other respondents declared that they would like their ePHRs to be in two languages (Arabic and English) and to be comprehensive and contain all the patient's information from birth to the present time, including dental visits. Some outpatients showed an interest in learning more about certain health conditions and complications through ePHRs such as heart diseases, hypothyroidism, obesity, asthma, pregnancy, and diabetes. Moreover, others were interested in knowing more about their treatment plans, side effects, complications, medication administration methods, prescription expiry dates alerts, and new

available treatment plans. Other respondents showed an interest in accessing information about new treatment plans for specific conditions and the hospitals and health centers that have experts in dealing with such conditions. Patients expressed an interest in accessing information about promoting the quality of life of patients for who have certain chronic health conditions such as diabetes. Other patients were interested in accessing some administrative information and services such as requesting sick-leave notes. Some participants suggested that the ePHR login codes should not use the patient's name; instead it should use the patient's file number so the patient would not be identified by anyone who could access the file (Table 8).

Table (8) Specific ePHR contents that were reported by the respondents (n=440)

Other contents reported by the participants:
• A complete patient history from the birth to the present time or death, including the dental visits
• Available clinics and the methods of booking appointments
• Comprehensive information about specific health conditions with treatment options
• Clear explanation of the case
• Information about appointments, tests, and new treatments for my case, and different doctors' opinions about my case
• Information about heart diseases
• Information about hypothyroidism and its treatment. I can't find answers about its causes and other treatments different than the thyroxin
• Information about medications and their complications
• Information about physical health and obesity and its complications
• Information about pregnancy complications
• Information about sick-leaves
• Information about the side effects of treatments
• Information about the surgical operations
• Information about the test results with the interpretations of each test
• Information about the types of the surgical operations I underwent
• Information about the ways of administering the medications
• Information about Asthma medications and treatment tools
• Medication expiry dates alerts and refills
• Physicians' reports about my case
• Please use the patient's file number as identification for the electronic file, and don't show or use the patient's name, so the patient will not be recognizable by anyone who could access the electronic file.
• Recommendations about other centers and hospitals that have better treatment options and plans for my case
• Some health recommendations to promote the health of the patients. For example, a diabetic person would like to learn more about the recommended daily walking duration etc.
• The diseases and the symptoms
• The reports should be in English and Arabic

The majority of participants were interested in being able to request medical appointments (86.1%) and medical reports (84.5%) using their ePHRs. Almost three-quarters (74.8%) of the respondents showed an interest in requesting medication refills online through ePHRs. Other activities that respondents were eager to use in ePHRs were requesting referrals (70%), accessing ePHRs by their first-degree relatives

and caretakers (70.2%), receiving educational materials (62.7%) and preventive health services reminders (60.9%), and contacting their health providers electronically (66.4%). Approximately half of the participating outpatients were interested in adding notes or changes to their ePHRs (47.5%), and recording their treatment preferences (53.2%) and their selection of their primary caretakers in case of an emergency (51.8%). The activity that had the least interest to the participants was communicating with support groups or other people who have similar health problems (37.7%) (Figure 2)(Table 9).

Table (9) Outpatients' preferences of ePHR features and activities (n=440)

Which of the following activities would you like to do on the Internet?	n	%
Receive a report from my doctor about my visit	372	84.5
Add my own notes or make changes to information in my patient health record	209	47.5
Request medical appointments	379	86.1
Request referrals to other doctors	308	70
Request prescription refills	329	74.8
Send emails to my doctor or his/her practice with my medical questions	292	66.4
Receive reminders for preventive health services (e.g. flu shots)	268	60.9
Access my child's or parent's medical record if I am their primary caretaker	309	70.2
Communicate with other people with similar health problems (e.g. support groups)	166	37.7
Receive educational materials related to my health	276	62.7
Record my treatment preferences	234	53.2
Record my selection of a family member or friend to manage my health care when I am not able to	228	51.8

Some outpatients expressed an interest in accessing specific activities such as measuring their blood glucose level using the computer or the cell-phone and uploading the result directly to the patient's file, consulting psychological medical services through ePHRs, receiving updates about the available case-specific treatments in the world, and receiving referrals to hospitals and health centers that are specialized in treating specific conditions.

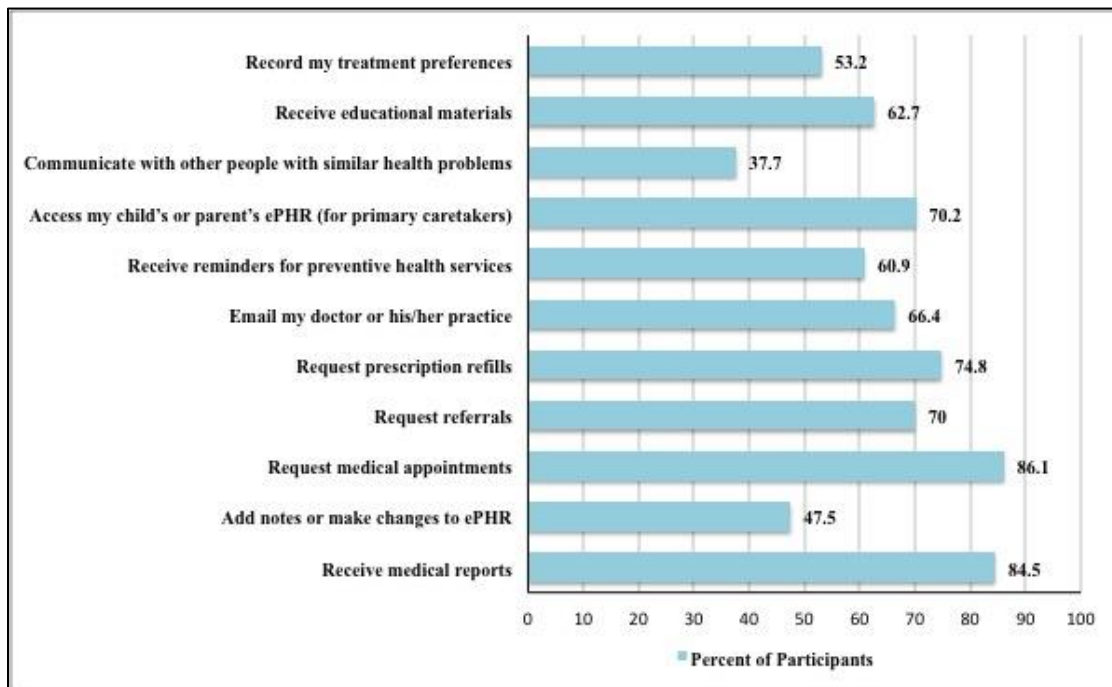


Figure (2) Outpatient preferences of ePHR features and activities (n=440)

Other respondents suggested that all the networks of MOH hospitals should be united, and that the patient could access ePHRs while travelling or being away from the hospital that has the patient's file (Table 10).

Table (10) Specific ePHR activities that were reported by the participants (n=440)

Other activities reported by the participants:
• Accessing ePHRs while travelling or being away from the hospital that has my files • Measuring the glucose level using the computer or the cell-phone, and then uploading the result directly to the patient's file • My rights • Proper referrals to best hospitals and centers that are specialist in treating specific cases • Psychological consultation for me or for my family member • Send the newest updates of the available treatments in the world • The MOH network in all hospitals should be united

3.4. Outpatient perceptions regarding potential benefits and use of ePHRs

Over three-quarters of the respondents (75.7%) were interested in using their ePHRs at least once a month. Of these, 36.8% showed more interest in using ePHRs once a week. A fifth of the participants (21.4%) believed that they would use ePHRs once every three to six months. Less interest was expressed by 3% (n=13) of participants who reported that they would rarely or not at all use an ePHR or only access it once a year (Table 11).

Table (11) The frequency of the potential use of ePHRs (n=440)

How often do you think you would view your personal health record or do the activities listed above?	n	%
Once a week	162	36.8
Once a month	171	38.9
Once every 3-6 months	94	21.4
Once a year	10	2.3
Rarely or not at all	3	0.7

The majority of the respondents believed that using ePHRs would be associated with improvements in their satisfaction (89.8%) and the overall quality of their healthcare (91.6%). They also believed that using ePHRs might improve their understanding of their physician's explanations (90.2%) and their overall health status (88%). A great number of participants reported that using ePHRs might improve their sense of control over their healthcare (86.4%), and their ability to make decisions about their medical care as a team with their physicians (85.7%). Almost three-quarters of respondents believed that the security and the privacy of their medical information (75%) and the safety of their care (74.8%) would improve with the use of ePHRs. However, over one-fifth of the participants believed that using ePHRs would have no effect on the security and the privacy of their medical information (21.8%) and the safety of their healthcare (20.7%). More than half of the participants (61.1%) believed that using ePHRs would eliminate their worries about their healthcare, while 34.5% saw that this would have no effect on their concerns about their healthcare (Table 12).

Table (12) Perceptions about the potential benefits of using ePHRs (n=440)

What effect do you think being able to view and manage (e.g. making appointments) your electronic personal health record will have on:	Improve n (%)	No effect n (%)	Worsen n (%)
The security and the privacy of my medical information	330(75)	96(21.8%)	14(3.2)
Understanding my doctor's explanations and advice	397(90.2)	40(9.1)	3(0.7)
My understanding of my own health	387(88)	48(10.9)	5(1.1)
My sense of control over my own healthcare	380(86.4)	56(12.7)	4(0.9)
The ability of my doctor(s) and I to make decisions about my medical care together as a team	377(85.7)	58(13.2)	5(1.1)
My worries about my own healthcare	269(61.1)	152(34.5)	19(4.3)
The safety of my care (e.g. medical errors)	329(74.8)	91(20.7)	20(4.5)
My satisfaction with my health care	395(89.8)	41(9.3)	4(0.9)
The overall quality of my healthcare	403(91.6)	35(8)	2(0.5)

3.5. Outpatient Preferences and concerns regarding the privacy of sharing their health information online and through ePHRs

Approximately 30% of the respondents expressed no concerns about the privacy of personal health information that was shared online. About 67% showed different levels of concerns about the privacy of their personal health information online, with about 33% who were very concerned or not very concerned, and 37% were concerned or somewhat concerned (Table 13).

Table (13) Level of concern about the privacy of shared personal information on the Internet (n=440)

How concerned are you about the privacy of personal health information that is shared over the internet?	n	%
Very concerned	48	10.9%
Not very concerned	116	26.4%
Concerned	28	6.4%
Somewhat concerned	117	26.6%
Not concerned	131	29.8%

The majority of the respondents would be willing to give their primary physicians (77%) and other health professionals who provide them with medical care (79.3%) permission to view their ePHRs. More than half of the respondents (64.3%) were willing to give permission to designated family members and friends to access ePHRs, while fewer people showed a willingness to share that access with employers (17.5%) and government officials (17%). About 5% (n=23) of the participants were not willing to give permission to anyone to view their information in ePHRs (Table 14).

Table (14) Outpatients' preferences of giving access to some people to view ePHRs (n=440)

Who would you give permission to view information in your electronic personal health record?	n	%
Designated family members or friends	283	64.3%
My primary care doctor	339	77%
Other doctors or healthcare providers who care for me (in clinic, the ER or the hospital)	349	79.3%
Government officials	77	17.5%
My employer	75	17%
I would not give anyone permission	23	5.2%

4. Discussion

This study assesses the perceptions of the Saudi population regarding ePHR features and potential use. Although the majority of the sample came from the central region of KSA, several participants came from diverse geographic backgrounds and different regions in KSA as the study settings serve all regions of KSA. More than three-quarters of the participants were less than 51 years old and had a minimum monthly income of 3000 SR. Almost half of the study sample had at least a university degree.

The majority of the respondents (93%) rated their health status as excellent, very good or good. More than a quarter (34.3%) of the sample reported having a chronic disease and more than half of the respondents (64.1%) were taking prescribed medications. Approximately, half of the participants had difficulties understanding their physicians' verbal communication (53%) and other written medical information (54.1%). However, the majority of the sample (68.2%) were satisfied with the quality of the healthcare received in the past five years.

The vast majority of the participants were frequent Internet users who use the Internet at least once daily, and almost half of the sample reported using the Internet to inquire for health purposes.

The results revealed that the majority of the sample (94.5%) were interested in using ePHRs to manage their health, with more than three-quarters of them interested in using this technology at least once a month. This high rate of interest in using ePHRs is higher than some rates reported in the literature (Noblin et al., 2012; Patel et al., 2011).

Studies showed that although participants show interest in potentially adopting ePHRs, the actual use of these records is not widespread (Kaelber, Jha, Johnston, Middleton, & Bates, 2008). To address the gap between the interest and the utilization of ePHRs by patients, the literature suggested looking into the types of data that might attract patients to adopt these records (Patel et al., 2012). In this study, participants reported that they would like to access different types of health information in their ePHRs. They were highly interested in accessing test results such as x-ray and blood test results. This finding was consistent with other studies that showed that test results were the most popular features that potential ePHR users were interested in (Curtis et al., 2011). Beside test results, participants were interested in accessing their medical problems, current and previous medications, doctors' list, surgeries and medical procedures, and allergies and immunization records. These types of information were also reported in the literature as patients were interested in accessing them in ePHRs (Segall et al., 2011). The type of information that had the least interest for inclusion in ePHRs was lifestyle choices such as exercise and smoking habit information.

Some participants in this study declared that they would like their ePHRs to be comprehensive and to contain all the patient's health-related information from birth to the present time. Likewise, some studies suggested that ePHRs should include all the information that are relevant to an individual's health such as information about family members, caregivers, and information about home and work environments (Tang et al., 2006). Other patients suggested that all MOH hospitals' records should be combined together so that the patient can access his/her complete medical information anywhere anytime. Several studies suggested that ePHRs should be integrated in hospital EHRs to provide a comprehensive source of health information to the patient and clinicians (Archer et al., 2011; Johansen & Henriksen, 2014; Kahn et al., 2009; Winkelman et al., 2005; Yau et al., 2011). ePHRs with comprehensive patients' health records are believed to be useful to both physicians and patients (Archer et al., 2011). Other studies stressed that the information in ePHRs should be explained and displayed in a way that is understandable to health consumers (Archer et al., 2011; Earnest et al., 2004; Noblin et al., 2012; Segall et al., 2011; Tang et al., 2006).

Some respondents revealed that they would like to learn more about some health conditions and complications through ePHRs. As the literature shows, an ePHR can serve as an educational tool that provides patients with access to valid trustworthy health information and knowledge (Tang et al., 2006). Consumers could use this knowledge to improve their health conditions and to promote the quality of their lives (Kahn et al., 2009; Tang et al., 2006). Some physicians believed that ePHRs might empower patients and motivate them to be more involved in their health (Witry et al., 2010).

Furthermore, participants showed an interest in accessing different services in ePHRs. There was a high interest in being able to request medical appointments and reports, referrals, medication refills, educational materials, and preventive medical services alerts in ePHRs. More than half of the patients were also interested in contacting their physicians through ePHRs and authorizing their caretakers to access their personal health information. Moreover, almost half of the sample was interested in adding notes and changes and recording their treatment preferences in ePHRs. This finding is consistent with the literature that showed that health consumers were also interested in contacting their physicians and accessing their medical reports (Segall et al., 2011).

Some patients suggested that they would like to be able to measure some health parameters through the use of ePHRs. For example, one patient revealed that he would like to be able to measure his blood glucose level using a computer or a smartphone, and then upload the result directly to his ePHR. Other patients reported that they would like to be able to consult psychological medical services through ePHRs. Similar to previous studies, the service that had the least interest to the participants was communicating with support groups or other people who have similar health problems (Segall et al., 2011).

The vast majority of the respondents believed that ePHRs are associated with improvements in different health-related outcomes. Patients believed that ePHRs could improve their satisfaction levels and the quality of healthcare. They also believed that ePHRs could lead to enhancements in their overall health status and their understanding of physicians' instructions. Patients also expected to see improvements in their sense of control and their ability to make decisions regarding their health with the use of an ePHR. Some studies concluded that perceived usefulness of ePHR might positively influence the adoption of these records (Jian et al., 2012).

Most of the respondents expressed concerns regarding the privacy of the health information shared online. However, almost three-quarters of the sample believed that ePHRs would improve the security and the privacy of their health information and enhance the safety of their healthcare. Some participants suggested that the ePHR login codes should not use the patient's name; instead, it should use the patient's file number so the patient will not be identified by anyone who could access the file. A study showed that

actual ePHR users were less concerned about the privacy and security of their health information compared to potential users and health professionals (Archer et al., 2011; California HealthCare Foundation, 2021).

Finally, more than three-quarters of the participants reported that they would be willing to share their records with their primary physicians or other members of their care team; whereas, in another study, only half of the participants were willing to share their ePHR data with their family physicians or other health providers (Curtis, Cheng, Rose, & Tsai, 2011). Moreover, approximately 65% of the respondents were willing to share their ePHR with designated family members and friends. In another study, less than half of the patients were willing to share their records with a family member (Curtis, Cheng, Rose, & Tsai, 2011). The findings also showed less interest in sharing personal health data with government officials and employers.

Strength and Limitations

One of the main strengths of the study is the large number of participants who came from diverse backgrounds and regions. Furthermore, this study presents new valuable findings to the literature and Saudi health institutions regarding outpatients' attitudes towards ePHR uses and features. Although KSA is considered to be a developing country, these participants showed more enthusiasm for ePHRs than some studies done in more developed countries. Our study reported high levels of perceived usefulness of ePHR that may lead to improving the use of these records according to the literature.

However, the authors acknowledged some limitations of this study. One limitation is that the characteristics of the sample might not resemble the characteristics of the Saudi population. This stems from the fact that 61% of approached outpatients refused to participate to this study. Those non-responders might have unfavorable attitudes compared to those who participated. In an effort to improve the generalizability, researchers included different major hospitals that serve not only the central region but also all regions of KSA. In addition, the authors surveyed patients from different medical departments such as dermatology, ophthalmology, cardiac, and renal health departments, strengthening the possibility of having a broad-based sample.

Translating the survey questions to another language might affect the meaning of the questions. However, the researchers back-translated the letter of information and the survey to ensure the consistency and the accuracy of the information. Despite these limitations, this study may provide guidance to other studies and present valuable findings that could be useful in addressing the gap between the interest in ePHRs and their utilization.

5. Conclusion

This study examines patients' attitudes and expectations regarding ePHRs in KSA. Participants showed higher levels of interest in using ePHRs than other studies in developed countries. More than three-quarters of the participants were interested in using ePHRs at least once a month. Moreover, respondents were highly interested in accessing imaging and blood test results in ePHRs. They also were interested in viewing other health information in ePHRs such as current and previous medications, doctors' list, health conditions, surgeries and medical procedures, and allergies and immunization records. In addition, respondents were extremely interested in requesting medical appointments, reports, medication refills, and referrals through ePHRs. They also showed an interest in using an ePHR as an educational tool to learn about specific health conditions.

This study presented high levels of perceived usefulness of ePHR potential benefits to the individual's health and the healthcare systems. Although patients showed some concerns about the privacy of their information online, most patients believed that ePHRs could improve the safety and the security of healthcare data. Patients were willing to share their ePHRs with their physicians and some designated family members and friends.

Finally, further research is needed to investigate ePHR privacy concerns of patients and the factors that may influence the adoption of these records.

6. Declarations

6.1 Conflict of Interest Statement

No conflicts of interest.

6.2 Funding Disclosure

This study was funded by King Saud University.

6.3 Ethical Considerations

6.4 Acknowledgements

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