A Review on Electronic Personalized Health Records

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Abstract— **In accordance with the current information communication technology growth up in widely used at everywhere. Therefore the implementation in ICT is highly assisted patient on their health. As the current technology can be access at everywhere in anytime, the electronic personalized health records are considered as the best solution for the patient to care and monitor their health. This research paper provides a cross review of relevant literature from the previous study in order to clarify the rationality. Its continue with reviewing, comparing and contrasting the existing studies in order to obtain the factors that influence the adoption of electronic personalized health records. A summary that clarifies the relation each factor has been mentioned serve as the foundation for this empirical analysis. In addition, a logical justification is provided concerning the theory based meta-analysis from other studies.**

Index Terms— **Adoption Barriers of e-PHR; Adoption of PHR; e-PHR; Personalized Health Record.**

I. INTRODUCTION

Personal Health Records (PHRs)[1]–[4] are on the fast track of a broadened area of medical informatics due to having confidence in that it's will control costs of care and increase the delivery of healthcare. According to [5] a Personal Health Record (PHR) is an electronic, universally available, lifelong resource of health information maintained by individuals. The PHRs in use or in development today support a variety of different functions and consequently offer different value proposition [6]. As another definition of PHRs as mention in [19] PHRs can be defined as "a set of computer-based tools that allow people to access and coordinate their lifelong health information and make appropriate parts of it available to those who need it.

Referred to [7] PHRs system did not obtain the same level of observation while the role and focus of electronic health records (EHR) system is to provide the required information of health care professional, PHR system captured particular health data which been enter by individual and provide the information related to the care of that specific individual and it also provides the tool to assist individual patient play more active role in their own health.

The personalized health records also can be defined as a repository for patient data while the PHR systems are a decision support system that capable to help the patient as individual access to manage and maintain their own health especially for a patient who has a chronic disease. As the medical data in PHR is sensitive, it has to be encrypted before outsourcing [8]. Furthermore, Electronic Patient Health Record (EPHR) systems may facilitate a patient not only to

share patient health records securely with healthcare professional but also to control patient health privacy [9]. According to [10] Personal Electronic Health Records (PCEHR) was launched in July 2012, from this system people could register to participate in the system which is currently viewed through a government-run web-based portal. [11] EPHR enable the healthcare consumer to electronically access, manage and share their personal health information with healthcare providers, third-party payers, and public healthcare facilities or to be authorized to act for a third-party as their representative. With full interoperability, via e-PHR, healthcare consumers can have better information about their healthcare status and can move easily between clinicians [11]. According to [12] Personal Health Records (PHRs) is very important to apply because of personal privacy of certain medical information and help in enhancing health care deliverance and in managing care costing.

Here can conclude that electronic personalized health records (e-PHR) is system as a web-based portal application which obtained the personalized data from EHR system and its provides access to a patient's and allows them to view, monitor and control their own health by their self at everywhere in anytime via various devices such as laptop, computer, and smartphone. However, understanding the user acceptance of PHRs by individuals and organizations can be considered as a critical issue [13]–[15], and it's one of the adoption problems. There are few factors that influenced the adoption of electronic personalized health records has been obtained from previous studies.

II. RELATED WORK

Personal Health Records (PHR) has been defined as a new pattern in medical information exchange system which provides the different type of e-health records because of the medical records is recorded and maintained by patients themselves[6], [16]. According to [16] PHR is an ideal which meant it be able to provide the medical summary via the portable or internet and provide the correct and complete particulars of personal health and it also could be able to integrate the particulars of personal medical from many different resources under the requirements of security and privacy[16]. Besides that, as mentioned in [16], currently most of healthcare provider offered the integrated PHRs which meant it offered from a beginning until determination why individual need to use the PHR, how does the PHR work, how to use it, the purpose to used it, the workflows and impact of PHR, with this knowledge its will health care provider to deliver better health care to individual and the

needed of health information. Electronic personalized health records are concerned about patients responsibility and roles in their healthcare it also provides the details of PHR model for individuals and healthcare provider. As mentioned in [2], [17], [18] PHR which could be able to expand to users of standalone PHRs and there are many opportunities related to PHR exist for organizations and individuals studies in sociotechnical issues. At the national level, the particular of genomic probably will increase the PHR is needed in term of support for a better vision and the vision on how PHR is able to help and provide better health care with the population health tracking. In addition, there are a lot of PHR issues such as technical issues, interface issues, vocabulary issues and data issues is still required for further investigation[1], [19], [20].

III. METHOD

The systematic literature review has been performed to get the clear overview of personalized health records in the healthcare sector that been used in the healthcare system in order to provide a clear understanding in electronic Personalized Health Records.

IV. OVERVIEW OF PREVENTIVE PERSONAL HEALTH RECORDS

The Personal Health Records of an individual is a repository of information considered by that individual to be relevant to his or her health, wellness, development and welfare, and for which that individual has primary control over the record's content. PHR systems can also improve quality of healthcare by supporting care providers' work. For example, it can help in closing the health information gap between patients and providers by making the "episodic" nature of care more continuous [43] as well as facilitate patient education and shared decision making [43].

V. BARRIER S IN PERSONAL HEALTH RECORDS ADOPTION

The used of PHRs can improve both documentation of health information and patient care [18]. There are few factors which considered as barriers to the adoption of PHRs. According to [19] there are few obstacles to overcome for wide-scale PHR adoption such as environmental barriers, technical issues, legal concerns, individual-level barriers and cultural issues. Below is the details explanation of each barrier.

A. Environmental Barriers

According to [21], environmental barriers in personal health records adoption is referred to few issues first is location issues which meant the integrated PHR s should be capable of achieving the organizational boundaries and communicating with multiple EHRs systems due to particular of health for each patient now is available in multiple locations also its cause of synchronization problem between PHRs and EHR. Therefore, EHR should have in hospitals and individual office, and it's capable of communicating with PHRs (Committee and ACRL Research Planning and Review Committee, 2013). Secondly is lack of ubiquitous EHR usage issues which meant its present the largest number of these barriers due to the integrated PHR adopts cannot be adopted if many hospital and clinic did not use or implement EHR

system. Next is lack of robust medical particular infrastructure its meant due to lack of medical infrastructure it causes of weakening any attempt to establish a comprehensive and credible plan to address natural disasters or other affecting public health[5]. A related another problem is storing data into the cloud, it cause privacy of personal health data issues while they are storing their medical data and the patients did not believe that the information in their PHR was confidential[22] . As a conclusion, the barriers can be assumed as one factor that influences the adoption of PHR which related closely to the environment in clinician, hospital, and organization whether the implement the EHR system and PHR system and its capable to communication to each other's in order to make the information is synchronized in any location. Roman.

B. Technical Barriers

As mentioned in [23] technical issue in PHR can be defined in few such difficulties with data exchange, authentication of information, and summarization tools. While referred to [24] the electronic exchange problem is always referred to the privacy issue which can be resolved using the that implements core privacy principles, adopts trusted network design characteristics, and establishes oversight and accountability mechanism. As a conclusion this barrier can be assumed as one factor that influences the adoption of PHR which closely related to system problem which are difficulties, authentication, and summarization of health information problem.

C. Individual- Level Barriers

As stated by [22] these barriers refer to the healthcare users as the patient must understand, committed, accept their roles, responsibilities and realize related to their own healthcare own. The developers and users of PHRs and EHRs must realize of the clinician's and individual mental models of health care process and related workflow. According to [28], there are issues has been captured in this level such as lack of knowledge in technology, consumer related to interface, access issues related to PHRs system, process and workflow models of concept that been applied in PHRs system between patients and health care provider still not understand. In order to overcome this issue, the needed an understanding of how the PHRs can be competent into the existing daily patients and healthcare provider activities. As mentioned that the barriers and facilitator of individual level[25]–[28] of PHRs made a summary that individual-level factors are self-efficacy, lack of knowledge of technology literacy especially its refer to elder patients which is understand what recorded in system and monitor also manage their own healthcare. Other than that, there is also a problem in trustworthiness it's related to unpredictability on who is responsible in term of ensuring the health information integrity and accurate. Moreover, uncertainty of lack of self-efficacy in navigate the health particular involvement when deal with a chronic diseases or its required an easy access to an IT attitude and a family member's which help the individual to maintain, control, manage and reduce the worries about the effect of a privacy by patients as a user's which see the value in access information. As a conclusion, this can be assumed as one factor that influences the adoption of PHR which closely related to the individual themselves problem regarding their role, responsible for understanding, manage, maintain and monitor their own health.

D. Legal Issues

Legal issues are related to protection of health data for particular PHRs patients, as referred to [23] the measurement of aggressive protection could make difficult PHR access by patient and clinician, and it may obstruct to provide optimal care due to healthcare users desire the suitable protection of their private health particular. According to [1], [29], [30] it's been considered as very important to provide excellent healthcare as the privacy of the risk of personal data. There are few law such as antitrust, fraud and abuse, property intellectual and others were captured generate a climate of unpredictability for health care provider in IT implementation. As a conclusion, the legal issues related closely to the law that been implement in IT in order to protect the personal data but by the aggressive protection that cause the difficult to the users to access the PHRs.

E. Cultural Issues

This barrier to adoption is referred to about the cultural issues and trends can expedite the viewing of PHR adoption [31]as a common goal. For example, a greater awareness of health issues and greater availability of public-oriented health information resources have led many individuals to use the Internet increasingly [5]. Individuals, and especially patients with chronic illnesses, are more aware of the need to monitor their own health and to access health-related information. The patients who are ill, and their families, have "teachable moments" when they are especially receptive to educational interventions. By providing PHR system component such as appointment information, medication information, health care knowledge resources and care provider communication, the health care be considered and defined as a perfectly simple health management tools (Archer et al., 2011) to users [5]. As a conclusion, it is closely related to the people mindset and trend in culture and also awareness in individual themself.

F. Legal Issues

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VI.   OVERVIEW DESIGN OF E-PHR SYSTEM

Electronic Personal Health Record systems (PHRs) provide opportunities for patients to access their own PHRs [32]. While according to [6], proposes a flexible personal electronic health record system for the seamless access to patient EHR. The system was developed after an analysis of clinical consultation workflow and systematic review of other health information system [33], [34]. The proposed system is important for achieving prompt access to a patient's PHR and for the provision of seamless and continuous care [35], [36]. Most of the department in Medical Centre has been integrated with computer technology to improve their daily operation. Since there is a growing culture of consumer empowerment and widespread computer literacy, generating an electronic health record is a need for patients and physicians. It is to enable them to access to the medical data easily. Nowadays, there is few patients deal with only one healthcare provider. This is particularly true for those who have complex health problems or for those who frequently move for working purpose [37]–[41]. Thus, they have to bring along with their

personal medical history for the emergency purposes. This may bring inconvenience to the patients and physicians [42], [43]. Besides that, most of the patients could not be able to remember their medical history or medication details. From old days until now, most of the individuals' medical history is a record on the paper. Keeping a medical record on paper is insecure because it could be covered with water or be on fire. In fact, using paper is not environmentally friendly and space consuming and difficult to be accessed by the clinicians promptly. Moreover as mentioned in [44] assisting patients with setting up the e-PHR system may enhance pharmacists' ability to identify and resolve medication-related problems that may lead to rehospitalization.

VII.   CAPTURING SEMANTICS FOR PERSONAL HEALTH RECORDS

A PHR is accessible to the consumer and to those authorized by the consumer. (EHR)[46] [48], which is designed for use by healthcare providers. According to [45] it to dramatically change in the healthcare sector and many PHRs [2], [6], [49] also provide links to materials or other websites that have information about consumer's health conditions or medications. Some PHRs also provide added-value services such as drug-drug interaction checking or electronic messaging between patients and healthcare providers. PHRs can be classified according to the platform by which they are delivered. In paper-based PHRs health information is recorded and stored in a paper format, and so the information is accessible without the need for a computer or any other devices. On the other hand, paper-based PHRs may be difficult to update and share with others. In portable-storage PHRs health information is stored on a portable-storage device such as CDROM or USB flash drive. Similar to paper-based PHRs they are subject to physical loss. However, their main disadvantage is that reading and updating them by the computers in healthcare organizations such as in Hospitals and physician offices have turned out to be problematic. In PC-based PHRs health information is recorded and stored in personal computer-based software that may have the capability to import data from other sources such as a hospital laboratory or physician office. PC-based health information can be copied and shared with anyone who has a compatible with the processor. In Internet-based PHRs health information is stored on a remote server, and so the information can be shared with healthcare providers. They also have the capacity to import data from other information sources such as a hospital laboratory and physician office.

VIII.   CONCLUSION

Prevalent developments of the Electronic Personalized Health Record (e-PHR) have demonstrated numerous significant and beneficial features inefficient. However, the confinements and restrictions faced with regards to generalizability and costing pertaining to observable data are also detected. Findings from past studies by role model leaders revealed that the employment of a system that functions under various multitudinous conditions would produce significant advantages in terms of enhanced care deliverance which is founded by guidelines; in the preventive health domain specifically. Other advantages include the increase in activities with regards to scrutiny and

observations, the decrease in medication inaccuracies, and the lessening of non-apt care-giving.

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