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Factors that affect the use of electronic personal health records among patients: A systematic review

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Abstract

Background: Electronic personal health records (ePHRs) are web-based tools that enable patients to access parts of their medical records and other services. In spite of the potential benefits of using ePHRs, their adoption rates remain very low. The lack of use of ePHRs among patients leads to implementation failures of these systems. Many studies have been conducted to examine the factors that influence patients' use of ePHRs, and they need to be synthesised in a meaningful way.

Objective: The current study aimed to systematically review the evidence regarding factors that influence patients' use of ePHRs.

Methods: The search included: 42 bibliographic databases (e.g. Medline, Embase, CINHAL, and PsycINFO), hand searching, checking reference lists of the included studies and relevant reviews, contacting experts, and searching two general web engines. Study selection, data extraction, and study quality assessment were carried out by two reviewers independently. The quality of studies was appraised using the Mixed Methods Appraisal Tool. The extracted data were synthesised narratively according to the outcome: intention to use, subjective measures of use, and objective measures of use. The identified factors were categorised into groups based on Or and Karsh's conceptual framework.

Results: Of 5225 citations retrieved, 97 studies were relevant to this review. These studies examined more than 150 different factors: 59 related to intention to use, 52 regarding subjectively-measured use, and 105 related to objectively-measured use. The current review was able to draw definitive conclusions regarding the effect of only 18 factors. Of these, only three factors have been investigated in connection with every outcome, which are: perceived usefulness, privacy and security concerns, and internet access.

Conclusion: Of the numerous factors examined by the included studies, this review concluded the effect of 18 factors: 13 personal factors (e.g. gender, ethnicity, and income), four human-technology factors (e.g. perceived usefulness and ease of use), and one organisational factor (facilitating conditions). These factors should be taken into account by stakeholders for the successful implementation of these systems. For example, patients should be assured that the system is secure and no one can access their records without their permission in order to decrease their concerns about the privacy and security. Further, advertising campaigns should be carried out to increase patients' awareness of the system. More studies are needed to conclude the effect of other factors. In addition, researchers should conduct more theory-based longitudinal studies for assessing factors affecting initial use and continuing use of ePHRs among patients.

Keywords

electronic personal health record; tethered personal health record; patient portal; adoption; acceptance; intention to use.

Abbreviations

AA: Alaa Abd-alrazaq

ePHRs: electronic personal health Records

EHRs: electronic health records

EMRs: electronic medical records

MK: Mohammad Khasawneh

MMAT: mixed methods appraisal tool

TAM: technology acceptance model

1 Introduction

Electronic Personal Health Records (ePHRs) are secure internet-based systems that allow patients to view parts of their medical records and share them with trusted others [1]. Such systems may also provide services to patients such as messaging healthcare providers, requesting repeat prescriptions, and booking appointments [2-4]. There are three categories of ePHRs [5-7]: Standalone PHRs which are not connected with EHRs or Electronic Medical Records (EMRs), and they enable patients to fully control and manage their ePHR. Tethered PHRs which are connected with EMRs in one setting, and patients may not have or partially have control over their records. Integrated PHRs that are connected to EHRs in multiple settings, and patients have some control over them.

Despite the potential benefits of ePHRs, their adoption rates are often very low [4, 8-12]. The lack of use of ePHRs among patients leads to a failure of the implementation of these systems. Identifying factors that influence patients' use of ePHRs is crucial to increasing patients' adoption and improving implementation success of ePHRs [9, 10, 13-16]. Many studies have investigated factors that affect patients' use of ePHRs. To date, no meaningful synthesis of findings has been produced. Therefore, the current study aimed to systematically review the evidence regarding factors that influence patients' use of ePHRs.

2 Methods

The systematic review followed guidelines recommended by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement [17].

2.1 Search strategy

2.1.1 Search sources

This review utilised five search sources. First, we searched 42 electronic bibliographic databases including Medline, Embase, CINAHL, PsycINFO, and Scopus. A list of all 42 databases is shown in Appendix A. The search process started on 25th June 2018 and finished on 30th June 2018. Second, we checked the references of all studies included in the current review, and of reviews identified in the search (backward reference list checking). In addition, we conducted forward reference list checking to identify studies that cited the included studies using the "cited by" function available in Google Scholar. Third, we undertook hand searching in recent issues of journals where a large number of the included studies were published (e.g. International Journal of Medical Informatics and Journal of the American Medical Informatics Association). Fourth, we contacted 12 authors who published more than one of the included studies. Fifth, we searched two general search engines; Google Scholar and Turning Research Into Practice (TRIP).

2.1.2 Search terms

The search terms were identified based on three elements: population (e.g. patient* and consumer*), intervention (e.g. personal health record*, personal medical record*, personally controlled health record*, and patient portal*), and outcome (e.g. use*, adopt*, intention, and accept*). Appendix A shows the search terms used for searching each electronic database.

2.2 Study eligibility criteria

The eligibility criteria were developed according to seven elements. Population: participants had to be patients. Studies were excluded where participants were healthcare providers, caregivers, or designers. Intervention was constrained to tethered PHRs (as it is the most common type worldwide [18, 19]). Studies which had as their intervention only standalone

PHRs or integrated PHRs were excluded. Outcome of interest was intention to use as well as initial use. The outcome could be measured by asking the patients (i.e. subjectively-measured use) or by checking the system logs (i.e. objectively measured use). Studies were excluded if concerned only with continuing use. Studies could be quantitative, qualitative, or mixed methods. Only English language studies were included. Publications were considered for inclusion if they were peer-reviewed articles, theses, and conference proceedings in addition to unpublished studies (grey literature). The year of publication was restricted to studies published in 2000 and onwards as ePHRs were not widespread before the year 2000 or even before 2006 [20].

2.3 Study selection

The selection process consisted of two steps: firstly, screening titles and abstracts of all retrieved studies; secondly, reading full texts of studies included from the first step. Each step was carried by the principal reviewer (AA) and a research assistant (MK) independently. Any disagreements were resolved through further examination and discussion between both assessors (AA & MK). The interrater agreement, assessed using Cohen's kappa [21, 22], was 0.83 and 0.88 in the first and second step of the selection process, respectively, indicating a very good agreement [23].

2.4 Data extraction

The reviewers developed a data extraction form, which was piloted using 10 included studies and modified accordingly. The data extraction process was carried out by two reviewers (AA & MK) independently. Any disagreements were resolved through further examination and discussion. The interrater agreement of 0.78 indicated a good agreement [23].

2.5 Study quality assessment

The Mixed Methods Appraisal Tool (MMAT) was used to assess the quality of included studies (see Appendix B) [24]. The MMAT consists of 21 criteria that are categorised into four groups [24]. The first group has two screening questions that must be applied to all studies regardless of their design. The second group is composed of four questions that are specific to assess the quality of qualitative studies and the qualitative part of mixed methods studies. The third group consists of 12 criteria for appraising quantitative studies and the quantitative part of mixed methods studies. The last group includes three criteria that must be applied to mixed methods studies. The quality of studies was assessed by two reviewers (AA & MK) independently. Any disagreements were resolved through further examination and discussion. The interrater agreement was 0.84 indicating a very good agreement [23].

2.6 Data Synthesis

The findings of the included studies were synthesised narratively. Factors were categorised into three groups according to the outcome assessed: intention to use, subjectively-measured use, and objectively-measured use. Factors in each group were categorised into subgroups based on Or and Karsh's conceptual framework [25]. According to the framework, six groups of factors affect the adoption of health information technologies: personal factors, human-technology interaction factors, organisational factors, social factors, environmental factors, and task factors [30].

Findings of the included studies could not be synthesised statistically due to extreme heterogeneity of the studies in terms of outcome, setting, study method, statistical analyse, and study design. For this reason, the current review developed the following conditions that a factor needed to meet to draw a conclusion regarding its effect. Firstly, the factor must be examined by at least four studies. Fewer studies (e.g. 2 or 3 studies) was not selected as a cut-

off point because the current review included many studies with weak and moderate quality, thereby, more studies are required to confirm the effect of a factor. In the same time, more studies (e.g. 5 or 6) were not selected as a cut-off point as this reduces considerably the number of factors that could meet this criterion. Four studies was a compromise which enabled a sufficient number of factors to be included for consideration while at the same time ensuring enough data was available to make an informed decision on the factors effect. Secondly, the effect of the factor must have a consensus among most studies that examined it. Thirdly, those studies that have consensus on the effect of the factor must be superior to the few studies that show a contrary effect in terms of study quality, sample size, and study method.

3 Results

3.1 Search results

As shown in Figure 1, the search process of 42 bibliographic databases and two web engines retrieved 5225 citations. After removing 1602 duplicates, 3623 unique titles and abstracts remained. Of those titles and abstracts, 3345 citations were excluded after scanning their titles and abstracts. By reading the full text of the 278 remaining citations, 85 publications were included. Nineteen additional studies were identified from others sources. In total, 104 publications were included in the synthesis. The 104 publications describe 97 unique studies.

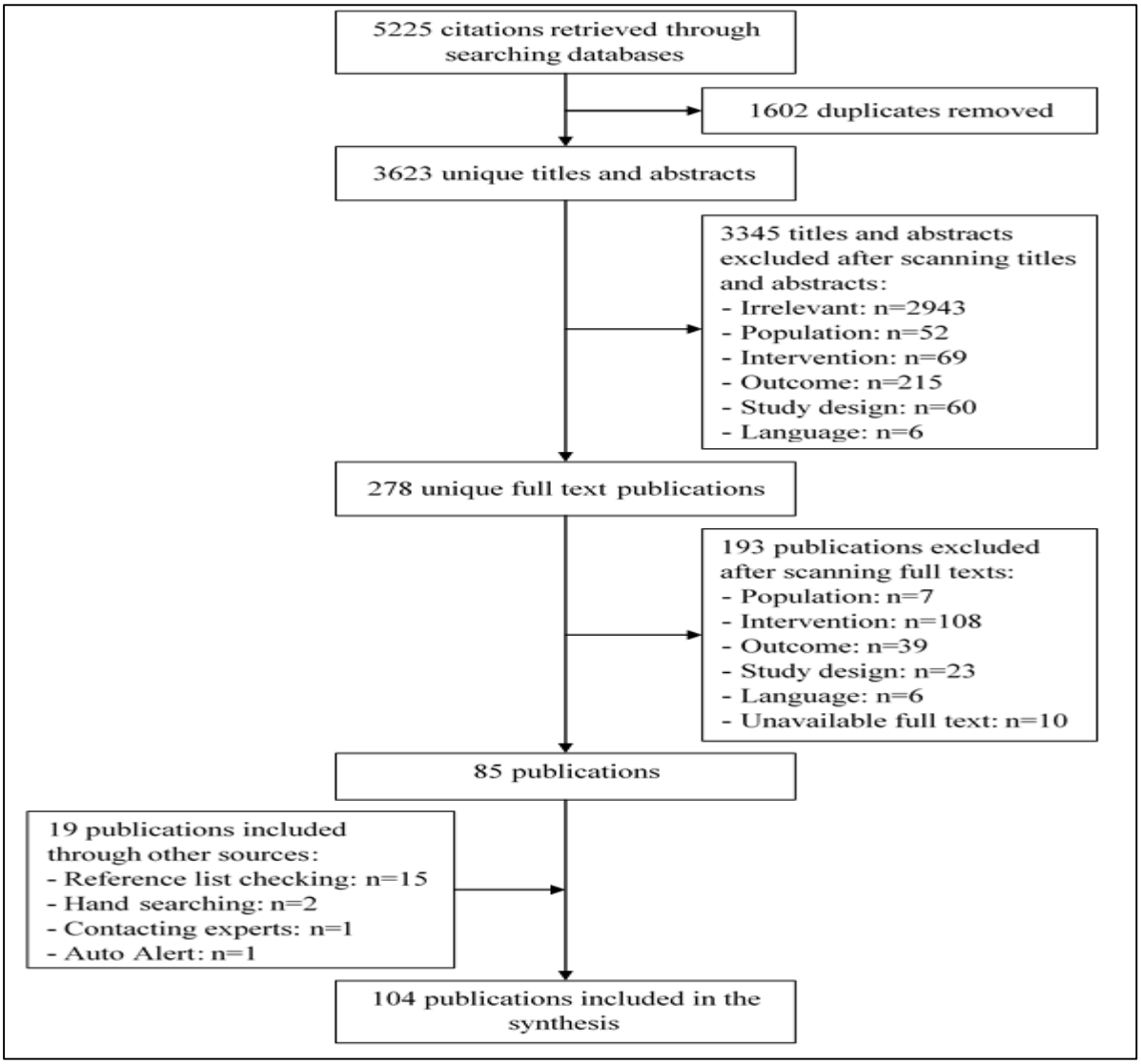

Figure 1: Flow chart of the study selection process

3.2 Characteristics of studies

Most studies were quantitative (n=85, 88%), survey (n=76, 78%), journal article (n=88, 91%), published in the USA (n=81, 84%), published between 2012 and 2018 (n=74, 76%), non-theory based studies (n=81, 84%), and not restricted to people with certain conditions (n=63, 65%) (Table 1). The mean age reported in 48 studies was 54 years. The mean of female percentage reported in 93 studies was 52.5%. While 34 studies had a low quality score (≤25%), 45 studies had high quality (≥75%).

Table 1: Characteristics of the included studies.

Characteristics	Number of publications (number of studies)[1]
Study method	Quantitative: 90 (85) Qualitative:10 (8) Mixed methods:4
Study design	Cross-sectional studies:83 (76) Cohort:19 Case-control:2
Type of publication	Journal article:88 Conference proceeding:7 Thesis:9
Country	USA:85 (81) Canada:8 (6) Netherlands:4 Finland:1 Portugal:1 New Zealand:2 (1) Jordan:1 Korea:1 Argentina:1
Year of publication	2000-2005:0 2006-2011:30 2012-2018:74
Study quality	0%:14 25%:20 50%:21 (18) 75%:22 (19) 100%:28 (26)
Theory used	TAM:14 (10) UTAUT & URM:1 UTAUT2:1 SCT:1 IDT:1 PMT & TTF:1 C-TAM &TPB:1
Sample size	<500:48 (43) 500-999:8 1000-4999:14[2] ≥5000:35[2] (33)
Mean age	54[3] years
Age range	18-98[4]
Sex	Female:52.5%[5]
Conditions	General:67 (63) Rheumatic diseases:1 Diabetes:18 (17) Kidney diseases:1 Chronic diseases:4 Multiple sclerosis:1 Without diseases:4 (2) Depression:1 HIV:3 Hypertension:1 Cancer:2 Cardiac diseases:1
ePHR name	MyChart:15 Portal Personal de Salud:1 My HealtheVet:8 OpenNotes:1 kp.org:6 (5) HealthView Portal:1 MyGroupHealth:6 (5) MyMDAnderson:1 MyHealthManager:5 MiCare:1 MyHealthAt Vanderbilt:4 DirectMD:1 Digitaal Logboek:3 DTC PHR:1 Patient Gateway:2 My UNC Chart:1 PatientSite:2 eClinicalWorks:1 UPMC HealthTrak:2
ePHR provided by	Primary care:33 (29) Specialised clinic:21 Hospital:14 Various settings:12

ePHR functions	Accessing records:97 Messaging providers:93 Booking appointments:74 Setting reminders:13 Adding information:9 Requesting referrals:4 Discussion groups:3 Communicating peers:1 Calendar:1	Messaging providers:93 Refilling prescriptions:74 Educational materials:44 Tracking system:10 Assessment tools:5 Checking billing:6 Tele-monitoring:1 Clinical decision support system:1
Tips	[1]: Numbers in brackets refer to number of studies not publications. [2]: One study has 2 different samples. [3]: Mean Age was reported in 48 studies. [4]: Age range was reported in 19 studies. [5]: Sex was reported in 93 studies.	
Abbreviations	**C-TAM &TPB**: Combined TAM and TPB, **IDT**: Innovation Diffusion Theory, **PMT**: Protection Motivation Theory, **SCT**: Social Cognitive Theory, **TAM**: Technology Acceptance Model, **TTF**: Task Technology Fit, **URM**: User Resistance Model, **UTAUT 2**: Unified Theory of Acceptance and Use of Technology 2	

3.3 Quality of studies

In general, the quality of the quantitative studies (n=85) was moderate. As depicted in Figure 2, 44% of the quantitative studies had a representative sample of the population. Approximately 58% of quantitative studies used an appropriate and valid data collection instrument and defined clearly the variables. About 71% of quantitative studies addressed the most important factors, listed the key demographic information, and took into account any dissimilarities between groups in the analysis. Lastly, 54% of quantitative studies had adequate outcome data (≥80%) in addition to a high response rate (≥60%).

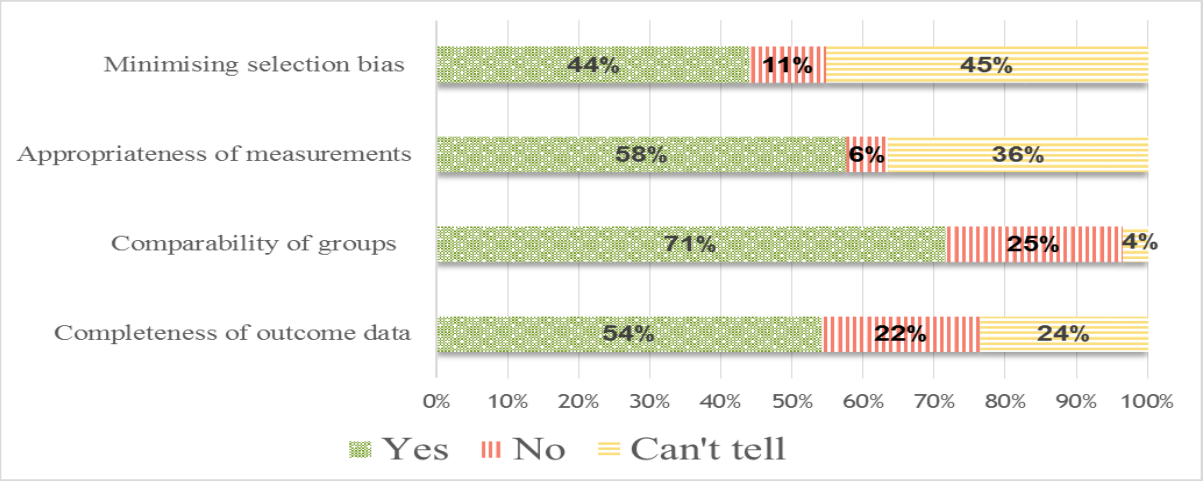

Figure 2: Proportion of quality criterion met for quantitative studies

Generally, the quality of the eight qualitative studies was moderate and slightly higher than quantitative studies. As presented in Figure 3, 88% of qualitative studies selected the appropriate data sources and data analysis and discussed the influence of the context on the findings. However, none of the qualitative studies clarified how their findings were affected by the researchers' perspective, role and interactions with participants.

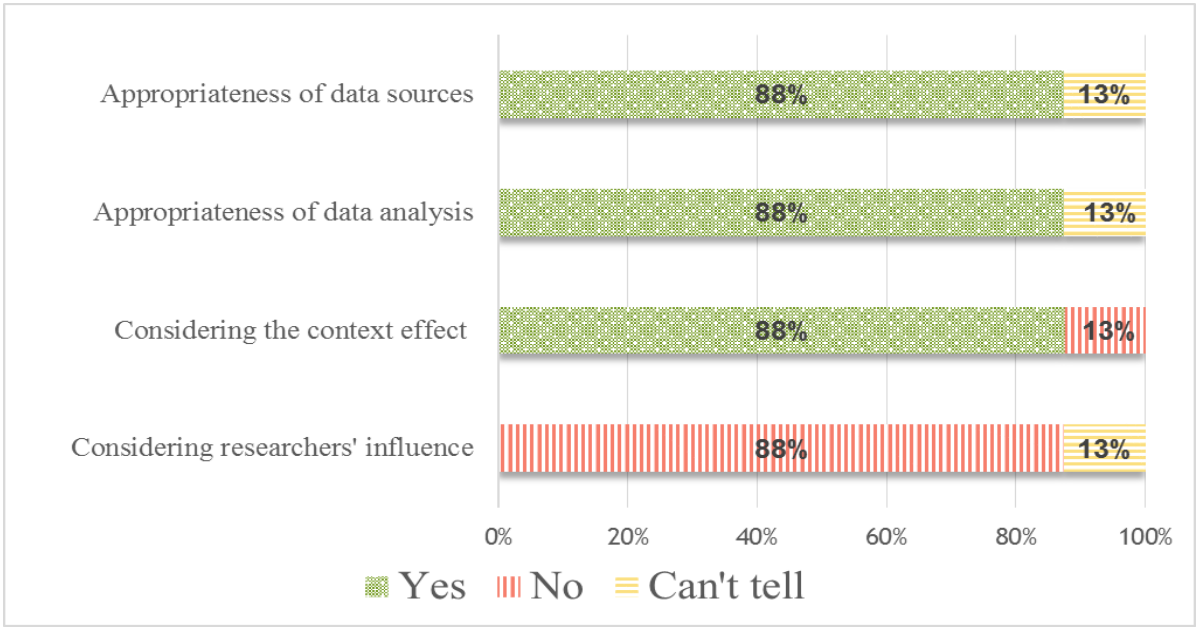

Figure 3: Proportion of quality criterion met for qualitative studies

In general, the quality of the four mixed-methods studies was low. As shown in Figure 4, none of these studies reported the researchers' influence on the findings and the limitations of the integration process of qualitative and quantitative data. Similarly, the integration process did not clearly address the research question in any of the studies. Only one of the four studies had suitable data sources, appropriate and valid data collection instruments, and a representative sample. Two of the four studies met criteria regarding the relevance of data analysis, completeness of outcome data, and comparability of groups. Lastly, three of the mixed-methods studies explained the effect of context on the findings, and the appropriateness of mixed-methods design to answer the research question.

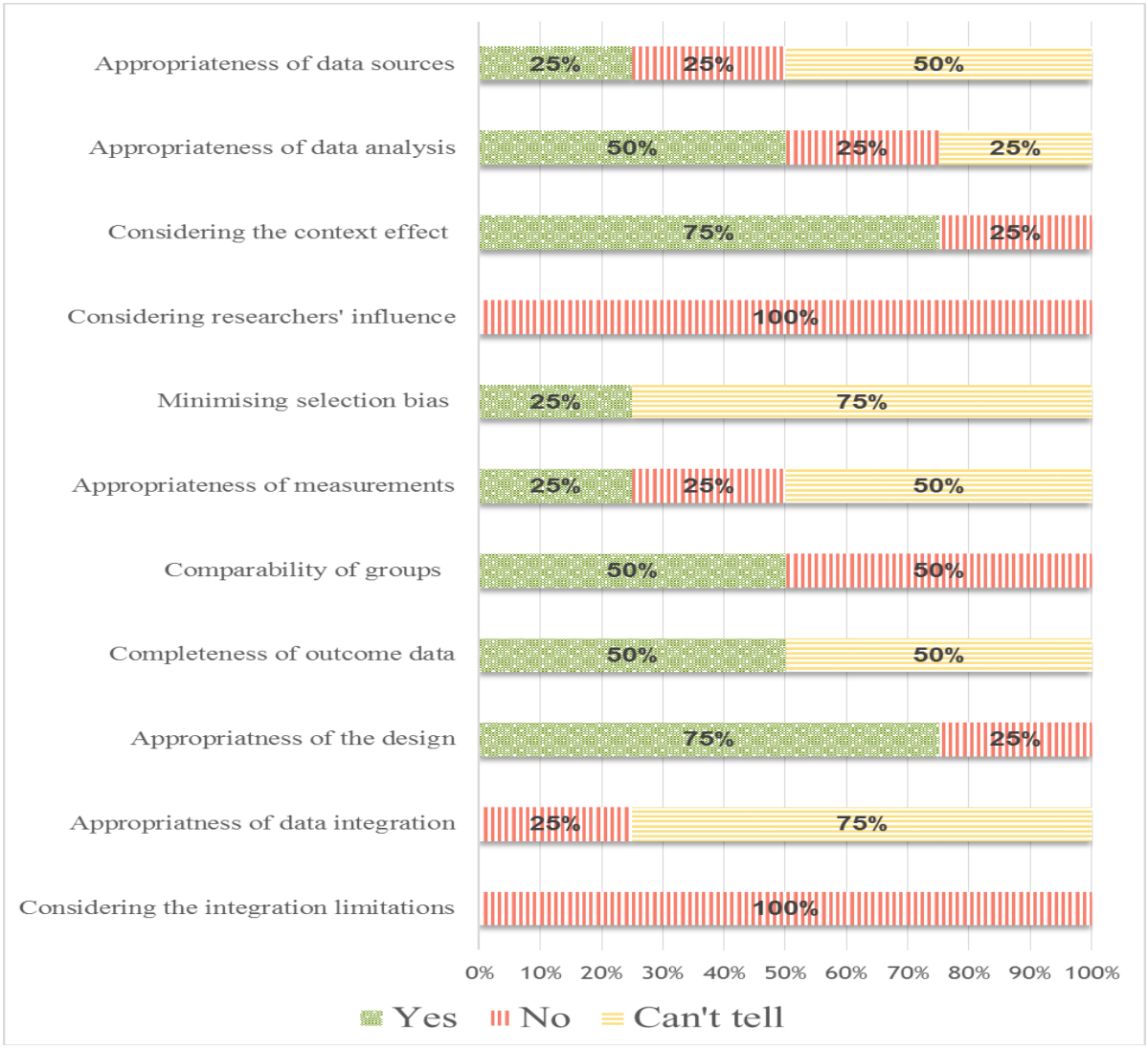

Figure 4: Proportion of quality criterion met for mixed-methods studies

3.4 Results of studies

3.4.1 Factors affecting intention to use

Twenty-nine publications (25 studies) assessed the effect of 59 factors on patients' intention to use ePHRs [26-54]. These factors were categorised into four main groups based on Or and Karsh's conceptual framework [25]: 38 personal factors, 10 human-technology interaction factors, 10 organisational factors, and one social factor. Further, personal factors were subdivided into three subgroups: 11 sociodemographic factors, 13 digital divide-related factors, and 14 health-related factors. All these grouped factors and their effects on intention to use ePHRs are presented in Appendix C.

Of those 59 factors, we were able to draw definitive conclusions regarding the effect of eight factors (see Appendix D). Four of those factors positively affect patients' intention to use: internet access, perceived usefulness, facilitating conditions, and internet use. On the other hand, there was no effect of three factors on intention to use: ethnicity, sex, and health status. The last factor (privacy and security concerns) has a negative effect on patients' intention.

3.4.2 Factors affecting subjectively-measured use

Twenty publications (19 studies) examined the influence of 52 factors on subjectively-measured use of ePHRs [32, 47, 50, 55-71]. These factors were grouped into four main categories according to Or and Karsh's conceptual framework [25]: 35 personal factors, 9 human-technology interaction factors, 7 organisational factors, and 1 social factor. Further, personal factors were subdivided into three subgroups: 15 sociodemographic factors, 9 digital divide-related factors, and 11 health-related factors. All these grouped factors and their effects on subjectively-measured use of ePHRs are presented in Appendix E.

Of those 52 factors, decisive conclusions could be drawn regarding the impact of eight factors on the subjectively-measured use of ePHRs (see Appendix F). Four of those factors positively

affect subjectively-measured use: education, income, internet access, perceived usefulness, perceived ease of use, and awareness of ePHRs. While sex does not affect subjectively-measured use, privacy and security concerns negatively affect it.

3.4.3 Factors affecting objectively-measured use

The influence of 105 factors on objectively-measured use of ePHRs has been assessed by 59 publications (57 studies) [32, 72-129]. The factors were classified into three main groups according to Or and Karsh's conceptual framework [25]: 80 personal factors, 9 human-technology interaction factors, and 16 organisational factors. The personal factors were subdivided into three subgroups: 15 sociodemographic factors, 12 digital divide-related factors, and 53 health-related factors. All these grouped factors and their effects on objectively-measured use of ePHRs are presented in Appendix G.

Of those 105 factors, we were able to draw definitive conclusions regarding the effect of 12 factors: education level, income, language, employment status, marital status, socioeconomic status, residence place, internet access, internet use, computer access, perceived usefulness, and privacy and security concerns (see Appendix H). All these factors positively affect objectively-measured use except the latter factor, which negatively affects objectively-measured use.

4 Discussion

4.1 Principal findings

This review aimed to identify factors that affect patients' use of ePHRs. We identified ninety-seven individual studies examining the effect of more than 150 different factors: 59 factors related to intention to use, 52 factors regarding subjectively-measured use, and 105 factors related to objectively-measured use. In spite of this large number of factors, the current review was able to draw definitive conclusions regarding the effect of only 18 factors. For the

remaining factors, definitive conclusions regarding their effect could not be drawn because they did not meet at least one of the three predefined criteria. This does not mean that those factors are not influential more than there is insufficient evidence to draw a firm conclusion.

Of the 18 factors, three factors affected each of intention to use, subjectively-measured use, and objectively-measured use: perceived usefulness, internet access, and privacy and security concerns (see Figure 5). Sex did not affect intention to use and subjectively-measured use. Internet use affected intention to use and objectively-measured use. Two factors, income and level of education, influenced subjectively-measured use and objectively-measured use. Three factors were related to only intention to use: facilitating conditions, health status, and ethnicity. Two factors influenced only subjectively-measured use: awareness of ePHRs and perceived ease of use. The remaining six factors affected only objectively-measured use: language, employment status, marital status, socioeconomic status, computer access, and residence place (see Figure 5).

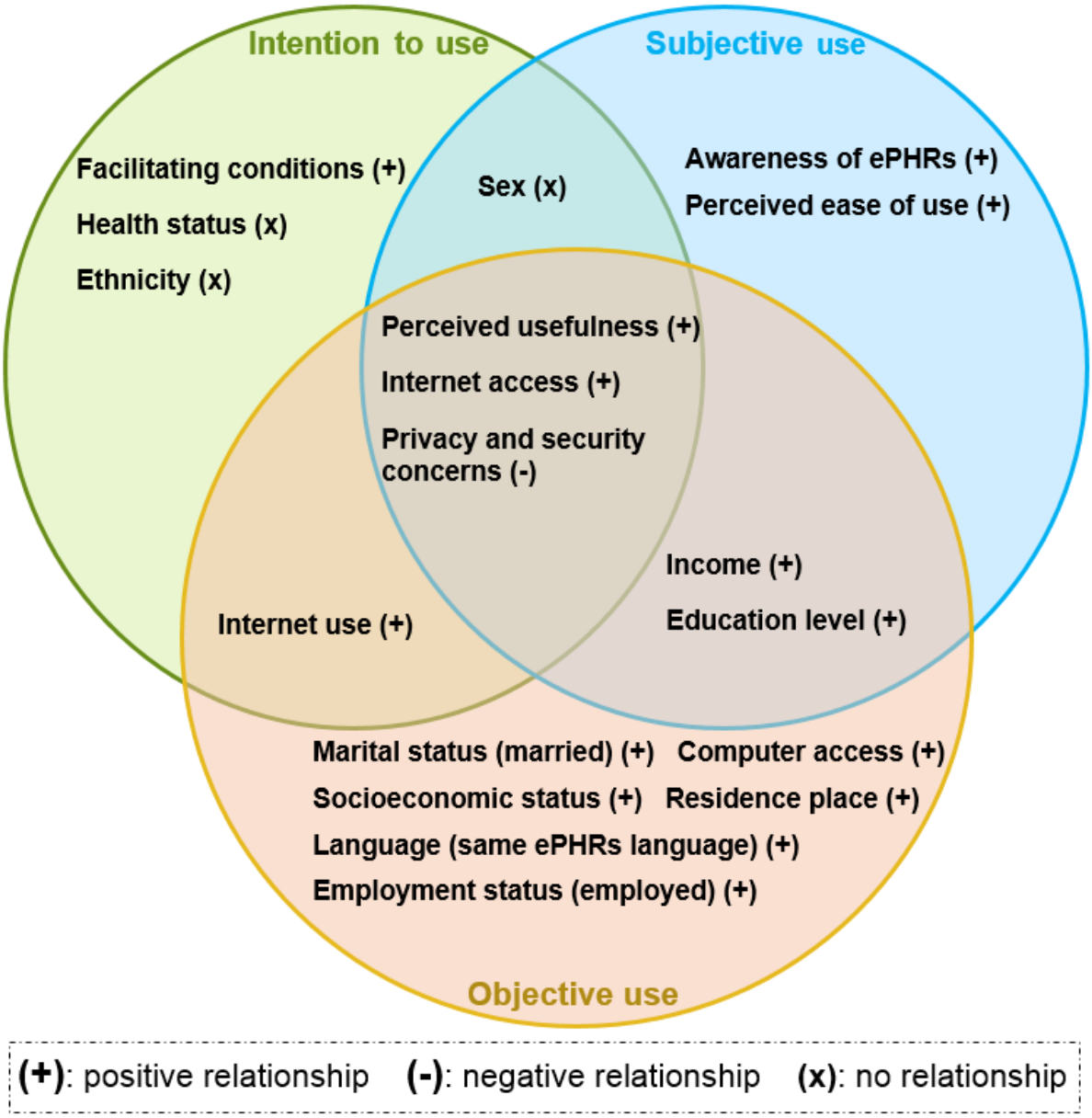

Figure 5: Factors that had definitive conclusion regarding their effect

The findings of the current review were comparable with findings of Or and Karsh's review regarding the factors affecting patients' use of consumer health information technologies [25]. Specifically, three groups of factors were common in both reviews: personal/patient factors, human-technology interaction factors, and organisational factors. Most factors in these groups were similar in both reviews. However, the group "social factors" was found in the current review but not Or and Karsh's review [25]. In contrast, Or and Karsh's review contained a group entitled "environmental factors", which was not found in the current review. The main

difference between the two reviews that the current review differentiated between factors affecting each outcome (i.e. intention to use, subjectively-measured use, and objectively measured use), and this is not the case in Or and Karsh's review [25].

4.2 Strengths and limitations

4.2.1 Strengths

Of nine reviews assessing factors that affect patients' adoption of ePHRs and patient portals [i.e. 10, 19, 25, 130, 131-134], the current review is the only one that differentiated between factors affecting the intention to use, subjectively-measured use, and objectively-measured use. This classification of factors provides more specificity in identifying the influential factors.

In comparison with the abovementioned reviews, this review is the only one that utilised five search sources (i.e. searching 42 bibliographic databases, checking reference lists, hand searching, contacting experts and professionals, and searching two general web engines). As a result, this review contained the largest number of relevant studies (97 studies).

This review is the only one focused on the tethered PHRs while other reviews either did not identify the type of ePHRs [e.g. 131] or included all types [e.g. 10]. The factors that affect patients' use of tethered PHRs may be different from those affecting other types of ePHRs due to the differences in the characteristics and functionalities [135-140].

The current review identified the largest number of factors (more than 150 different factors) in comparison with the other reviews. These factors were also grouped into main categories and subcategories (i.e. personal, human-technology interaction, organisational, social factors) based on a well-developed conceptual framework to enhance the understanding of ePHRs adoption.

Lastly, the current review is the first review that endeavoured to draw definitive conclusions regarding the effect of factors, and this was based on predefined criteria developed by the reviewer.

4.2.2 Limitations

Although investigating factors affecting the use of ePHRs among healthcare providers and caregivers are very important [25, 141], the current review concentrated on patients' adoption only. This is attributed to the fact that ePHRs is designed to be used by patients in the first place, thereby, their adoption is the most important aspect to be assessed.

This study focused on the adoption of tethered PHRs, and so may limit the ability to generalise the findings of this review to other types of ePHRs (i.e. stand-alone and integrated PHRs). This may be attributed to the fact that standalone and integrated PHRs have features and functions different from the tethered PHRs, thereby, the factors affecting patients' use of each type of ePHRs might be different [7, 142, 143]. For example, perceived privacy and security may have stronger effect on adoption of standalone PHRs than adoption of tethered PHRs as standalone PHRs are more vulnerable to hack attacks, theft, and damage (Daglish and Archer, 2009; Detmer et al., 2008; Tang et al., 2006). Similarity, price value may play an important role in adoption of standalone PHRs but not tethered PHRs as several standalone PHRs are not provided for free as with tethered PHRs (Tang et al., 2006).

As this review focused on factors that influence the initial use and intention to use ePHRs, its findings may not be generalised to factors affecting continuing use. This is because factors affecting initial use may be different from those influencing continuing use [41, 144-148]. For example, perceived ease of use of a technology is a strong predictor of initial use but not continuing use (Venkatesh et al., 2003). In contrast, habit is an influential factor in relation to continuing use of a technology but not to initial use (Forquer et al., 2014; Kim and Malhotra, 2005; Limayem et al., 2007).

The search process was restricted to studies published in 2000 onwards. This restriction should not affect the findings of this review because this review did not find any relevant study published between 2000 and 2005 indicating a likely paucity of research published before 2000.

As 84% of the included studies were conducted in the USA, the findings of this review may not be generalisable to other countries. Finally, the data were not synthesised statistically in this review (e.g. meta-analysis). A statistical synthesis could not be performed due to extreme heterogeneity of the studies in terms of outcome, setting, study method, statistical analyse, and study design.

4.3 Practical and research implications

4.3.1 Practical implications

Healthcare practices, policy makers, and developers of ePHRs should consider the factors found in this review, especially the 18 factors that the review drew definitive conclusions regarding their effect on adoption of ePHRs. For example, since the perceived usefulness and ease of use are identified as influential factors in the current review, developers of ePHRs should develop a system that is compatible with patients' skills, preferences and desires by involving them in the process of designing and developing the system. Further, healthcare practices should increase patients' perceptions regarding the benefits and ease of use of ePHRs through outreach programs.

As this review found concerns about privacy and security as an influential factor, patients should be assured by practices that the system is secure and no one can access their records without their permission. Furthermore, ePHR developers should protect the system with strong firewalls, complex passwords, regular security reviews, and software updates.

This review concluded that particular facilitating conditions positively affect the intention to use ePHRs. Therefore, practices should provide patients with manuals, online assistance, technical support, and training sessions. Given the positive effect of patients' awareness of ePHRs on using the system, practices should increase patients' awareness of the system using advertising campaigns through different marketing channels, such as public media, social media, and face-to-face communication.

As several personal factors affect patients' adoption of ePHRs (e.g. income, education, employment status, language, using the internet, and having computer and internet access), providers of ePHRs should assess the characteristics of patients in the setting where the system will be implemented. If their characteristics are not comparable with the characteristics of users of the system that were found in the current review, system providers should postpone the implementation of the system and provide suitable solutions and interventions to convince those groups to use the system. For example, if the majority of patients registered in a practice do not use the internet, the practice should offer training sessions about using the internet for them. Further, if they speak a language that is different from the language in the system, developer should add that language to the system.

4.3.2 Research implications

All included studies were subject to the common method bias because they examined independent variables and dependent variables at one point in time and using one data collection instrument [7, 145, 149]. Therefore, future researchers should avoid this bias through examining the independent variables and dependent variables at two different time points and using at least two different instruments (such as questionnaires, system logs, and patient records).

Only 16 of the included studies were theory-based despite the importance of using a theoretical framework [10, 16, 19, 79, 150, 151]. Furthermore, 10 of those 16 studies utilised the technology acceptance model (TAM) despite the existence of other competing theories such as the theory of reasoned action and unified theory of acceptance and use of technology [10, 19]. Accordingly, the current review recommends researchers to conduct more theory-based studies and adopt other theories rather than TAM.

Most of the studies included in the current review focused on personal factors. Investigating factors from different groups enhances the understanding of ePHRs adoption [25]. Thus, future studies should pay more attention to human-technology interaction factors, social factors, organisational factors, environmental factors.

Assessing moderating and mediating effects on relationships between the independent variables and dependent variables enhances understanding of factors that affect the adoption [25]. However, none of the included studies examined moderating and mediating effects on the proposed relationships. Therefore, future research should consider adding moderators and mediators to their models.

Although the included studies tested more than 150 factors, other factors were tested by studies included in other reviews but not in our review (because they did not meet all eligibility criteria); such as health consciousness, perceived complexity of treatment, autonomy, self-management perception, provider quality measure, interoperability, trust in the provider, promotional adds, and social divide (Amante et al., 2014; Jabour and Jones, 2013; Najaftorkaman et al., 2014). Consequently, future studies should examine the abovementioned factors.

As long-term viability and eventual success of information technologies count on continuing use more than initial use [144, 145, 152, 153], researchers should endeavour to conduct studies and systematic reviews to assess factors that affect continuing use of ePHRs.

The majority of studies in this review were quantitative and carried out in the USA. Thus, researchers should conduct more mixed-methods studies in other developed and developing countries.

Lastly, included studies had low quality in several aspects such as representativeness of the sample, appropriateness of measurements, comparability of groups, and completeness of outcome data. Accordingly, researchers should conduct better quality studies by applying the MMAT criteria and reporting sufficient, standardised data to enable reviewers to synthesise the findings statistically.

5 Conclusion

Of the numerous factors examined by the included studies, this review concluded the effect of 18 factors: 13 personal factors (e.g. gender, ethnicity, and income), four human-technology factors (e.g. perceived usefulness and ease of use), and one organisational factor (facilitating conditions). These factors should be taken into account by stakeholders for the successful implementation of these systems. More studies are needed to conclude the effect of other factors. In addition, researchers should conduct more theory-based longitudinal studies for assessing factors affecting initial use and continuing use of ePHRs among patients.

Authors' contributions

The review was conducted by AA, with guidance from and under the supervision of BMB, TF, and PG. AA drafted the manuscript, and it was revised critically for important intellectual content by all authors. All authors approved the manuscript for publication and agree to be accountable for all aspects of the work.

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Statement on conflicts of interest

The authors have no competing interests to declare.

Summary table

Summary table

What was already known on this topic:

- Electronic personal health records are useful tools for converting the care from physician-centred to patient-centred.
- Adoption rates of electronic personal health records are usually very low.
- Many studies assessed factors affecting adoption of electronic personal health records.

What this study added to our knowledge:

- This review provides a long list of possible factors affecting patients' use and intention to use ePHRs, and these factors are categorised into four main groups.
- This review demonstrated that previous studies focused mainly on personal factors.
- Of the factors identified, the review concluded the effect of 18 factors: 13 personal factors (e.g. gender, ethnicity, and income), four human-technology factors (e.g. perceived usefulness and ease of use), and one organisational factor (facilitating conditions).
- It is not necessarily that factors affecting intention to use influence the use as well, and vice versa.

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Appendices

Appendix A: Search process details for each database

Database	Date	Search terms	Hits	Notes
MEDLINE ® 1996 and onward	25/06/18	Presented in a special table after this table	1514	AutoAlert was created
CINAHL ® 1961 to present	25/06/18	Presented in a special table after this table	366	This result is after excluding Medline journals AutoAlert was created
EMBASE 1996 and onward	25/06/18	Presented in a special table after this table	127	This result after excluding Medline journals AutoAlert was created
PsycINFO® 1806 to June Week 1 2016	26/06/18	Presented in a special table after this table	232	AutoAlert was created
Global Health 1973 to 2016 Week 21	26/06/18	Presented in a special table after this table	131	AutoAlert was created
ACM Digital Library 1954 and onward	26/06/18	personal health records AND (adoption OR acceptance OR use) personal medical records AND (adoption OR acceptance OR use) personally controlled health records AND (adoption OR acceptance OR use) individual medical record (adoption OR acceptance OR use) patient portals AND (adoption OR acceptance OR use) patient internet portals AND (adoption OR acceptance OR use) patient internet portals AND (adoption OR acceptance OR use)	61	The search functions in this database are not highly developed, so the search was broken down into multiple searches AutoAlert was created
IEEE Xplore 1872 and onward	26/06/18	("MeSH Terms":"personal health record" OR Abstract":"personal health record" OR "Abstract":"personal health records" OR "Abstract":"personal medical record" OR "Abstract":"personal medical records" OR "Abstract":"patient portal" OR Abstract":"patient portals" OR "Abstract":PHR) AND (p_Abstract:use OR "Abstract":accept* OR "Abstract":adopt* OR "Abstract":intention*) AND (p_Abstract:patient* OR Abstract":consumer)	270	This database limits the number of search terms to 15. AutoAlert was created
Scopus 1960 and onward	27/06/18	(TITLE-ABS KEY (patient* OR consumer* OR elder* OR old* OR veteran*)) AND (TITLE-ABS-	886	AutoAlert was created

		KEY(use* OR adopt* OR accept* OR intention* OR attitude* OR satisf*)) AND ((TITLE-ABS-KEY ({personal health record} OR {personal medical record} OR {patient-held record} OR {patient-held medical record} OR {patient accessible electronic medical record} OR {patient accessible electronic health record} OR {personally controlled health record})) OR (TITLE-ABS-KEY ({interactive preventive health record} OR {personal health information management system} OR {computer-based patient record} OR {patient portal} OR {patient internet portal} OR {patient web portal})))		
Web of Science **1950 and onward**	27/06/18	(patient* OR consumer* OR elder* OR old* OR adult* OR senior* OR veteran*) AND ("personal health record*" OR "personal medical record*" OR "patient health record*" OR "patient medical record*" OR "patient-held record*" OR "patient-held medical record*" OR "patient-held health record*" OR "personal electronic health record*" OR "personal electronic medical record*" OR "patient accessible electronic medical record*" OR "patient accessible electronic health record*" OR "personally controlled health record*" OR "personally controlled medical record*" OR "individual health record*" OR "individual medical record*" OR "interactive preventive health record*" OR "personal health information management system*" OR "patient portal*" OR "patient internet portal*" OR "patient web portal*") AND (use* OR usage OR adopt* OR utilis* OR utiliz* OR accept* OR intention* OR attitude* OR satisf* OR adhere* OR reject* OR abandon*)	302	AutoAlert was created
Journal of the American Medical Informatics Association (JAMIA) **1977 and onward**	27/06/18	"personal health record" AND adoption (5) "personal health record" AND use (3) "personal health record" AND accept (0) "personal health record" AND intention (0) "personal medical record" AND adoption (0) "personal medical record" AND use (0) "personal medical record" AND accept (0) "personal medical record" AND intention (0) "electronic patient record" and adoption (0) "electronic patient record" and use (4) "electronic patient record" and accept (0) "electronic patient record" and intention (0) "patient health record" AND adoption (0) "patient health record" AND use (0) "patient health record" AND accept (0) "patient health record" AND intention (0) "patient medical record" AND adoption (0) "patient medical record" AND use (2) "patient medical record" AND accept (0)	20	It does not have an advanced search tool. Therefore, the search performed in a simple way.

		"patient medical record" AND intention (0) “patient portal” AND adoption (0) “patient portal” AND use (5) “patient portal” AND accept (0) “patient portal” AND intention (0)		
International Journal of Medical Informatics (IJMI) **1970 and onward**	27/06/18	"personal health record*" in Title/Abs/Keywords OR "personal medical record*" in Title/Abs/ Keywords OR "patient health record*" in Title/ Abs/Keywords OR "patient medical record*" in Title/Abs/Keywords OR "patient-held record*" in Title/Abs/Keywords OR "personal electronic health record*" in Title/Abs/Keywords OR "personal electronic medical record*" in Title/Abs/Keywords OR "patient accessible electronic medical record*" in Title/Abs/ Keywords OR "patient accessible electronic health record*" inTitle/Abs/Keywords OR "personally controlled health record*" in Title/ Abs/Keywords OR "personally controlled medical record*" inTitle/Abs/Keywords OR "individual medical record*" in Title/Abs/ Keywords OR "individual health record*" inTitle/Abs/Keywords OR "interactive preventive health record*" inTitle/Abs/Keywords OR "personal health information management system*" inTitle/Abs/Keywords OR "patient portal*" in Title/Abs/Keywords OR "patient internet portal*" in Title/Abs/Keywords OR "patient web portal*" inTitle/Abs/Keywords	39	This database was searched using searching terms that are related to only the intervention because number of studies retrieved from this search are very low
Telemedicine and e-Health **1995 and onward**	27/06/18	You searched for: [Abstract: "personal health record*"] OR [Abstract: "personal medical record*"] OR[Abstract: "personal electronic health record*"] OR [Abstract: "personal electronic medical record*"] OR[Abstract: "patient-held record*"] OR [Abstract: "patient-held medical record*"] OR [Abstract: "patient-held health record*"] OR [Abstract: "patient accessible electronic health record*"] OR [Abstract: "personally controlled health record"] OR [Abstract: "personally controlled medical record*"] OR [Abstract: "personal health information management system*"] OR [Abstract : "interactive preventive health record*"] OR [Abstract: "patient portal*"] OR [Abstract: "patient internet portal*"] OR [Abstract: "patient web portal*”] AND [in Journal: Telemedicine and e-Health]	18	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Health Informatics Journal (HIJ) **1995 and onward**	27/06/18	personal health record OR personal medical record OR patient health record OR patient medical record OR personal electronic health record OR personal electronic medical record OR patient accessible electronic medical record OR patient accessible electronic health record OR personally controlled health record OR personally controlled medical record OR individual health record OR individual medical record OR interactive preventive health record OR personal health information management system OR patient portal OR patient internet portal OR patient web portal	24	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Journal of Medical Systems (JMS) **1977 and onward**	27/06/18	'"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal	78	This database was searched using search terms that are related to only the intervention because a number of studies

		health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"'		retrieved from this search is very low
LILACS Database (Literatura Latino Americana em ciencias da Saude) 1980 and onward	27/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	5	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Library & Information Networks for Knowledge Database (WHOLIS) 1948 and onward	27/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
African Index Medicus (AIM) 1948 and onward	27/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Africa (AFRO) library database (AFROLIB) 1948 and onward	27/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
WHO Regional Office for Europe 1977 and onward	27/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	18	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Index Medicus for the Eastern Mediterranean Region (IMEMR)	27/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal	4	This database was searched using search terms that are related to only the intervention because a number of studies

1948 and onward		health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"		retrieved from this search is very low
Western Pacific Region Index Medicus (WPRIM) **1951 and onward**	28/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal" OR "personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals"	3	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
WHO Regional Office for South-East Asia (WROSEA) **1950 and onward**	28/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	1	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
WHO Regional Office for Americas (PAHO) **1930 and onward**	28/06/18	"personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	31	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
National Library of Australia (NLA)	28/06/18	subject:("personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals")	18	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
IndMED **1985 and onward**	28/06/18	personal health records OR personal medical records OR personal electronic health records personal electronic medical records OR patient-held records OR patient-held medical records OR patient-held health records OR patient accessible electronic health records OR personally controlled health records OR personally controlled medical records OR personal health	0	This database was searched using search terms that are related to only the intervention because a number of studies

		information management systems OR interactive preventive health records OR patient portals OR patient internet portals OR patient web portals		retrieved from this search is very low
KoreaMed **1933 and onward**	28/06/18	"personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals" OR "personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	16	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
ProQuest Dissertations & Theses Database **1743 and onwards**	28/06/18	AB,TI(patient* OR consumer* OR elder* OR old* OR veteran*) AND AB,TI("personal health record*" OR "personal medical record*" OR "patient health record*" OR "patient medical record*" OR "patient-held record*" OR "patient-held medical record*" OR "patient-held health record*" OR "personal electronic health record*" OR "personal electronic medical record*" OR "patient accessible electronic medical record*" OR "patient accessible electronic health record*" OR "personally controlled health record*" OR "personally controlled medical record*" OR "individual health record*" OR "individual medical record*" OR "interactive preventive health record*" OR "personal health information management system*" OR "computer-based patient record*" OR "patient portal*" OR "patient internet portal*" OR "patient web portal*") AND AB,TI(use* OR usage OR adopt* OR utilis* OR utiliza* OR accept* OR intention* OR attitude* OR satisfy* OR adhere* OR reject* OR abandon*)	215	This search was not only for theses and dissertations but for scholarly journals and reports and books Auto Alert was created
Electronic Theses Online Service (EThOS)	28/06/18	"personal health record*" OR "personal medical record*" OR "patient health record*" OR "patient medical record*" OR "patient-held record*" OR "patient-held medical record*" OR "patient-held health record*" OR "personal electronic health record*" OR "personal electronic medical record*" OR "patient accessible electronic medical record*" OR "patient accessible electronic health record*" OR "personally controlled health record*" OR "personally controlled medical record*" OR "individual health record*" OR "individual medical record*" OR "interactive preventive health record*" OR "personal health information management system*" OR "computer-based patient record*" OR "patient portal*" OR "patient internet portal*" OR "patient web portal*"	18	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
DART-Europe E-theses Portal	28/06/18	"personal health record*" OR "personal medical record*" OR "patient health record*" OR "patient medical record*" OR "patient-held record*" OR "patient-held medical record*" OR "patient-held health record*" OR "personal electronic health record*" OR "personal electronic	10	This database was searched using search terms that are related to only the intervention

1900 and onward		medical record*" OR "patient accessible electronic medical record*" OR "patient accessible electronic health record*" OR "personally controlled health record*" OR "personally controlled medical record*" OR "individual health record*" OR "individual medical record*" OR "interactive preventive health record*" OR "personal health information management system*" OR "computer-based patient record*" OR "patient portal*" OR "patient internet portal*" OR "patient web portal*"		because a number of studies retrieved from this search is very low
Networked Digital Library of Theses and Dissertations (NDLTD) **1970 and onward**	28/06/18	subject:"personal health record" OR subject:" personal medical record*" OR subject:"patient health record" OR subject:"patient medical record" OR subject:"personal electronic health record" OR subject:"personal electronic medical record" OR subject:"patient accessible electronic medical record" OR subject:"patient accessible electronic health record" OR subject:"personally controlled health record" OR subject:"personally controlled medical record" OR subject:"individual health record" OR subject:"individual medical record" OR subject:"interactive preventive health record" OR subject:"personal health information management system" OR subject:"computer based patient record" OR subject:"patient portal" OR subject:"patient internet portal" OR subject: "patient web portal" OR title:"personal health record" OR title:"personal medical record" OR title:"patient health record" OR title:"patient medical record" OR title:"personal electronic health record" OR title:"personal electronic medical record" OR title:"patient accessible electronic medical record" OR title:"patient accessible electronic health record" OR title: "personally controlled health record" OR title:" personally controlled medical record" OR title:" individual health record" OR title:"individual medical record" OR title:"interactive preventive health record" OR title:"personal health information management system" OR title:" computer based patient record" OR title:"patient portal" OR title:"patient internet portal" OR title:"patient web portal" OR subject:"personal health records" OR subject:"personal medical records" OR subject:"patient health records" OR subject:"patient medical records" OR subject:" personal electronic health records" OR subject:" personal electronic medical records" OR subject:"patient accessible electronic medical records" OR subject:"patient accessible electronic health records" OR subject:" personally controlled health records" OR subject:"personally controlled medical records" OR subject:"individual health records" OR subject:"individual medical records" OR subject: "interactive preventive health records" OR subject:"personal health information management systems" OR subject:"computer based patient records" OR subject:"patient portals" OR subject:"patient internet portasl" OR subject:"patient web portals" OR title:"personal health records" OR title:"personal medical records" OR title:"patient health records" OR title :"patient medical records" OR title:"personal electronic health records" OR title:"personal electronic medical records" OR title:"patient accessible electronic medical records" OR title:"patient accessible electronic health records" OR title:"personally controlled health records" OR title:"personally controlled medical records" OR title:"individual health records" OR title: "individual medical records" OR title:" interactive preventive health records" OR title:"personal health information management systems" OR title:"computer based patient records" OR title:"patient portals" OR title:" patient internet portals" OR title:"patient web portals"	70	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low

Theses Canada	29/06/18	"personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals"	7	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Brazilian Digital Library of Theses and Dissertations (BDLTD) **1942 and onward**	29/06/18	"personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals"	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
South African Theses and Dissertations (SATD) **1980 and onward**	29/06/18	"personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals"	2	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Hong Kong University Theses **1941 and onward**	29/06/18	((abstract:("personal health records")) OR (abstract:("personal medical records")) OR (abstract:("personal electronic health records")) OR (abstract:("personal electronic medical records")) OR (abstract:("patient-held records")) OR (abstract:("patient-held medical records")) OR (abstract:("patient-held health records")) OR (abstract:("patient accessible electronic health records")) OR (abstract:("personally controlled health records")) OR (abstract:("personally controlled medical records")) OR (abstract:("personal health information management systems")) OR (abstract:("interactive preventive health records")) OR (abstract:("patient internet portals")))	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
System for Information on Grey Literature in Europe (openSIGILE) **1980 and onward**	29/06/18	"personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals" OR "personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held	6	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low

		health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"		
COPAC **1850 and onward**	29/06/18	subject :"personal health record*" OR subject :"personal medical record*" OR subject :"patient health record*" OR subject :"patient medical record*" OR subject :"personal electronic health record*" OR subject :"personal electronic medical record*" OR subject :"patient accessible electronic medical record*" OR subject :"patient accessible electronic health record*" OR subject :"personally controlled health record*" OR subject:"personally controlled medical record*" OR subject:"individual health record*" OR subject:"individual medical record*" OR subject:"interactive preventive health record*" OR subject:"personal health information management system*" OR subject:"computer based patient record*" OR subject:"patient portal*" OR subject:"patient internet portal*" OR subject:"patient web portal*" OR title:"personal health record*" OR title:"personal medical record*" OR title:"patient health record*" OR title:"patient medical record*" OR title:"personal electronic health record*" OR title:"personal electronic medical record*" OR title:"patient accessible electronic medical record*" OR title:"patient accessible electronic health record*" OR title:"personally controlled health record*" OR title:"personally controlled medical record*" OR title:"individual health record*" OR title:"individual medical record*" OR title:"interactive preventive health record*" OR title:"personal health information management system*" OR title:"computer based patient record*" OR title:"patient portal*" OR title:"patient internet portal*" OR title:"patient web portal*"	38	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
BMC Proceedings	29/06/18	(Exact phrase) in All fields (full text)(personal health records OR personal medical records OR personal electronic health records OR personal electronic medical records OR patient-held records OR patient-held medical records OR patient-held health records OR patient accessible electronic health records OR personally controlled health records OR personally controlled medical records OR personal health information management systems OR interactive preventive health records OR patient portals OR patient internet portals OR patient web portals OR personal health record OR personal medical record OR personal electronic health record OR personal electronic medical record OR patient-held record OR patient-held medical record OR patient-held health record OR patient accessible electronic health record OR personally controlled health record OR personally controlled medical record OR personal health information management system OR interactive preventive health record OR patient portal OR patient internet portal OR patient web portal)	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
ISI Proceedings	29/06/18	personal health records OR personal medical records OR personal electronic health records OR personal electronic medical records OR patient-held records OR patient-held medical records OR patient-held health records OR patient accessible electronic health records OR personally controlled health records OR personally controlled medical records OR "personal health information management systems OR "interactive preventive health records OR patient portals OR patient internet portals OR patient web portals OR personal health record OR personal	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low

		medical record OR personal electronic health record OR personal electronic medical record OR patient-held record OR patient-held medical record OR patient-held health record OR patient accessible electronic health record" OR "personally controlled health record OR personally controlled medical record OR personal health information management system OR interactive preventive health record OR patient portal OR patient internet portal OR patient web portal"		
NHS Evidence	29/06/18	("personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals" OR "personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal") AND (use* OR usage OR adopt* OR accept* OR intention* OR attitude* OR satisf* OR adhere* OR reject* OR abandon*)) AND (patient* OR consumer* OR elder* OR old* OR adult OR veteran*)	282	
ISRCTN registry	29/06/18	"personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals" OR "personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal"	0	This database was searched using search terms that are related to only the intervention because a number of studies retrieved from this search is very low
Explore the British Library	30/06/18	("personal health records" OR "personal medical records" OR "personal electronic health records" OR "personal electronic medical records" OR "patient-held records" OR "patient-held medical records" OR "patient-held health records" OR "patient accessible electronic health records" OR "personally controlled health records" OR "personally controlled medical records" OR "personal health information management systems" OR "interactive preventive health records" OR "patient portals" OR "patient internet portals" OR "patient web portals" OR "personal health record" OR "personal medical record" OR "personal electronic health record" OR "personal electronic medical record" OR "patient-held record" OR "patient-held medical record" OR "patient-held	73	

		health record" OR "patient accessible electronic health record" OR "personally controlled health record" OR "personally controlled medical record" OR "personal health information management system" OR "interactive preventive health record" OR "patient portal" OR "patient internet portal" OR "patient web portal") AND (use* OR usage OR adopt* OR accept* OR intention* OR attitude* OR satisf* OR adhere* OR reject* OR abandon*)) AND (patient* OR consumer* OR elder* OR old* OR adult OR veteran*)		
Health Management Information Consortium (HMIC))	30/06/18	Presented in a special table after this table	47	
Google Scholar	30/06/18	("personal health records" OR "personal medical records" OR "patient portals" OR patient web portals") AND (use OR adoption OR acceptance OR intention) AND (patients OR consumers)	100	Checking the first 10 pages only
Turning Research Into Practice (TRIP)	30/06/18	("personal health record*" OR "personal medical record*" OR "personal electronic health record*" OR "personal electronic medical record*" OR "patient-held record*" OR "patient-held medical record*" OR "patient-held health record*" OR "patient accessible electronic health record*" OR "personally controlled health record*" OR "personally controlled medical record*" OR "personal health information management system*" OR "interactive preventive health record*" OR "patient portal*" OR "patient internet portal*" OR "patient web portal*") AND (use* OR usage OR adopt* OR utilis* OR utiliz* OR accept* OR intention* OR attitude* OR satisf* OR adhere* OR reject* OR abandon*) AND (patient* OR consumer* or elder* OR old* OR veteran*)	193	

Ovid MEDLINE(R) 1996 to June Week 2 2016

#	Searches	Results
1	Patients/	8416
2	patient*.tw.	3381644
3	consumer*.tw.	36430
4	elder*.tw.	133613
5	old*.tw.	744450
6	Adult/	2551458
7	adult*.tw.	635716
8	senior*.tw.	21193
9	veteran*.tw.	18053
10	Health Records, Personal/	1063
11	personal health record*.tw.	570
12	personal medical record*.tw.	45
13	patient-held record*.tw.	45
14	patient-held medical record*.tw.	5
15	patient-held health record*.tw.	5
16	personal electronic health record*.tw.	23
17	personal electronic medical record*.tw.	1
18	patient accessible electronic health record*.tw.	6
19	patient accessible electronic medical record*.tw.	5
20	personally controlled health record*.tw.	22
21	personally controlled medical record*.tw.	0
22	individual health record*.tw.	14
23	individual medical record*.tw.	44
24	interactive preventive health record*.tw.	4
25	personal health information management system*.tw.	6
26	patient portal*.tw.	241
27	patient internet portal*.tw.	10
28	patient web portal*.tw.	24
29	use*.tw.	3551038
30	usage.tw.	43510
31	adopt*.tw.	120558
32	utilis*.tw.	23477
33	utiliz*.tw.	252482
34	accept*.tw.	230089
35	intention/	7071
36	intention*.tw.	45612
37	attitude*.tw.	71670
38	satisf*.tw.	164607
39	adhere*.tw.	91827
40	reject*.tw.	61107
41	abandon*.tw.	10582
42	or/1-9	5128463
43	or/10-28	2465
44	or/29-41	4130668
45	42 and 43 and 44	1570
46	limit 44 to yr="2000 -Current"	1514

Embase 1996 to 2016 Week 23

#	Searches	Results
1	*patient/	348912
2	patient*.tw.	5527811
3	consumer*.tw.	50583
4	elder*.tw.	212734
5	old*.tw.	1194079
6	adult/	3754898
7	adult*.tw.	932113
8	senior*.tw.	32754
9	veteran*.tw.	26009
10	or/1-9	7852347
11	personal health record*.tw.	758
12	personal medical record*.tw.	66
13	patient-held record*.tw.	74
14	patient-held medical record*.tw.	8
15	patient-held health record*.tw.	5
16	personal electronic health record*.tw.	29
17	personal electronic medical record*.tw.	3
18	patient accessible electronic health record*.tw.	4
19	patient accessible electronic medical record*.tw.	6
20	personally controlled health record*.tw.	26
21	personally controlled medical record*.tw.	0
22	individual health record*.tw.	18
23	individual medical record*.tw.	117
24	interactive preventive health record*.tw.	5
25	personal health information management system*.tw.	7
26	patient portal*.tw.	365
27	patient internet portal*.tw.	10
28	patient web portal*.tw.	28
29	or/11-28	5519
30	use*.tw.	5311789
31	usage.tw.	73866
32	adopt*.tw.	179620
33	utilis*.tw.	42946
34	utiliz*.tw.	402011
35	accept*.tw.	358719
36	patient attitude/ or patient participation/ or patient preference/ or patient satisfaction/ or refusal to participate/	161328
37	intention*.tw.	67015
38	attitude*.tw.	102868
39	adhere*.tw.	148499
40	reject*.tw.	97817
41	abandon*.tw.	16403
42	or/39-41	6147455
43	10 and 29 and 42	5402
44	limit 47 to (exclude medline journals and yr="2000 -Current")	127

CINAHL 1961 to present

#	Query	Results
S48	Limiters - Published Date: 20000101-20161231; Exclude MEDLINE	366
S47	(S44 AND S45 AND S46)	2,752
S46	S29 OR S30S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43	594,528
S45	S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28	5,075
S44	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9	934,787
S43	AB abandon*	1,888
S42	AB reject*	4,700
S41	AB adhere*	16,379
S40	AB satisf*	40,454
S39	(MH "Patient Satisfaction") OR (MH "Consumer Satisfaction")	33,706
S38	AB intention*	13,181
S37	(MH "Intention")	2,579
S36	AB accept*	38,312
S35	AB utiliz*	33,882
S34	AB utilis*	5,073
S33	AB Adopt*	21,863
S32	(MH "Patient Attitudes")	21,999
S31	(MH "Consumer Attitudes")	3,719
S30	AB Usage	6,120
S29	AB use*	474,868
S28	AB patient web portal*	17
S27	AB patient internet portal*	11
S26	AB patient portal*	287
S25	AB personal health information management system*	0
S24	AB interactive preventive health record*	2
S23	AB individual medical record*	109
S22	AB individual health record*	50
S21	AB personally controlled medical record*	0
S20	AB personally controlled health record*	8
S19	AB patient accessible electronic medical record*	1
S18	AB patient accessible electronic health record*	1
S17	AB personal electronic medical record*	5
S16	AB personal electronic health record*	34
S15	AB patient-held health record*	4
S14	AB patient-held medical record*	3
S13	AB patient-held record*	37
S12	AB personal medical record*	55
S11	AB personal health record*	174
S10	(MH "Medical Records, Personal")	509
S9	AB veteran*	6,648
S8	AB senior*	8,616
S7	AB Adult*	102,799
S6	(MH "Adult")	495,487
S5	AB old*	110,100
S4	AB elder*	32,179
S3	AB patient*	490,924
S2	AB consumer*	10,507
S1	(MH "Consumers")	1,664

PsycINFO 1806 to June Week 2 2016

#	Searches	Results
1	*patients/	5672
2	patient*.tw.	598605
3	consumer*.tw.	45537
4	elder*.tw.	62580
5	old*.tw.	478859
6	adult*.tw.	380997
7	senior*.tw.	23600
8	veteran*.tw.	16666
9	personal health record*.tw.	130
10	personal medical record*.tw.	8
11	patient-held record*.tw.	21
12	patient-held medical record*.tw.	4
13	patient-held health record*.tw.	4
14	personal electronic health record*.tw.	1
15	personal electronic medical record*.tw.	1
16	patient accessible electronic health record*.tw.	0
17	patient accessible electronic medical record*.tw.	1
18	personally controlled health record*.tw.	5
19	personally controlled medical record*.tw.	0
20	individual health record*.tw.	1
21	individual medical record*.tw.	5
22	interactive preventive health record*.tw.	2
23	personal health information management system*.tw.	2
24	patient portal*.tw.	60
25	patient internet portal*.tw.	3
26	patient web portal*.tw.	2
27	use*.tw.	1224008
28	usage.tw.	25559
29	adopt*.tw.	71246
30	utilis*.tw.	5775
31	utiliz*.tw.	106182
32	accept*.tw.	113041
33	behavioral intention/ or intention/ or planned behavior/ or reasoned	15186
34	consumer behavior/ or consumer satisfaction/	25408
35	intention*.tw.	57602
36	attitude*.tw.	202401
37	client attitudes/	14640
38	computer attitudes/ or computer anxiety/	1498
39	adhere*.tw.	26542
40	reject*.tw.	32665
41	abandon*.tw.	9996
42	or/1-8	1303741
43	or/9-26	309
44	or/27-41	1600372
45	42 and 43 and 44	255
46	limit 47 to yr="2000 -Current"	232

Global Health 1973 to 2016 Week 22

#	Searches	Results
1	patients/ or elderly patients/	23388
2	patient*.tw.	556314
3	consumer*.tw.	39089
4	adults/	49705
5	adult*.tw.	226075
6	senior*.tw.	36983
7	old*.tw.	228667
8	elder*.tw.	46015
9	veteran*.tw.	3221
10	personal health record*.tw.	50
11	personal medical record*.tw.	6
12	patient-held record*.tw.	5
13	patient-held medical record*.tw.	2
14	patient-held health record*.tw.	2
15	personal electronic health record*.tw.	0
16	personal electronic medical record*.tw.	0
17	patient accessible electronic health record*.tw.	0
18	patient accessible electronic medical record*.tw.	0
19	personally controlled health record*.tw.	0
20	personally controlled medical record*.tw.	0
21	individual health record*.tw.	9
22	individual medical record*.tw.	19
23	interactive preventive health record*.tw.	0
24	personal health information management system*.tw.	0
25	patient portal*.tw.	8
26	patient internet portal*.tw.	0
27	patient web portal*.tw.	1
28	use*.tw.	829458
29	usage.tw.	18482
30	adopt*.tw.	29991
31	utilis*.tw.	7477
32	utiliz*.tw.	67309
33	accept*.tw.	51476
34	consumer attitudes/ or attitudes/ or exp consumer behaviour/	40941
35	consumer preferences/ or consumer satisfaction/	4008
36	attitude*.tw.	48976
37	satisf*.tw.	27985
38	adhere*.tw.	24364
39	reject*.tw.	6569
40	abandon*.tw.	2339
41	intention*.tw.	12301
42	or/1-9	877242
43	or/10-27	220
44	or/29-41	973158
45	42 and 43 and 44	143
46	limit 47 to yr="2000 -Current"	131

HMIC Health Management Information Consortium 1983 - present

#	Searches	Results
1	patients/	10669
2	patient*.tw.	69982
3	consumers/	780
4	consumer*.tw.	4861
5	elder*.tw.	9083
6	old*.tw.	16834
7	adults/	2757
8	adult*.tw.	13351
9	senior*.tw.	4243
10	veteran*.tw.	424
11	personal health record*.tw.	41
12	personal medical record*.tw.	5
13	patient-held record*.tw.	30
14	patient-held medical record*.tw.	8
15	patient-held health record*.tw.	2
16	personal electronic health record*.tw.	5
17	personal electronic medical record*.tw.	0
18	patient accessible electronic health record*.tw.	0
19	patient accessible electronic medical record*.tw.	0
20	personally controlled health record*.tw.	1
21	personally controlled medical record*.tw.	0
22	individual health record*.tw.	2
23	individual medical record*.tw.	2
24	interactive preventive health record*.tw.	0
25	personal health information management system*.tw.	0
26	patient portal*.tw.	2
27	patient internet portal*.tw.	1
28	patient web portal*.tw.	0
29	use*.tw.	77589
30	usage.tw.	1024
31	adopt*.tw.	7489
32	utilis*.tw.	4103
33	utiliz*.tw.	1224
34	accept*.tw.	7709
35	intention*.tw.	2430
36	consumer behaviour/ or consumer needs/ or consumer	2145
37	attitude*.tw.	8814
38	patient attitudes/	156
39	satisf*.tw.	8460
40	adhere*.tw.	1714
41	reject*.tw.	926
42	abandon*.tw.	396
43	or/1-10	106538
44	or/11-28	126
45	or/29-42	101400
46	43 and 44 and 45	82
47	limit 47 to yr="2000 -Current"	47

Appendix B: Quality assessment form

Screening questions (for all types)		
Methodological quality criteria	Responses	Comments
Are there clear qualitative and quantitative research questions (or objectives*), or a clear mixed methods question (or objective*)?	☐Yes ☐No ☐Can't tell	
Do the collected data allow address the research question (objective)? E.g., consider whether the follow-up period is long enough for the outcome to occur (for longitudinal studies or study components).	☐Yes ☐No ☐Can't tell	
Qualitative studies		
Methodological quality criteria	Responses	
Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question (objective)?	☐Yes ☐No ☐Can't tell	
Is the process for analysing qualitative data relevant to address the research question (objective)?	☐Yes ☐No ☐Can't tell	
Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected?	☐Yes ☐No ☐Can't tell	
Is appropriate consideration given to how findings relate *to researchers' influence, e.g., through their interactions* with participants?	☐Yes ☐No ☐Can't tell	
Quantitative non-randomised studies		
Methodological quality criteria	Responses	
Are participants (organizations) recruited in a way that minimizes selection bias?	☐Yes ☐No ☐Can't tell	
Are measurements appropriate (clear origin, or validity known, or standard instrument; and absence of contamination between groups when appropriate) regarding the exposure/intervention and outcomes?	☐Yes ☐No ☐Can't tell	
In the groups being compared (exposed vs. non-exposed; with intervention vs. without; cases vs. controls), are the participants comparable, or do researchers take into account (control for) the difference between these groups?	☐Yes ☐No ☐Can't tell	
Are there complete outcome data (80% or above), and, when applicable, an acceptable response rate (60% or above), or an acceptable follow-up rate for cohort studies (depending on the duration of follow-up)?	☐Yes ☐No ☐Can't tell	
Mixed methods		
Methodological quality criteria	Responses	
Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)?	☐Yes ☐No ☐Can't tell	
Is the integration of qualitative and quantitative data (or results*) relevant to address the research question (objective)?	☐Yes ☐No ☐Can't tell	

Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results*) in a triangulation design?	☐Yes ☐No ☐Can't tell	

Appendix C: Studies that assessed each factor affecting intention to use

Group	Factors	Positive associations	Negative associations	No associations	Total	Notes
Personal factors: Sociodemographic factors	Age	1[33]	6[26,29,32,41,43,51/52]	9[35,37,38/39/40,42,46,47,48,49,54]	16	
	Education level	6[26,29,33,35,43,51/52]		6[37,38/39/40,41,46,49,54]	12	
	Sex (female)	1[38/39/40]		11[26,33,35,37,41,42,46,47,48,49,54]	12	
	Income	3[33,35,41]		6[26,29,37,38/39/40,42,49]	9	
	Ethnicity (white and non-Hispanic)	1[32]	1[26]	6[29,37,41,42,46,48]	8	
	Employment status (Employed)	3[26,41,43]		3[38/39/40,42,49]	6	
	Marital status			3[38/39/40,46,54]	3	
	Insurance status			2[46,54]	2	
	Language	1[26]		1[46]	2	[26]: English
	Living arrangements (alone)		2[26,43]		2	
	Residence place			1[48]	1	
Personal factors: Digital divide-related factors	Internet use/experience	9[26,33,37,41,42,43,46,50,51/52]		3[28,30/31,43]	11	[43]: Using the internet for health information/ managing healthcare & Using internet in general (+ve) [43]: Using the internet for sharing personal information (purchasing or paying bills online) (no) [28,30/31]: Internet reliance
	Internet access	5[26,29,41,40,54]		1[37]	6	
	Computer/ IT self-efficacy	2[35,54]		3[28,30/31,34]	5	
	Computer anxiety		2[28,30/31]	2[48,54]	4	
	Personal innovativeness	3[28,30/31,34]			3	
	Computer literacy	3[51/52,53,54]			3	
	Experience with health care systems	1[48]		1[43]	2	
	Access to data sources			2[28,30/31]	2	

	Information seeking			2[28,30/31]	2	
	Trust in the internet	1[29]			1	
	Computer use/ experience	1[51/52]			1	
	Computer access	1[54]			1	
	Resistance to change		1[45]		1	
Personal factors: health-related factors	Health status (healthier)	1[49]	1[34]	5[26,35,38/39/40,41,49]	6	[49]: mental health (+ve), physical health (no)
	Health Literacy/ knowledge	3[26,35,51/52]		4[30/31,35,38/39/40,49]	6	[35]: Health knowledge (+ve), Diabetes knowledge (no)
	Number or presence of diseases/ health issues	1[33]	1[51/52]	3[26,37,41]	5	
	Perceived severity of the disease	2[35,47]			2	
	Patient activation level	2[27,35]		1[27]	2	[27]: Patient activation (action/maintenance) moderates the relationship between tool empowerment potential and intentions, while patient activation (knowledge/beliefs) had no influence on the relationship between tool empowerment potential and intentions
	Caring for someone with disease			2[26,33]	2	
	Duration since diagnosed			2[35,49]	2	
	Number of prescriptions			2[26,41]	2	
	Disability			1[47]	1	
	Clinical office visits			1[41]	1	
	Control over the disease			1[35]	1	
	Making treatment decisions collaboratively with their provider			1[41]	1	
	Perceived vulnerability	1[35]			1	
	Personal health information management activities	1[37]			1	

Human-technology interaction factors	Perceived usefulness/ benefits/ value	16[26,27,28,30/31,33,34,35, 36,38/39/40,41,42,43,44,45, 47,53]			16	
	Perceived ease of use	6[38/39/40,45,47,51/52,53, 54]		3[34,36,43]	9	
	Privacy & security concerns		6[30/31,41,42,43,51/ 52,54]	1[28]	7	
	Attitude	3[37,44,48]			3	
	Price value/ Response costs/ ePHR cost		2[35,51/52]	1[47]	3	Potential costs (monetary, time, etc.) incurred by the individual in using ePHR
	Hedonic motivation	2[48,51/52]		1[47]	3	Intrinsic motivation (e.g. enjoyment) [48] :Electronic PHIM apathy (motivational loss)
	Perceived task technology fit	1[35]			1	Perception that the technology matches the user's task requirements and the user's abilities
	Habit	1[47]			1	
	Comfort with sharing ePHRs data with the primary care doctor	1[42]			1	
	Awareness of ePHRs			1[33]	1	
Organisational factors	Facilitating conditions	4[43,45,48,54]		1[47]	5	Individual's perception of the support available for using a technology activity (e.g. training, manuals, technical support)
	Satisfaction with health care providers	1[27]	1[53]	2[28,30/31]	4	
	Satisfaction with quality of care			2[1,41]	2	
	Communication tactics (CT)	1[27]	1[27]	1[27]	1	[27]: Personal & impersonal CT positively moderated the relationship between perceived usefulness of healthcare process management support functions and intention. Personal CT negatively moderated the relationship between the perceived usefulness of the record keeping functions and intention.

						Impersonal CT had no influence on the relationship between the perceived usefulness of the record keeping functions and intentions.
	Practice setting (primary care)	1[34]			1	Primary vs Specialist
	ePHRs sponsor (government)	1[51/52]			1	Government vs private
	Data integrity	1[51/52]			1	
	Control & customisation of ePHRs	1[51/52]			1	
	fear of losing relationships and e-mail contact with the provider		1[53]		1	
	Doctors' use of EHR			1[26]	1	
Social factors	Social influence/norm	1[48]		2[45,47]	3	
Hint	Black numbers: Quantitative studies		Red numbers: Qualitative studies		Blue numbers: Mixed-methods studies	

Appendix D: Identification of the criteria met by the most tested factors affecting intention to use

Factors	Number of studies											
Age	Positive association =1			Negative association = 6			No association = 9			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 0	Qn= 6	Hi= 1	La= 2	Qn= 8	Hi= 0	La= 1	✓	x	x
	Ql= 0	Me= 0	Me= 1	Ql= 1	Me=1	Me= 3	Ql= 0	Me= 3	Me= 6			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 5	Sm= 2	Mx= 1	Lo= 6	Sm= 2			
Sex (female)	Positive association = 1			Negative association = 0			No association = 11			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 10	Hi= 0	La= 2	✓	✓	✓
	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 2	Me= 7			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 9	Sm= 2			
Education Level	Positive association = 6			Negative association = 0			No association = 6			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 5	Hi= 1	La= 1	Qn= 0	Hi= 0	La= 0	Ql= 5	Hi= 1	La= 0	✓	x	x
	Ql= 1	Me= 1	Me= 3	Ql= 0	Me= 0	Me= 0	Qn= 0	Me= 3	Me= 1			
	Mx= 0	Lo= 4	Sm= 2	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 2	Sm= 5			
Income	Positive association = 3			Negative association = 0			No association = 6			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 6	Hi= 0	La= 1	✓	x	x
	Ql= 0	Me= 1	Me= 3	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 4			
	Mx= 0	Lo= 2	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 5	Sm= 1			
Ethnicity (white)	Positive association = 1			Negative association = 1			No association = 6			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 1	Qn= 1	Hi= 0	La= 1	Qn= 6	Hi= 0	La= 1	✓	✓	✓
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 4			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 6	Sm= 1			
Employment status	Positive association = 3			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 0	La=1	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 0	La= 0	✓	x	x
	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 3			
	Mx= 0	Lo= 3	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 0			
Internet use	Positive association = 9			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 8	Hi= 1	La= 3	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 1	La= 0	✓	✓	✓
	Ql= 1	Me= 0	Me= 3	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 2			
	Mx= 0	Lo= 8	Sm= 3	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 1			
Internet access	Positive association = 5			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 4	Hi= 0	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 0	Me= 2	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 1	Lo= 5	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 1			
Health status	Positive association = 1			Negative association = 1			No association = 5			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0	Qn= 5	Hi= 0	La= 1	✓	✓	✓
	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 2	Me= 4			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 3	Sm= 0			
Computer/ IT self-efficacy	Positive association = 2			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Sample	Quality	Sample	1	2	3

	Qn= 1	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 2	La= 0			
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 3	✓	x	x
	Mx= 1	Lo= 1	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Health literacy	Positive association = 3			Negative association = 0			No association = 4			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 1	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 4	Hi= 1	La= 0			
	Ql= 1	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 2	Me= 4	✓	x	x
	Mx= 0	Lo= 2	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
Presence of diseases	Positive association = 1			Negative association = 1			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 0	La= 1			
	Ql= 0	Me= 0	Me= 1	Ql= 1	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 1	✓	x	x
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 3	Sm= 1			
Perceived usefulness	Positive association = 16			Negative association = 0			No association = 0			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn=15	Hi= 3	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0			
	Ql= 1	Me= 7	Me= 13	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	✓	✓
	Mx= 0	Lo= 6	Sm= 2	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Perceived ease of use	Positive association = 6			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 2	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 0	La= 0			
	Ql= 2	Me= 3	Me= 3	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 2	✓	x	x
	Mx= 1	Lo= 1	Sm= 3	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 1			
Privacy and security concerns	Positive association = 0			Negative association = 6			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 0	Hi= 0	La= 0	Qn= 4	Hi= 2	La= 0	Qn= 1	Hi= 0	La= 0			
	Ql= 0	Me= 0	Me= 0	Ql= 1	Me= 0	Me= 3	Ql= 0	Me= 1	Me= 1	✓	✓	✓
	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 4	Sm= 3	Mx= 0	Lo= 0	Sm= 0			
Facilitating conditions	Positive association = 4			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0			
	Ql= 0	Me= 1	Me= 2	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 1	✓	✓	✓
	Mx= 1	Lo= 3	Sm= 2	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Satisfaction with health care providers	Positive association = 1			Negative association = 1			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 0	Qn= 0	Hi= 1	La= 0	Qn= 2	Hi= 2	La= 0			
	Ql= 0	Me= 1	Me= 1	Ql= 1	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 2	✓	x	x
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 1	Mx= 0	Lo= 0	Sm= 0			
Abbreviations	**Design: Qn (Quantitative) Ql (Qualitative) Mx (Mix-methods)** **Quality: Hi (High) Me (Medium) Lo (Low)** **Sample size: La (Large (>500)) Me (Medium (200-500)) Sm (Small (<200))** **Criteria: 1 (assessed by at least 4 studies)** **2 (there is consensus among most studies that examined it)** **3 (those studies that have consensus on the effect of the factor must be superior to the few studies that show a contrary effect in terms of study quality, sample size, and study method)**											

Appendix E: Studies that assessed each factor affecting subjective use

Group	Factors	Positive associations	Negative associations	No associations	Total	Comments
Personal factors: Demographic factors	Age	3[47,50,71]	2[57,57]	5[55,56,58,61,70]	10	
	Sex (female)	2[50,71]		6[55,56,57,58,61,70]	8	
	Education level	6[57,50,55,57,58,61]		1[70]	7	
	Ethnicity (white or non-Hispanic)	4[57,55,57,70]		2[58,61]	6	
	Income	5[50,55,57,61,70]			5	
	Employment status			3[55,57,61]	3	
	Marital status (single)	1[57]	1[55]	1[61]	3	
	Living arrangements (alone)	1[55]	1[69]		2	
	Numeracy			2[59,69]	2	
	Insurance status (private)	1[70]			1	
	Graph literacy	1[59]			1	
	Duration since entered active duty		1[61]		1	
	Homeless ever			1[57]	1	
	Military branch			1[61]	1	
	Veterans Affairs enrolment			1[61]	1	
Personal factors: Digital divide-related factors	Computer literacy	5[62/63,66,67,68,70]		2[58,69]	7	
	Internet access	4[55,58,66,68]		1[67]	5	
	Internet literacy	2[57,56]			2	
	Experience with health care systems	2[55,66]			2	
	Computer access	1[66]		1[67]	2	
	Computer use/experience	1[56]			1	
	Internet use	1[55]			1	
	eHealth literacy	1[55]			1	
	Computer anxiety		1[55]		1	

Personal factors: health-related factors	Health Literacy/ knowledge	5[55,59,62/63,56,67]		2[58,69]	7	
	Health status (healthier)	1[57]	2[55,71]	3[57,58,61]	6	
	Presence of chronic diseases	1[50]		1[56]	2	
	Type of disease	1[71]			1	
	Patient activation level	1[69]			1	
	Substance use		1[57]		1	
	Duration since diagnosed			1[58]	1	
	Having care partner			1[55]	1	
	Health insurance status			1[55]	1	
	Using mental health service			1[61]	1	
	Hazardous alcohol use (AUDIT of 8+)			1[57]	1	
Human-technology interaction factors	Perceived usefulness/ benefits/ value	9[60,62/63,64,65,66,67,68,70,71]		2[58,60]	10	[60]: on login frequency and duration (+ve) [60]: on portal usage (no effect)
	Perceived ease of use	6[58,60,62/63,64,67,68,71]		1[55]	7	[60]: on login duration (+ve) [60]: on login frequency and portal usage (no effect)
	Awareness of ePHRs	5[64,65,68,70,71]			5	
	Privacy and security concerns		4[64,66,67,68]	1[69]	5	
	Difficulty getting onto the system		3[64,65,68]		3	
	Response costs/ price value/ ePHRs cost		2[62/63,64]		2	
	Intention to use	1[47]			1	
	Habit	1[47]			1	
	Preferences (in-person communication)		1[67]		1	

Organisational factors	Satisfaction with providers		1[66]	1[56]	2	
	Facilitating conditions	1[66]		1[47]	2	
	Difficulty in contacting the medical office after regular hours	1[55]			1	
	Difficulty in contacting the medical office during regular hours			1[55]	1	
	Medical office has night or weekend office hours			1[55]	1	
	place of clinic (urban)	1[55]			1	
	Being complementary service	1[66]			1	
Social factors	Social influence/norm	1[58]			1	
Hint	Black numbers: Quantitative studies Red numbers: Qualitative studies Blue numbers: Mixed-methods studies					

Appendix F: Identification of the criteria met by the most tested factors affecting subjective use

Factors	Number of studies											
Age	Positive association =3			Negative association = 2			No association = 5			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 0	La= 2	Qn= 2	Hi= 0	La= 2	Qn= 4	Hi= 0	La= 1			
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 2	Me= 2	✓	x	x
	Mx= 1	Lo= 2	Sm= 0	Mx= 0	Lo= 2	Sm= 0	Mx= 1	Lo= 3	Sm= 2			
Sex (female)	Positive association = 2			Negative association = 0			No association = 6			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 5	Hi= 0	La= 2			
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 2	Me= 2	✓	✓	✓
	Mx= 1	Lo= 2	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 4	Sm= 2			
Education Level	Positive association = 6			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 6	Hi= 0	La= 4	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0			
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 0	✓	✓	✓
	Mx= 0	Lo= 5	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 0	Sm= 1			
Ethnicity (white)	Positive association = 4			Negative association = 0			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 0	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 2	Hi= 0	La= 1			
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 0	✓	x	x
	Mx= 1	Lo= 3	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 1			
Income	Positive association = 5			Negative association = 0			No association = 0			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 4	Hi= 0	La= 3	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0			
	Ql= 0	Me= 2	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	✓	✓
	Mx= 1	Lo= 3	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Computer literacy	Positive association = 5			Negative association = 0			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 0	Hi= 3	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0			
	Ql= 4	Me= 2	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	x	x
	Mx= 1	Lo= 0	Sm= 5	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 2	Sm= 2			
Internet access	Positive association = 4			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 1	La= 0	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 1	La= 0			
	Ql= 2	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 1	Me= 0	Me= 0	✓	✓	✓
	Mx= 0	Lo= 2	Sm= 3	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 1			
Health Literacy	Positive association = 5			Negative association = 0			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 3	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0			
	Ql= 3	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	✓	x
	Mx= 0	Lo= 2	Sm= 3	Mx= 0	Lo= 0	Sm= 0	Mx= 1	Lo= 2	Sm= 2			
Health status	Positive association = 1			Negative association = 2			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 1	Qn= 1	Hi= 0	La= 1	Qn= 3	Hi= 0	La= 2			
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 1	Me= 0	✓	x	x
	Mx= 0	Lo= 1	Sm= 0	Mx= 1	Lo= 2	Sm= 0	Mx= 0	Lo= 2	Sm= 1			
	Positive association = 9			Negative association = 0			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Sample	Quality	Sample	1	2	3

Perceived usefulness	Qn= 1	Hi= 4	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 2	Hi= 0	La= 0	✓	✓	✓
	Ql= 6	Me= 2	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 1			
	Mx= 2	Lo= 3	Sm= 7	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 1			
Perceived ease of use	Positive association = 6			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 3	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0	✓	✓	✓
	Ql= 4	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 1			
	Mx= 1	Lo= 3	Sm= 5	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
Privacy and security concerns	Positive association = 0			Negative association = 4			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 3	La= 0	Qn= 0	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 0	Me= 0	Ql= 4	Me= 1	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 4	Mx= 1	Lo= 1	Sm= 1			
Awareness of ePHRs	Positive association = 5			Negative association = 0			No association = 0			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 0	Hi= 1	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	✓	✓	✓
	Ql= 3	Me= 2	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 2	Lo= 2	Sm= 4	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Abbreviations	**Design:** Qn (Quantitative) Ql (Qualitative) Mx (Mix-methods) **Quality:** Hi (High) Me (Medium) Lo (Low) **Sample size:** La (Large (>500)) Me (Medium (200-500)) Sm (Small (<200)) **Criteria:** 1 (assessed by at least 4 studies) 2 (there is consensus among most studies that examined it) 3 (those studies that have consensus on the effect of the factor must be superior to the few studies that show a contrary effect in terms of study quality, sample size, and study method)											

Appendix G: Studies that assessed each factor affecting objective use

Group	Factors	Positive associations	Negative associations	No associations	Total	Notes
Personal factors: Demographic factors	Age	15[72,76,77,79,80,81,88,91,98,99,101,107,121,122,124]	25[32,74,82,84,85,87,89,90,92,94,95,96,97,102,103,104,111,112,113,114,115,118,123,126,127]	13[74,75,86,100,105/106,108,109,110,116/117,120,125,128,129]	52	[74]:negative relationship when the setting adopted opt-in policy, and no relationship when the setting used universal access policy
	Sex (female)	17[76,77,80,81,88,91,95,96,101,102,103,105/106,110,115,118,121,125]	6[99,107,109,111,112,127]	28[72,74,75,79,82,84,85,86,87,89,90,92,94,97,98,100,104,108,113,114,116/117,120,122,123,124,126,128,129]	51	
	Ethnicity (white)	34[32,72,73,74,77,79,80,81,82,84,85,86,88,89,92,94,96,97,98,100,101,103,104,107,110,115,116/117,120,121,122,123,125,126,129]	1[85]	8[74,75,83,102,112,113,114,128]	41	[74]:there is positive relationship when the setting adopted the opt-in policy and there is no relationship when the setting used the universal access policy [85]: +ve for using ePHRs via any platform, -ve For using ePHRs via mobile only
	Insurance status (private)	15[72,73,74,88,89,97,98,103,104,105/106,111,115,123,125,126]	2[80,107]	3[96,100,129]	20	[80]: Medicaid [98]: Military insurance [103]: Medicare
	Education level	15[73,75,78,79,92,95,96,103,110,112,113,115,116/117,120,123]		3[114,122,128]	18	
	Income	14[73,75,79,87,89,92,96,103,115,118,122,123,125,129]		1[116/117]	15	
	Language	9[72,74,77,81,96,98,112,113,125]		1[114]	10	[72,74,77,81,96,99,125]: English [112,113,114]: Dutch
	Employment status (Employed)	9[73,80,97,98,100,112,113,114,127]			9	
	Marital status (married)	5[79,89,94,97,102]		2[75,128]	7	

	Socioeconomic status	5[85,94,98,107,127]	1[85]		5	[85]: +ve for using ePHRs via any platform, -ve For using ePHRs via mobile only
	Residence place	4[74,75,80,115]		1[95]	5	
	Distance to the nearest healthcare setting	1[81]		3[86,127,128]	4	
	Living arrangements (alone)		2[112,113]	1[114]	3	
	Place of birth	1[115]			1	
	Military period of service	1[99]			1	
Personal factors: Digital divide-related factors	Internet access	8[73,92,103,110,112,113,116/117,128]		1[83]	9	
	Computer access	5[79,92,112,113,116/117]		1[83]	6	
	Internet use/experience	4[73,113,114,128]			4	
	Self-efficacy	2[112,113]		1[114]	3	
	Computer literacy	2[83,92]			2	
	Personal innovativeness	1[79]			1	
	Place of accessing internet (work)	1[73]			1	
	Computer use	1[79]			1	
	Internet speed	1[128]			1	
	Email use	1[128]			1	
	Health information seeking	1[128]			1	
	Number of internet/ email devices			1[73]	1	
Personal factors: health-	Number of diseases/ comorbidities	5[91,95,97,111,129]	5[74,78,96,107,126]	11[72,85,87,89,92,100,108,112,120,125,128]	21	[72,74,87,85,91,120,125]: Number of chronic conditions
	Type of disease	8[72,82,94,107,110,113,115,118]	3[89,102,118]	6[89,100,107,108,114,128]	14	[72]: HIV/AIDS [82]: Upper aerodigestive malignancy [89]: Diabetes, coronary artery disease, congestive heart failure (-ve)

						[89]: Hypertension, hyperlipidemia, cerebrovascular disease, peripheral vascular disease, chronic kidney disease stage, nephrolithiasis (no) [94]: having depression [100]: Psychiatric history [102]: bipolar disorder [107]: Hepatitis C, depression (+ve), hepatitis B (no) [108]: Type 1 or 2 diabetes, hypercholesterolemia (no) [110]: Diabetes or elevated lipids [113]: Type 1 Diabetes [114]: Type of diabetes [115]: Chronic diseases, or cancer [118]: HIV, hyperlipidemia, hypertension, post-traumatic stress disorder, traumatic brain injury, spinal cord injury, depression and anxiety (+ve) complex chronic medical conditions (CHD, CHF, Schizophrenia) (-ve) [128]: chronic diseases
	Clinical office visits	10[72,74,81,89,95,96,97,98,104,125]	5[89,104,108,126,129]	1[108]	13	[89]: All outpatient offices (+ve) except nephrology office (-ve) [104]:Visiting a specialist & outpatient visits (-ve) Visiting a primary care/medicine provider (+ve) [108]: Number of nurse visits (-ve), number of doctor visits (no)
	Health status (healthier)	7[73,79,81,89,94,105/106,115]		5[86,102,103,108,128]	12	[81]: Illness burden [86,94,103]: comorbidity score [89]: Stage of chronic kidney disease [102,115]: Severity of depression & anxiety [105/106]: Expected clinical needs [108:] Physiological health & mental health [115]: Complexity of condition
	Tobacco use	1[112]	5[89,94,113,115,123]	2[114,128]	8	
	Number of medications	5[73,100,104,112,113]	1[126]	1[114]	7	
	Duration since diagnosed	2[72,113]		3[100,112,114]	5	
	Hospitalizations	3[91,95,104]	1[126]	1[73]	5	

	Alcohol use	3[112,113,115]		2[102,114]	5	
	Patient activation level	1[87]		4[73,108,110,128]	5	
	Using diabetes-related medication (insulin)	3[92,113,114]		1[127]	4	
	Weight/ body mass index	1[90]		2[112,123]	4	
	HbA1C level		2[114,123]	1[112]	3	
	Health literacy	3[78,116/117,120]		1[78]	3	[78]:Effect of health literacy on PHR use (no), Effect of health literacy on PHR registration (+ve)
	Emergency department visits	2[91,104]	1[73]		3	
	Diabetes-specific distress score	2[112,113]		1[114]	3	
	Episodes of hypoglycemia or hyperglycemia	3[112,113,114]			3	
	Diabetes knowledge	3[112,113,114]			3	
	Low-density lipoprotein (LDL) cholesterol level			3[90,112,123]	3	
	Systolic blood pressure level		2[112,123]	1[90]	3	
	Physically active	1[115]		1[112]	2	
	Nonadherence	1[85]	2[85,112]		2	[85]: -ve for using ePHRs via any platform, +ve For using ePHRs via mobile only
	Diastolic blood pressure level		1[123]	1[112]	2	
	Total Cholesterol level		1[112]	1[114]	2	
	Disability		2[75,100]		2	
	Number of referrals	1[108]			1	
	Taking antiretroviral therapy	1[107]			1	
	CD4+ count <200 cells/μL	1[107]			1	
	HIV RNA ≥77 copies/ml	1[107]			1	

	New to antiretroviral therapy (ART) (1st time)	1[107]			1	
	Visual acuity	1[100]			1	
	Risk factor for HIV (gay)	1[107]			1	
	Having kidney transplant	1[89]			1	
	Length of membership in the healthcare setting	1[81]			1	
	known primary care provider	1[98]			1	
	length of stay	1[109]			1	
	Surgery type	1[109]				[109]: liver transplant
	having a usual place for receiving healthcare	1[115]			1	
	Having copies of health records	1[128]			1	
	Treatment stage (newly diagnosed)		1[75]		1	
	Health plan duration		1[107]		1	
	Dipstick proteinuria (≥1+)		1[89]		1	
	Serum creatinine level		1[89]		1	
	Having ≥1 HbA1C measurement		1[108]		1	
	Having ≥1 BMI measurement		1[108]		1	
	Having ≥1 blood pressure measurement		1[108]		1	
	High-density lipoprotein (HDL) cholesterol level			1[112]	1	
	Having at least one LDL measurement			1[108]	1	
	Type of depression			1[102]	1	
	Total follow up time			1[90]	1	
	Number of provider calls			1[108]	1	

	Score on patient-reported outcomes			1[112]	1	
	Quality of life			1[112]	1	
Human-technology interaction factors	Perceived usefulness/ benefits/ value	5[79,83,113,114,119]			5	
	Privacy and security concerns		4[73,79,83,92]	1[128]	5	
	Perceived ease of use	2[79,114]		2[83,119]	4	[114:] Easy to use, Easy to login
	Awareness of ePHRs	2[83,92]			2	
	Preferences (in person)		2[83,92]		2	
	Observability	1[79]			1	
	Trialability	1[79]			1	
	Perceived system quality	1[119]			1	
	Lack of motivation		1[83]		1	
Organisational factors	Practice setting (Primary care)	1[94]	3[112,114]		4	[94]: Family medicine
	Provider use of secure messaging	2[92,127]			2	
	Provider encouragement	1[92]			1	
	Trust in provider	1[93]			1	
	Enrolment policy (universal access policy)	1[74]			1	[74:] opt-in policy vs universal access policy
	Type of healthcare provider (Physicians and nurse practitioners)	1[87]			1	
	Provider ePHRs patient ratio	1[96]			1	
	University-affiliated primary care provider	1[89]			1	[89:]versus non-university-affiliated primary care provider
	Number of practice's marketing strategies (aggressive)	1[129]			1	Aggressive marketing strategy (using more than 5 strategies) vs Normal (using 5 or fewer strategies)

	Type of practice's marketing strategies	1[128]			1	promotional materials or clinicians
	Hospital location	1[86]			1	
	Adoption rate of EHRs by the organisation	1[115]			1	
	Provider age		1[87]		1	
	Provider gender			1[87]	1	
	Satisfaction with general treatment			1[112]	1	
	Patient–provider communication			1[93]	1	

Appendix H: Identification of the criteria met by the most tested factors affecting objective use

Factors	Number of studies											
	Positive association = 15			Negative association = 25			No association = 13			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Age	Qn=15	Hi= 12	La= 15	Qn= 25	Hi= 20	La= 23	Qn= 13	Hi= 2	La= 8	✓	x	x
	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 3	Me= 1	Ql= 0	Me= 3	Me= 4			
	Mx= 0	Lo= 2	Sm= 0	Mx= 0	Lo= 2	Sm= 1	Mx= 0	Lo= 4	Sm= 1			
	Positive association = 17			Negative association = 6			No association = 28			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Sex (female)	Qn= 17	Hi= 13	La= 16	Qn= 6	Hi= 4	La= 6	Qn= 28	Hi= 19	La= 22	✓	x	x
	Ql= 0	Me= 3	Me= 1	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 4	Me= 4			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 5	Sm= 2			
	Positive association = 34			Negative association = 1			No association = 8			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Ethnicity (White)	Qn= 34	Hi= 26	La= 30	Qn= 1	Hi= 1	La= 1	Qn= 8	Hi= 4	La= 5	✓	x	x
	Ql= 0	Me= 6	Me= 4	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 2	Me= 1			
	Mx= 0	Lo= 2	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 2			
	Positive association = 15			Negative association = 2			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Insurance status	Qn= 15	Hi= 12	La= 12	Qn= 2	Hi= 2	La= 2	Qn= 3	Hi= 3	La= 2	✓	x	x
	Ql= 0	Me= 2	Me= 2	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 1			
	Mx= 0	Lo= 1	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
	Positive association = 15			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Education level	Qn= 15	Hi= 6	La= 13	Qn= 0	Hi= 0	La= 0	Qn= 2	Hi= 1	La= 2	✓	✓	✓
	Ql= 0	Me= 5	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 1			
	Mx= 0	Lo= 4	Sm= 2	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 0			
	Positive association = 14			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Income	Qn= 14	Hi= 9	La= 11	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 1	✓	✓	✓
	Ql= 0	Me= 4	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 0			
	Mx= 0	Lo= 1	Sm= 2	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
	Positive association = 9			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Language	Qn= 9	Hi= 6	La= 8	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 1	✓	✓	✓
	Ql= 0	Me= 2	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
	Positive association = 9			Negative association = 0			No association = 0			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Employment status	Qn= 9	Hi= 5	La= 7	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 3	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
	Positive association = 5			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
Marital status	Qn= 5	Hi= 4	La= 5	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 0			
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 1			
	Positive association = 5			Negative association = 1			No association = 0			Criteria met		

Socioeconomic status	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 5	Hi= 5	La= 5	Qn= 1	Hi= 1	La= 1	Qn= 0	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Residence place	Positive association = 4			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 4	Hi= 2	La= 3	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 1	La= 1	✓	✓	✓
	Ql= 0	Me= 2	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 0	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Distance to the nearest healthcare setting	Positive association = 1			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 1	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 1	La= 2	✓	✓	x
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 1			
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
Internet access	Positive association = 8			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 8	Hi= 1	La= 6	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 3	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 4	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 1			
Computer access	Positive association = 5			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 5	Hi= 0	La= 5	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 4	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 1			
Internet use	Positive association = 4			Negative association = 0			No association = 0			Criteria met		
	Design	Quality	Sample	Design	Design	Quality	Sample	Design	Design	1	2	3
	Qn= 4	Hi= 0	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0	✓	✓	✓
	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 4	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Number of diseases	Positive association = 5			Negative association = 5			No association = 11			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 5	Hi= 5	La= 5	Qn= 5	Hi= 5	La= 4	Qn= 11	Hi= 5	La= 7	✓	x	x
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 3	Me= 4			
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 3	Sm= 0			
Clinical office visits	Positive association = 10			Negative association = 5			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 10	Hi= 9	La= 9	Qn= 5	Hi= 4	La= 3	Qn= 1	Hi= 0	La= 0	✓	x	x
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 2	Ql= 0	Me= 0	Me= 1			
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
Type of disease	Positive association = 8			Negative association = 3			No association = 6			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 8	Hi= 6	La= 8	Qn= 3	Hi= 3	La= 3	Qn= 6	Hi= 3	La= 3	✓	x	x
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 3			
	Mx= 0	Lo= 2	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 3	Sm= 0			
Number of medications	Positive association = 5			Negative association = 1			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 5	Hi= 2	La= 3	Qn= 1	Hi= 1	La= 0	Qn= 1	Hi= 0	La= 1	✓	x	x
	Ql= 0	Me= 1	Me= 1	Ql= 0	Me= 0	Me= 1	Ql= 0	Me= 0	Me= 0			
	Mx= 0	Lo= 2	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
Health status	Positive association = 7			Negative association = 0			No association = 5			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3

	Qn= 7	Hi= 4	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 5	Hi= 3	La= 3			
	Ql= 0	Me= 2	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 2	✓	x	x
	Mx= 0	Lo= 1	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 0			
Duration since diagnosed	Positive association = 2			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 1	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 3	Hi= 1	La= 2			
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 1	Me= 1	✓	x	x
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0			
Alcohol use	Positive association = 3			Negative association = 0			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 0	La= 3	Qn= 0	Hi= 0	La= 0	Qn= 2	Hi= 2	La= 2			
	Ql= 0	Me= 2	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	x	x
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Number of hospitalisations	Positive association = 3			Negative association = 1			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 3	La= 3	Qn= 1	Hi= 1	La= 1	Qn= 1	Hi= 0	La= 0			
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	x	x
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 1			
Tobacco use	Positive association = 1			Negative association = 5			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 0	La= 1	Qn= 5	Hi= 3	La= 5	Qn= 2	Hi= 0	La= 1			
	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 0	Me= 1	✓	x	x
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 2	Sm= 0			
Patient activation level	Positive association = 1			Negative association = 0			No association = 3			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 1	Hi= 1	La= 1	Qn= 0	Hi= 0	La= 0	Qn= 4	Hi= 0	La= 1			
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 2	✓	✓	x
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 4	Sm= 1			
Insulin use	Positive association = 3			Negative association = 0			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 3	Hi= 0	La= 3	Qn= 0	Hi= 0	La= 0	Qn= 1	Hi= 1	La= 1			
	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	✓	x
	Mx= 0	Lo= 2	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Perceived usefulness	Positive association = 5			Negative association = 0			No association = 0			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 5	Hi= 0	La= 4	Qn= 0	Hi= 0	La= 0	Qn= 0	Hi= 0	La= 0			
	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	✓	✓
	Mx= 0	Lo= 4	Sm= 1	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 0	Sm= 0			
Perceived ease of use	Positive association = 2			Negative association = 0			No association = 2			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 2	Hi= 0	La= 2	Qn= 0	Hi= 0	La= 0	Qn= 2	Hi= 0	La= 1			
	Ql= 0	Me= 1	Me= 0	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 0	Me= 0	✓	x	x
	Mx= 0	Lo= 1	Sm= 0	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 1			
Privacy and security concerns	Positive association = 0			Negative association = 4			No association = 1			Criteria met		
	Design	Quality	Sample	Design	Quality	Sample	Design	Quality	Sample	1	2	3
	Qn= 0	Hi= 0	La= 0	Qn= 4	Hi= 0	La= 2	Qn= 1	Hi= 0	La= 0			
	Ql= 0	Me= 0	Me= 0	Ql= 0	Me= 2	Me= 0	Ql= 0	Me= 0	Me= 1	✓	✓	✓
	Mx= 0	Lo= 0	Sm= 0	Mx= 0	Lo= 2	Sm= 2	Mx= 0	Lo= 1	Sm= 0			
Abbreviations	**Design:**		**Qn (Quantitative)**		**Ql (Qualitative)**			**Mx (Mix-methods)**				
	Quality:		**Hi (High)**		**Me (Medium)**			**Lo (Low)**				
	Sample size:		**La (Large (>500))**		**Me (Medium (200-500))**			**Sm (Small (<200))**				

	Criteria: 1 (assessed by at least 4 studies) **2 (there is consensus among most studies that examined it)** **3 (those studies that have consensus on the effect of the factor must be superior to the few studies that show a contrary effect in terms of study quality, sample size, and study method)**