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A Review of the Personal Health Records in Selected Countries and Iran

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Abstract Personal Health Record (PHR) enables patients to access their health information and improves care quality by supporting self-care. The purpose of this study is to provide a comparative analysis of the concept of PHRs in selected countries and Iran in order to investigate the gaps between Iran and more advanced countries in terms of PHRs. The study was carried out in 2008-2009 using a descriptive—comparative method in Australia, the United States, England and Iran. Data was gathered from articles, books, journals and reputed websites in English and Persian published between 1995 and September 2009. After collecting the data, both advantages and disadvantages of each of concepts were analyzed. In the three countries considered in the present study the concepts of PHR, extracted from the literature, are that; a)patient/person be recognized as the owner of PHR; b)information be disclosed only to those authorized by the patient; c) and that PHR is created upon request and consent of the individual involved. Before PHRs can be profitably used in the health administration of a (developing) country, the necessary knowledge, infrastructures, and rules need to be developed.

Keywords Personal health record · Health information · Patient · Medical record · Electronic health record

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Introduction

Patient-cantered approaches which are among the essential methods of improving care quality can be enhanced by educating patients, facilitating physician-patient relationship and sponsoring self-care [1]. As information technologies can provide easy and quick access to health information for patients, they can promote both awareness and knowledge of the patients and thus accelerate the adoption of patient-centred approaches [2]. For this purpose, a PHR is created as an individual-centred record to enable individuals to access their health information so that patients may be able to undertake a more active role in implementing their health plan and health-related activities they face throughout their life [3]. Patient's access to medical information is also important in view of the fact that the final decision on one's treatment rests with the individual himself and therefore, the patient should have full access to his health information [4]. Furthermore, research shows that a considerable portion of vital information on patients' healthcare is just being ignored and is never recorded in the medical records prepared and kept by health care providers [5] or is entered wrongly [6].Therefore, any individual should monitor the recording of medical information in his record and should know what part of such information is being disclosed to others [4]. It is also possible that medical records, even when electronic health records are created, cannot be accessed at times of need and patients cannot use their vital information especially in cases of emergency, travel or changing their GP and medical centre when access to information gains more significance [7]. A PHR is an electronic or non-electronic record which enables people to keep their health-related information during their lifetime and to disclose all or any part of such information to anybody they choose in full confidentiality and security [8-
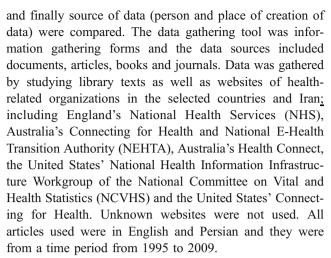
12]. In fact, creating a PHR is a response to emerging needs in health information [13] and an opportunity for health care professionals to train patients on their health issues and improve the relationship of care providers and patients [14]. Studies show that access of patients to their medical information and their use of PHR has improved patient-care provider relationship, has reduced errors caused by inaccuracy of information and has augmented their self-care [15-20]. Based on a report by the Institution of Medicine; 78% of patients interviewed stated that a PHR enables them to exchange information with physicians more easily; 65% believed using such records reduces medical errors and 45 % held that the use of PHR improves quality of health services [21]. However, there are also concerns about the efficiency of PHRs. While we are in the midway through the digital revolution, many medical offices use pen and paper for documentation which may not yet be complete or consistent to serve this purpose. Existing paper medical records are fat and disorganized; focus on episodes rather the continuum of patient care [22, 23]. Studies revealed that taking measures to improve the quality of medical records seems a priority for most of the countries, particularly for developing countries [24-30]. Since, there is currently a major drive to apply EHR and his sister PHR [31, 32] across the world and in developing countries like Iran [33-35], the realization of the full benefit of computerization needs to rely on not only the data processing capacity of IT but also its numerous challenges and building blocks.

In this regard comparisons of adapted PHRs in the countries that have well-established computerization facilitate this movement in others, especially in Iran to resolve existing identified problematic area. This study compares the characteristics of PHR in terms of its definition and description, basic principles, objectives, attributes and performances, standards components, and media used in Australia, USA, England—in view of their considerable progress in planning and implementing PHRs—and Iran during 2008-2009 to investigate the gaps between Iran and more advanced countries in terms of PHRs.

Material and methods

The present study was carried out using the descriptive-comparative method in the years from 2008 to 2009. The concepts of PHRs in Australia, the United States, England and Iran including definition and description(necessity elements in PHRs), basic principles (decision responsibility and access to information, specifications and use of inform-ation, communication with electronic health records and consent for creation of PHRs), objectives(aim of PHR creation), attributes and performances (transmission and review of data, PHRs functions), medium(PHRs carrier),

and finally source of data (person and place of creation of data) were compared. The data gathering tool was infor-mation gathering forms and the data sources included documents, articles, books and journals. Data was gathered by studying library texts as well as websites of health-related organizations in the selected countries and Iran; including England's National Health Services (NHS), Australia's Connecting for Health and National E-Health Transition Authority (NEHTA), Australia's Health Connect, the United States' National Health Information Infrastruc-ture Workgroup of the National Committee on Vital and Health Statistics (NCVHS) and the United States' Connect-ing for Health. Unknown websites were not used. All articles used were in English and Persian and they were from a time period from 1995 to 2009.

Provision of access to health information of patients for care providers and patients alike is being emphasized in many countries. Some of these countries have already created PHRs in one way or another. They included Australia, New Zealand, the United States, Canada, United Kingdom, Germany, Scotland, Sweden, France and Taiwan [36, 37]. For the purpose of this research, the United States, Australia and England were selected to study. Selection of these countries was based on advice from connoisseurs and for the following reasons:

1-Oceania Creating PHRs is a priority in many countries [38]. Studies show that in Oceania, Australia and New Zealand are marked ahead of other countries and islands of the region in view of implementing plans and providing infrastructures needed for health information technologies [36]. The conditions of electronic health record and other aspects of clinical computerization in New Zealand hospi-tals are similar to those in Australia [39]. Major works were done in New Zealand on a unique index for patients called National Health Index and on confidentiality of information which were both very important bases in creating PHRs and facilitated the process. However, PHRs are not part of the current strategy of national health information technology in this country and a little work has been done in this area [36, 37]. In Australia, a summary of health information of clients is accessible through Connecting for Health records and people can access their records and even enter new information in their files [23]. Therefore, Australia was selected for this study.

2-America In America, the United States and Canada are the two countries that have worked on PHRs. These two countries followed similar models of healthcare until 1973. The changes of Canadian system brought about major differences with the American model since that year and Canada's model advanced ahead considerably [40]. Al-though the health information infrastructure or the health

information highway in Canada is well ahead of the United States [41], limited works was done in Canada on PHRs and in fact Canada has chosen PHRs as a long-term subsequent target for its health information infrastructure [36]. Therefore, the United States was selected for this study.

3-Europe PHRs have developed in various models in different European countries. England has tried hard for create a health information infrastructure in NHS and has spent billions of Pounds for modernizing the mechanism of collecting, storing and using healthcare information. NHS studies and observations have so far lead to proper and positive progress. England is pioneering both design and implementation of PHRs because it has incorporated it as part of the national health information technology program and greatly emphasizes on involving the public [36, 42, 43].

The only thing in Germany which can be mentioned as a type of PHRs is the supply of health insurance card in the form of an electronic smart card. This is under planning by the German Health Department and is aimed at enabling German people to process their health insurance applications and electronic transcriptions through this card [40].

Based on its national strategy, Scotland intends to provide Integrated Care Record. This record is administered by patients and healthcare professionals and access of care providers is possible only upon patient's consent [44]. However, the most significant work, accomplished in Scotland, has been the provision of Unique Patient Identifier and the only PHR plan accomplished has been the one concluded in December 2005 by National Centre of Minorities Health which is a paper-based record aimed at those with no permanent residence address such as immigrants and travellers [45].

SUSTAINS (Support Users to Access Information and Services) was implemented only for 100 patients in Uppsala University Hospital and they were given access to their records SUSTAINS project in Sweden is a form of electronic PHR. No other activity in the area of PHRs was found in Sweden [46]. In Denmark, general practitioners have electronic access to a protected network to exchange information and retrieve health records and patients can also access this information via an online portal. The target group in this network is actually physicians not patients [47].

The French government has also embarked upon creating secure electronic process of insurance applications on a national level since 1998. This system includes client smart card (Vital Card) which provides necessary information for health professionals and health social networks. Access to patient's information is possible only in presence of the patient [38]. In 2004, the French Parliament passed a law for implementing electronic PHRs. This law was the starting point of a globally accessible PHRs system which could be viewed online by physicians, patients and pharmacists. Under this law, a record called Dossier Medical Personnel—

DMP was created for every French citizen since 1st July 2007. This record helps support coordination, quality and continuation of patient's care. On this date, public access to PHRs with due observance of safety and security was provided in France for the first time. Access to this record is supervised by the patient. PHRs in this country still face some resistances [47]. Due to unfamiliarity of the researchers with French language which made it difficult to access and use sources in non-English speaking countries and due to the pioneering position of England compared with other European countries [36], England was selected for study. As the existing documents show no PHR in other European countries, no mention of them is given here.

4-Africa The researchers didn't come across any country in Africa with a plan for PHRs. Among all African states, South Africa is economically the most developed one. However, like the rest of the Africa, the South African economy is the most important factor inhibiting the development of infrastructures needed for health information technologies [38].

5-Asia In Taiwan, the Health Department is developing National Electronic Personal Health Record since 2001 in order to promote the quality of healthcare and control healthcare cost increases. This Department has launched numerous projects including national health insurance smart card, adoptions of international health information standards, approving information security and confidentiality laws and implementing electronic PHRs portability. After years of work, these records still have limited potentialities and are only used for sending information to Bureau of National Health Insurance electronically [47]. Due to limited performance of these records as well as unfamiliarity with Taiwanese language, this Country was not selected for the present study.

Finally, Australia, the United States, and England were selected in view of their considerable progress in planning and implementing PHRs. These countries enjoy defined infrastructures, executive guarantees and necessary support systems to implement the approved plans. Therefore, based on the performance records of health departments of selected countries and their long history made them proper for study.

Results

The Findings of the study showed that all the three countries regarded the "patient/person as the owner of PHRs" [48-51], "information can be provided only to persons authorized by the patient" [37, 49-53] and "a PHR is created upon request and consent of the person involved" [52, 54, 55]. In the United States, PHRs are separate from electronic health records while in the other two countries it

Table 1 Comparison of definition and description of personal health record in selected countries and Iran

Definition and description		Studied countries			
		United States	Australia	England	Iran
A- Collecting health-related information		√	√	√	_
B- Keeping lifetime information	1. Full information	√	_	_	_
	2. Summary information	_	√	√	_
C- Being separate from national electronic health record		√	_	_	_
D- Providing patient with access to medical information		√	√	√	_
E- Creating record upon request of the person involved		√	√	√	_
F- Ownership of the record by the person involved		√	√	√	_
G- Obtaining information from different sources		√	_	_	_
H- Providing a secure site for patients to use		√	√	√	_
I- Providing a secure site for physicians to use		_	_	√	_
J- Possibility of storing medical information generated by the person involved		√	√	√	_
K- Possibility of providing information as authorized and permitted by the person/patient		√	√	√	_

is part of national electronic health record [4, 37, 52, 53]. No regulative standard in this regard was found in Iran. In Iran PHR does exist in its basic forms and one instance (Parham NGO institute) [54]. Table 1 Comparison of Definition and Description of PHRs in Selected Countries and Iran.

Comparing the basic principles at work in PHRs in the selected countries showed that they all emphasize on the difference between PHRs [4, 37, 56] and patient's medical records and the necessity of full consent and agreement of person involved for creating PHRs [49, 53, 57]. No standard in this regard was found in Iran. Table 2 Comparison of basic Principles involved in creating PHRs in Selected Countries and Iran.

All three countries emphasize that the aim of creating PHRs is to provide health records of individual patients to them [58–60]. The aim is also to provide a place for secure and confidential communication [55, 59, 61]. No regulated standard in this regard has been approved in Iran. Table 3 Comparison of the Objectives in using PHRs in Selected Countries and Iran.

In all three selected countries, the system offers and allows the use of knowledge bases to support medical decisions, reminders and warnings, renewing electronic prescriptions and arranging appointments with physicians [55, 59, 61]. In Iran, no regulated standard exists in this regard. Table 4 Comparison of the Attributes and Performances of PHRs in Selected Countries and Iran.

All three countries under study recommend using HL7v2 standard. In Australia and the United States, identifying data source is considered an issue relevant to setting the standards. In Australia, the emphasis is on using nationally accepted terminology [56]. Table 5 Comparison of the Standards Components in PHRs in Selected Countries and Iran. No standard in this respect exists in Iran.

In all three selected countries, the Internet is named as the medium to distribute/communicate PHRs and all three countries keep PHRs electronically [37, 38, 53, 62–64]. Only in England, mobile phones and smart phones are considered as a medium to distribute PHRs. Smart cards are also named as a possible medium for PHRs in

Table 2 Comparison of basic principles involved in creating personal health record in selected countries and Iran

Basic principles	Studied countries			
	United States	Australia	England	Iran
A- Ultimate responsibility of individual for deciding on his/her health	√	_	_	_
B- Necessity of supply of accurate, reliable and complete information	√	_	_	_
C-Necessity of comprehensibility of information in each record for all	√	_	_	_
D-Responsibility of the Personal Health Record operator in regard to unauthorized uses	√	_	_	_
E- Need to homogeneity of Personal Health Record and Electronic Health Record	√	√	√	_
F-Personal Health Record being different from Electronic Health Record	√	√	√	_
G- Possibility of referring to Personal Health Record data as document in judicial courts	_	√	√	_
H- Full consent of patient/person for creating Personal Health Record	√	√	√	_

Table 3 Comparison of the objectives in using personal health record in selected countries and Iran

Objectives		Studied countries			
		United States	Australia	England	Iran
A- Improving the level of understanding of individuals/patients of their health/sickness status		√	√	√	−
B- Patients' access to personal health information with the possibility of interoperability		√	√	√	−
C- Possibility of specifying third party access to health information		√	−	−	−
D- Possibility of supplying information to caregivers		√	√	√	−
E- Keeping updated the information of relevant users		√	√	√	−
F- Possibility of receiving behavior-related signs or data	1. Using self-report data	√	−	√	−
	2. Using goal-oriented supervisions through fixed or portable electronic gadgets	−	−	√	−
H- Existence of a personal health organizer		−	−	√	−
I- Supporting personal health managers		√	√	√	−
J- Creating a place for secure confidential communications		√	√	√	−
K- Possibility of connecting to other supports	1. Organizations and societies in service	√	−	√	−
	2. Virtual networks	−	−	√	−

the United States and England [65]. Table 6 Comparison of Media used in PHRs in Selected Countries and Iran.

The Internet was used to send the only record found in Iran [54]. Source of data in the United States are patients, health centres and health professionals [66]; in England, patients and national electronic health record and in Australia, data repositories [59]. Table 7 Comparison of Data Sources for PHRs in Selected Countries and Iran.

In Iran, in the only existing case, medical record information were obtained from health centres on paper or electronically and were then entered into the record.

Discussion

Based on the research findings, an important component of the definition and description of PHRs in selected countries

Table 4 Comparison of the attributes and performances of personal health records in selected countries and Iran

Features and performances	Studied countries			
	United States	Australia	England	Iran
A- Possibility of survey of person/ patient's health data by himself	√	√	√	−
B- Possibility of confidential exchange of messages of persons/patients with the provider	√	√	√	−
C- Possibility of appointment timing	√	√	√	−
D- Possibility of renewing prescriptions	√	√	√	−
E- Offering and use of knowledge bases for support	√	√	√	−
F- Offering and use of knowledge bases for sending reminders and warnings	√	√	√	−
G- Ability of automated data transfer from electronic health record	√	−	−	−
H- Ability of automated data transfer to electronic health record	√	−	−	−
I- Ability of tracing and administration of health plans	√	−	√	−
J- Possibility of adding data generated by the person himself	√	−	√	−
K- Containing important health information of individual throughout his life	√	√	√	−
L- Containing information from all healthcare providers	√	−	−	−
M- Owner's supervision on access of other people to his medical information	√	√	√	−
N- Possibility of exchange of information throughout the health system	√	√	√	−
O- Possibility of exchange of recorded information through the internet	√	√	√	−
P- Possibility of editing and adding data in the future	√	√	√	−
Q- Possibility of editing and adding data at present	√	−	√	−
R- Possibility of transferring sensitive data to a separate location	−	−	√	−

Table 5 Comparison of the standards components in personal health records in selected countries and Iran

Standards		Studied countries			
		United States	Australia	England	Iran
A- Compiling standards needed for:	1. Dealing with issues relevant to certificates	√	_	_	_
	2. Identifying data sources	√	√	_	_
	3. Avoiding redoing the same task	√	√	_	_
	4. Link to personal health record	√	√	_	_
	5. Transfer of data from personal health record	√	_	_	_
	6. Drawing concept maps for users	√	_	_	_
	7. Homogeneity between standards in electronic health record and personal health record	√	_	_	_
	8. Preparing data set of personal health record	√	_	_	_
	9. Supply of standards and data set to private sector	√	_	_	_
B- Developing standards to assure interoperability of data bases		_	√	_	_
C- Using E2369-05 Standard		√	_	_	_
D- Using European Standard EN13606		_	√	_	_
E- Using Standard ASAS		_	√	_	_
F- Using Standard ISO11199		_	√	√	_
G- Using Standard HL7v2		√	√	√	_
H- Using Standard CEN		_	√	_	_
I- Recommendations	1-Compatibility with terminology accepted in the Country	_	√	_	_
	2- Using Open HER Standards	_	√	_	_
	3- Cooperation of clinical specialists, electronic health system specialists and legislators	_	√	_	_
	4- Setting specified timed process for reviewing standards	_	√	_	_

is the ownership of person/patient over his/her PHRs. According to Siting, the key point in PHRs is that the person/patient undergoes a change of status and turns into the owner of the record and thereby is placed at the centre of cares and focus of attentions and is able to receive the information which actually concern him and are relevant to his health problems and requirements [11].A PHR is defined as an electronic tool through which people can manage their information [8-12, 37, 59]. Other reports from other countries also stress that management of PHRs is under direct supervision of patients. In France, PHRs are supervised by patients have been in place since July 2007 [47]. In Sweden, a data base has been formed which can be used by members who join and members can log in by a password and personally manage their records [46]. Some well known commercial companies like Google and Microsoft have also entered the field [67, 68]. They have created PHRs and allow users to register their medical records

Table 6 Comparison of media used in personal health record in selected countries and Iran

Medium	Studied countries			
	United States	Australia	England	Iran
A- Paper record in folder and cabinet	√	√	_	_
B- Installing software in PCs	√	_	_	_
C- Using smart card or chauffeured PHR or device-based transfer such as flash disk or CD	√	_	√	_
D- Installing software on the internet	√	_	√	_
E- Internet portal along with the device	√	_	_	_
F- Through the internet	√	√	√	√
G- Commercial smart cards	√	_	√	_
H- Mobile and intelligent phone and blackberry	_	_	√	_
I- Data repositories	_	√	√	_

Table 7 Comparison of data sources for personal health record in selected countries and Iran

Data source			United States	Australia	England	Iran
A- Health professionals and healthcare centers	1. Portal of associations	I. Integrated service gateway	√	–	–	–
		II. Single service gateway	√	–	–	√
	2. Advanced method	I. Third-party repositories	√	–	–	–
		II. Record locator service	√	–	–	–
	3. Received as hard copy and then entered into the record (e.g. by scanning)		√	–	–	√
			√	–	–	–
B- Patients			√	–	√	–
C- National electronic health records	1. Summary care record		–	–	√	–
	2. Data repositories		–	√	–	–

electronically. Supply of information, access and ownership of these records are with the individual who builds the record [67]. One of the policy documents on the distribution of information between providers and patients, which focuses on Connecting for Health project and is being implemented between Merkel Foundation and Robert Wood Johnson states that patients should be in the centre of PHRs. They should control its use and access if we are going to use the record more extensively [68] which is supported by the findings of the present research. In some countries, however, such as Scotland, Integrated Care Record is provided which is administered by patients and healthcare professionals jointly [44]. The only similar case, found in Denmark, is a website aimed at physicians which also provides patients with access to their medical record information [47]. Control of the only PHRs found in Iran is both at the hands of the patient and the centre providing the record [54] which is contradictory to the research findings stated above. As most of the researches results show that PHRs are controlled by the person involved, the researchers believe it is advisable to create such records under the control and supervision of patients themselves. However, in case of personal inclination of persons/patients and their expressed consent, e.g. for people of lower literacy level; the control of PHRs can be assigned to the organizations providing the PHRs or to any other person nominated by the person/patient involved.

The research finding for all three selected countries showed that the information of PHRs can be provided only to the persons named and authorized by the patient. One of the characteristics mentioned in the definition of PHRs is that the information contained therein should be only disclosed to authorize persons [66, 69] and that this authorization should have been declared by the patient [16].

Elaborating on the differences between electronic health records and PHRs, the Merkel Foundation Connecting for Health states that access to information in electronic health records is open to any qualified person authorized by the institutions in charge of these records while access to PHRs is only possible upon patient's consent [3]. Paligari et al write in their article entitled "Electronic Personal Health Records Emergence and Implications for the England" that access to patients' information is only permitted by the patient or authorized persons [37]. In Scotland, PHRs are administered by healthcare professionals and access of providers is possible upon consent of the patient [44].The new version of Google Health enables users to share their medical information on a selective basis with people they choose to [70]. Microsoft Health Vault includes–among other parts–a specific search engine which provides information about diseases, drugs, health and insurance centres and offers a place for registering information whereby the user can enable other people to access his or her information [67]. In a study of the outlook of Americans on PHRs and national electronic exchanges carried out by the Merkel Foundation in 2005, 79% of participants said that access to medical information of patients should be allowed only if permitted by the patients [71]. Research has shown that one of the essential requirements in both use and disclosure of information contained in electronic health records is consent of the person involved [46, 72]. A study carried out in Canada in 2003 shows that nearly 25% of organizations have provided key policies on access to information on site and 50% maintain policies which cover patient's consent for sharing information [73] which are in agreement with findings of the present research.

The PHRs, as approved by law in France can be accessed online by physicians and pharmacists as well-albeit under patient's supervision, while in Denmark, general practitioners have access to a protected network to exchange information and retrieve health records electronically and patients can get the information through an online portal [47]. SUSTAIN2 Project in Sweden provides

access to the record for general practitioners [46]. There are no systematic and principled PHRs in Iran and previous research shows that the right of consent for treatment and confidentiality of personal information not foreseen in the Patients' Rights Charter and only 9% of health units studied acquire written letter of consent for disclosing patient's information [74]. Findings from Iran do not conform to the outcome of this research. As a comparison of results contradicting the findings of this research and those compatible with the present research findings shows, in countries where PHRs are created in a systematic codified manner, the patient is considered owner of information and the authority which allows access of other people and the authorized people are nominated by the patient/person whose information is recorded but in countries which are in early stages of developing PHRs, portals are provided for patients to access their information in websites originally designed for physicians. It can be said that in the latter group of countries, physicians are the target group. Although the mere existence of these portals for access to health information is better than lacking them, the researcher suggests developing PHRs in health centres where such a development is possible and, in order to avoid legal problems, a list of authorized persons who may access the information especially for emergency cases be prepared based on patient's consent. The healthcare officials in every country especially in Iran are recommended to envisage the creation of PHRs in their plans and to develop the required infrastructures, laws, and standards. These bylaws and standards can then be used by individuals and commercial companies who wish to enter into this field and by other users of such a service especially healthcare providers.

This research shows that the aim of creating PHRs in all the three selected countries was to make information available to patients/persons through the records. American Health Information Management Association mentions the aim of PHR to be enabling people to manage their life span information and to access such information [12]. Numerous reports have emphasized on the need of people to access their information through their PHRs [4, 8-12, 37, 66]. Research, conducted in 2002, shows that 90% of hospitals have provided online services for their patients [75]. Iakovidis reported in 1998 that " we can witness a near future when supervision on patients' status has expanded and home support systems are interactive with PHRs to provide a full picture of patient and when procedures show further involvement of patient in treatment and prevention and a pre-requisite for this is access to personal health information" [76]. In Denmark, patients have access to physicians' website through online portal [47]. In Sweden, patients have access to three sources of information including hospital information systems, tests data bases and medical records of general practitioners [46]. In a survey carried out in 2004 in the United States, lack of policies on patients' access to information is mentioned as the most significant obstacle in creating electronic health records and the survey suggests that only 5% have had access to their health information [77]. A research in New South Wales, Australia in 1999 shows that health clients either have no access or little access to their health records [78]. In a research carried out in Iran, patients in majority of cases have no access to their health information [79]. The results of that research are not in agreement with the findings of our research. While physicians are afraid of patients' access to medical information which might lead to incorrect understanding of the disease and weakening of the process of treatment, no supporting evidence was found to substantiate this fear [80, 81]. It doesn't seem that an easy access to electronic PHRs be contradictory to an efficient clinical treatment [17, 66]. Effects of patients' access to their medical records depend on social and conceptual factors involved in application of these records and further studies on this part are needed [80]. Access to health information is considered necessary acts for the future [76] because it provides patients with a higher level of awareness and understanding of their conditions and improves their relationship with their physicians [81]. Cimino et al designed a PHR in 2002 which was participated by a number of physicians and patients in an experimental study. The researchers claimed that their system was able to improve the patient-physician relationship during the appointment by offering information to both prior to the time of the appointment [82]. Another researcher called Masys adheres numerous advantages to patient's access to his or her health information in his study [20]. In general, patients have a positive outlook towards accessing their medical record especially in some certain diseases such as infertility or cardiac disease [83, 84]. Considering the fact that numerous studies show that access of patients/persons to their medical information increases their level of understanding of their disease/health status and improves their relationship with their physicians, the researchers suggest that different methods of access to medical record are offered to the patients and hold that the best method is the use of PHRs. The researchers believe that access to PHRs improves the services quality in hospitals and health centres as well.

Findings of the present research showed that PHRs, in all three selected countries offer for secure and confidential communications. Based on the PHRs approach, patient should be able to inquire his financer directly on his financial status and his applications and to communicate his healthcare provider by secure email or other messaging systems or renew his prescriptions [11]. In counting the features of a special type of personal health record believed to be the most complete type, Detmer mentions capability

of secure communication among the objectives of such a record [36] which is similar to other researches on this issue [3] and findings from Denmark [47], Sweden [46]. Gaster et al conducted a research in 2001, concluding that 72% of physicians used electronic communication to contact their patients and considered the use of electronic communication useful and appropriate. In this study physicians reported using electronic communication for setting appointments (75%), renewing prescriptions (65%), receiving test results (64%) and responding in disease management (49 %) [85].

In a research in 2003 entitled "Sharing Electronic Medical Record Information with Patient via the Internet", Sands counts the characteristics of a PHR called Patients' Site launched in Beth Medical Centre under supervision of Harvard School of Medicine and states that these records can provide service through electronic communications which in turn enhances capabilities of patients, care providers and physicians and offers competitive privileges for the providers [86]. Tang and Lansky (2005) studied the PHR called PAMF Online created by Palo Alto Medical Foundation (www.PAMFOnline.org) and mentioned one of its advantages to be the possibility of electronic communication between patients and physicians [21]. Alarcon et al in their research of 2006 write: "75% of users use electronic communications for getting advice from their physicians. People with higher and high school studies as well as people above 45 years of age were found to be more interested in using the Internet to gain health information [87]. Iverson et al stated in a study entitled "Impact of the Internet Use on Health–Related Behaviours and the Patient-Physician relationship: A survey-Based Study and review " that 58% of patients use the Internet to find health information relevant to them and 49% said that receiving this information had changed their health behaviour. Although concerns have risen in regard to behavioural changes between physicians and patients as a result of using the Internet, evidence support a further involvement of patients in treatment and care [88]. In an article, which was published in 2007, Sands claims the way to stabilize and enhance care systems to be improving one of the three elements of system, participants and patients and says enabling the users is one of the best ways to improve because 80% of adults can have access to health information through online communication and this number is still increasing on a daily basis. This research implies that instead of seeing a doctor, people are looking for information and half of the people even act based on the information they receive. He believes that patterns are constantly changing and due to increased the Internet access and the subsequent increased public awareness, physicians are more considered a collaborator in treatment, patients are well aware of their rights and warn physicians

on the manner of treatment and observance of their rights. PHRs can effectively provide this communication [89]. Research carried out in Iran shows that using health information websites can influence the knowledge of individuals [90] and this thesis is supported by the findings of the present research. Ketz et al (2004) studied the obstacles and challenges of online communication between patients and healthcare providers and reported that patients have little experience of working with online communication tools while online communication tools and their applications are diverse [91]. These findings do not conform to the findings of the present research. Considering the fact that researchers emphasize on the potential role of PHR systems in changing the way of communication between patient and care providers [8] and the fact that 88% of patients have access to the Internet and online communications [92], it seems that online communication is quite feasible and practical. Therefore, hospitals and health centres are recommended to consider online communication in offering their services so that more people can access health services. To this end, using PHRs is very useful.

Conclusion

Overall, the findings of the study indicate that PHR in Iran is still in its infancy and there are numerous challenges and building blocks that have an impact on successful implementation and acceptance of PHR. The successful adoption of this patient-cantered record system as its ancestors—health information systems–is affected by environmental factors including operational, organizational and cultural features of socio-technical perspective [93]. This life time patient controlled record is extended to be more complicated through the involvement of patient, family and friends. These characteristics make developing countries like Iran face with broad range of barriers the adoption of PHR.

In this climate starting PHR form its simplest and primitive format–paper based PHR could ensure its effective deployment. In developing countries like Iran, There is a shortage because of the absence of specific standards relating to documentation, confidentiality and access to medical records [94, 95]. Since the implementation of PHRs may represent problems concerning basic rights of patients such a reliability, privacy and confidentiality of personal data, handling of patient information makes it necessary to introduce new codes of practice, well-established policies and patient acts. In addition to absence of standards, ownership and empowerment of unaware patients on health information, is another concern that must be addressed.

At the individual level computer literacy, reading literacy and health literacy poses another problem as environmental barriers to implementing PHR in developing countries [8, 96]. In this regard, the following steps can pave the way for the realization of the full benefits of PHR in Iran which can be considered as recommendations for PHR authorities in the country:

- Establishing a commission or national committee for developing and formulating health information policies and standards.
- Defining working group relating to EHR-PHR system adoption
- Determination of PHR features; concepts and definition, performance, standards components, media and data sources.
- Conducting pilot test in hospital located in metropolitan
- Conducting educational campaigns and distributing written health educational materials and "security cultures" materials among patients to promote health literacy.
- Approving the PHR features
- Promoting paper-based PHR to the continuum of PC-base and the Internet based PHR.

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