Patient Portal Readiness (PPR) among the underserved: Impact of PHIM activities, health information seeking, and patient attitudes towards record keeping

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Abstract

Patient portals are increasingly becoming a solution for healthcare providers to provide patients with access to parts of their medical records such as lab results as well as to offer services such as customized educational materials, appointment scheduling, etc. However, the use of patient portals is still very low [1] especially among the underserved population. The objective of this study is to develop an understanding of the factors that may impact patient portal readiness among the underserved population. We consider three main factors that will impact Patient Portal Readiness (PPR): (a) PHIM (Personal Health Information Management) activities; (b) attitude towards keeping personal health record, and (c) access to and use of Internet for health information seeking.

Findings from a survey of 132 patients of free clinics in northern Virginia support the study hypotheses related to the impact of the above three factors on PPR. Implications for research and practice are discussed.

1. Introduction

Patient portals are increasingly becoming a solution for healthcare providers to provide patients with access to parts of their medical records such as lab results as well as to offer services such as customized educational materials, appointment scheduling, etc. Patient portals are Web-based applications that are tethered to the provider’s electronic medical records and can be used to provide patients with limited/partial access to their medical records [2]. Patients do not access the actual medical records, but only a subset of patient’s clinical data through the portal and patients cannot make any changes to the records. Patient portals have been around for a long time although they have often been referred to as ‘tethered Personal Health Records’ (PHRs).

The main difference between a patient portal and a PHR is that a patient portal resides within the provider’s IT system and consumers can access it only by logging into the portal whereas a PHR resides with the consumers’ electronic platform (be it a computer, tablet, mobile phone, or password protected cloud) and as such PHR allows the consumer to save, transport or share data without any help from the provider. While setting up a patient portal is quite easy on the providers’ end, pouring data into a consumer-held PHR has been quite challenging. This also partially explains the popularity of patient portals compared to PHRs.

From a systematic review of all the studies that looked into the benefits of patient portals, Ammenworth et al (2012) [2] found significant differences among patients who used patient portals vs. a control group in the following categories. There was a significant decrease in office visit rates, and an increase in the use of messaging systems instead of the telephone [4] and better adherence to treatment [5]. It should be noted that some of these studies tested features that can be part of patient portal such as secure messaging systems and access to medical records, but not a patient portal itself.

Patient portals have also been found to be especially beneficial for the management of chronic diseases—in helping patients understand treatment protocols and lab results and in enhancing their compliance in treatments [6,7,8]. It has also been found to be beneficial during emergency medical situations and to ensure continuity of care after emergency care [7]. The primary benefit is in getting people engaged and involved in their own care [9]. With the rapid increase in EMR adoption among health care providers and the need for adhering to the ‘meaningful use’ criteria for providers who are using federal financial aid, there has been a steady rise in the number of patient portals.
Patient portals are easier than a PHR to start using and studies have found that patients like accessing lab results and scheduling appointments electronically [10]; however, the use of patient portals haven’t quite extended beyond that. Despite all the purported benefits and provider support for patient portals, the use of these portals among underserved population groups is still dismally low [11,12]. While these studies have identified some of the factors that may explain the low adoption rate of patient portals, by and large, prior studies have paid limited attention to factors that relate to patients’ Personal Health Information Management (PHIM) activities as well as their information seeking behavior.

In this study we examine the impact of three key factors on Patient Portal Readiness (i.e. readiness to use a patient portal): (a) PHIM activities; (b) attitude towards keeping personal health record, and (c) access to and use of Internet for health information seeking. We collected a set of survey-based data from 132 patients belonging to the underserved population in northern Virginia to validate our study hypotheses.

In the next section, we describe Patient Portal Readiness and the factors that impact the use of patient portals: PHIM practices; attitude towards personal health record keeping, Internet access and use of Internet for health information seeking. We also identify some of the key demographic factors including age, education, income, ethnicity and chronic illness that may shape Patient Portal Readiness.

2. Research Background

2.1. Patient Portal Readiness (PPR) among the underserved

While Patient portals are increasingly becoming part of Electronic Medical Records, the low usage, especially among underserved populations have become a source of concern [1,11, 13]. Some studies in this area merely concluded that usage among underserved population is low due to lack of Internet access [14] while other studies found that even with sufficient access to Internet, logging into patient portals and using it was significantly lower among minority groups [1,11]. These studies speculated that it could be due to lack of sufficient training, poor health literacy, lack of time and poor e-health literacy. However, none of these studies evaluated the patient portal readiness of this population or the factors (other than Internet access) that may impact such readiness.

Are the underserved patients ready to use patient portals?

To better investigate this, we first define Patient Portal Readiness (PPR) as an individual’s overall readiness to use patient portals provided to them. PPR encompasses patients’ inclination or need to access their own health records, receive health related services and support through a website, and their need for having a shared health record with the provider.

2.1. Personal Health Information Management (PHIM)

Personal health information management (PHIM) is defined as ‘activities that support consumers’ access, integration, organization, and use of their personal health information” [15 p156]. Consumers’ PHIM practices are quite complex and difficult to understand, largely because such practices are context-specific and highly dependent on individual characteristics and attributes [16,17,18]. Studies have found that relevant health information is often scattered, fragmented, and stored in multiple repositories and media ranging from paper to electronic systems. There are multiple sources of health information or ‘information scraps’ [19, 20,15,16] such as doctor’s office, insurance company, employer, Internet resources and other mass media, friends and family, and home health monitors. Further, more recently, numerous mobile health apps that are used for information storage, monitoring, and even as decision-making tools have been added to the milieu.

Consumers’ PHIM practices are also often not restricted to a single location—people conduct PHIM activities in different places, at their homes, workplace, while commuting or travelling, and while at a healthcare setting [17,18]. All of this leads to a high cognitive burden for the individual and information retrieval and usage becomes a tedious task [19]. Researchers in the PHIM area generally agree that an electronic system to manage health information might be the most appropriate for PHIM, if designed to accommodate consumers’ PHIM needs [15,17].

Here we first hypothesize that a patient’s PHIM activities will be positively associated with his/her readiness to use a patient portal. The more the patient is involved in PHIM activities, the more they would have felt the need to maintain and/or access their own health records and as such the more positively inclined they would be to use a patient portal that would offer such access. Hence,
**H1: Patient’s extent of PHIM activities will be positively associated with patient portal readiness**

It should also be noted here that most studies on PHIM practices [e.g. 15,20] have mainly focused on using qualitative methods such as observation, focus groups and interviews. While these and other participatory methods provide a number of insights on PHIM activities, they are very time consuming and not quite feasible at all settings. Further, to validate the impact of PHIM activities on patient’s readiness for electronic tools – be it a PHR or a patient portal, we also need to employ quantitative methods such as a survey-based questionnaire as is done in the current study.

### 2.2. Attitude towards health record keeping

Attitudes have long been known for predicting behavioral intentions [21], and hence the first step towards evaluating the readiness for patient portals is to understand the attitude of the population towards health record keeping.

Several studies have looked into attitudes of patients towards electronic personal health records or patient portals [3,22], but none have looked into attitudes of patients towards health record keeping. Patient attitudes towards this very basic activity – health record keeping – holds important clues to understanding Patient Portal Readiness. Someone who is not interested or is not inclined to keep any kind of records regarding health, may not be interested in accessing their records at a patient portal.

Here we suggest that patients’ attitude towards maintaining personal health records would enhance their patient portal readiness. Even if providers offer access to patient portals, if patients maintain negative attitudes towards maintaining one’s own health records, that would translate into lower readiness to use patient portals. On the other hand, positive attitude towards personal health records (even non-electronic health records) would instill in them a positive inclination towards services that offer access to such health records or services that lower patients’ burden to maintain such records. Hence,

**H2: Patient’s attitudes towards maintaining personal health record will be positively associated with patient portal readiness.**

### 2.3. Internet access and the use of Internet for health information seeking

Internet access is a requirement for patient portal use and hence that factor alone could be a big predictor of patient portal readiness. Among the underserved, access to Internet have been steadily increasing (Pew reports), however, one study [14] found that current Internet access was the most important predictor of patient portal use. It should also be noted that patient portal usage has been low among the general population as well. This could mean the relevance of other factors such as the use of Internet for health information seeking.

Health Information seeking is an important factor that impacts patient participation in treatment and decision-making [23,24]. Here, health information seeking relates to the patients’ use of Internet for acquiring information on diseases, treatments, and other health related activities/issues. We suggest that patient’s prior use of Internet for health information seeking would enhance their patient portal readiness. A need to be better informed and being connected to the Internet could improve health literacy and thereby increase the use of patient portals and also develop positive perceptions regarding the value of such patient portals [1]. Hence,

**H3: Patient’s access to Internet will be positively associated with Patient Portal Readiness.**

**H4: Patient’s use of Internet for health information seeking will be positively associated with Patient Portal readiness.**

### 2.4. Age, education, income, ethnicity and chronic illness

Age, education, income, ethnicity and chronic illness are also factors that could influence patient’s PHIM activities as well as their patient portal readiness. Age, education and income are closely related to Internet access and thereby may indirectly influence patient portal use. Age, education and income could also directly impact the need for health information and feeling of ownership on one’s health information and as such PPR. Further, it could also impact patient’s confidence in interpreting medical terminology and seeking out professionals to interpret the information in acquired from patient portals.
Chronic illnesses have been found to be a main reason for patients to turn to Internet in their search for health information and also to start keeping some form of health record. Patients who have chronic illness have routine medical visits and lab tests and they have been found to keep records. In addition, technological advancements for keeping track of chronic illnesses have also made patients more confident in using new technologies – for example there are several mobile phone apps specifically for keeping track of diabetes care or BP measurements. These patients could be more inclined to use patient portals.

Based on the above discussion, we propose the following hypotheses

**H5**: Age, income, education, and chronic illness will be positively associated with Patient Portal readiness.

3. Data and Method

3.1 Study data collection

The study subjects were patients of free clinics in the Northern Virginia (NoVa) Area. Five free clinics in the NoVa region (Moss free clinic in Fredericksburg, Loudoun Free clinic in Loudoun, Arlington Free clinic in Arlington, Arlington Pediatric Free clinic in Arlington, and Jeanie Schmidt Free clinic in Herndon) participated in a questionnaire-based survey. We collected data from 132 patients who visited these clinics (approximately 26-28 patients from each clinic). The paper-based survey was administered to the patients who visited the free clinics for care. Participation was voluntary and no incentives were provided for participation.

3.2 Variable operationalization

3.2.1. Patient Portal Readiness (PPR)

This variable was captured by surveying patients’ interest in accessing their own medical records through a provider-based patient portal. Specifically the following three questions were asked: (a) “If your healthcare provider allows you to access your health record through the Internet would you be interested in accessing it?”; (b) “If your healthcare provider provides access to health-related services and support through the Internet, would you be interested in using them?”; (c) “If you do keep any kind of record, do you take that with you when you visit a healthcare provider?” This is to capture whether the individual actually is trying to use paper based record to the level of functioning that is similar to that of a patient portal or PHR. The total of these three items was taken as the measure of PPR.

3.2.2. Personal Health Information Management (PHIM)

Much of the research on PHIM activities has been qualitative in nature and so far there hasn’t been any measure developed to capture PHIM activities through a survey. This study is the first of its kind to understand the record keeping practices within PHIM quantitatively. Patient’s extent of PHIM activities was captured with a question in the survey as to whether they kept any kind of health records. The options ranged from keeping notes on sticky notes to keeping detailed electronic records. There were also options to choose such as “keep notes on family members medication list”, “keep notes on drug allergies you or your family member might have”, “keep a folder with all the printed lab results and letters from doctors”, “keep immunization records of children” to keeping electronic records.

3.2.3. Attitude towards personal health record keeping

Patient’s attitude towards personal health record keeping was captured by the following question (on a 5 point scale Likert type scale): (a) “In your opinion is it a good idea to keep some kind of a record for your health?”

3.2.4. Internet access and use of Internet for health information seeking

Internet access was a ‘yes’ or ‘no’ question supplemented by questions on whether they had access through a computer at home, at the work place, through a mobile device or through a public library. The variable ‘use of Internet for health information seeking’ had 4 items: Do you use the Internet for (a) searching for health information, (b) searching for health services, (c) searching for health providers, and (d) health apps and tools. The total of these four items was taken as a measure of the patient’s use of Internet for health information seeking.

4. Results

Majority (67.4%) of the study sample had income below $20,000. The majority (40.2%) were Hispanic or Latino, 23.5% were black non-Hispanic, 19.7% were
white non-Hispanic, 7.6% Southeast Asian, and 6.1% Far East Asian.

The majority (81.8%) had Internet access through some means. Only 18.2% did not have any Internet access through any means. 56.1% had Internet access through a computer at home, 8.3% had Internet access at work place, 30.3% had Internet access through their mobile phone, 18.2% had Internet access through a public library or community center. While 59.8% had only one way of Internet access 22% had two or more means to access the Internet. 56.1% regularly checked email or regularly accessed the Internet. 66.7% reported that they use Internet for health related activities such as, search for health information, search for health care providers, search for health services, and a small minority (2.3%) also used online health tools and apps.

The sum of items was used to derive the variables – PHIM, PPR and use of Internet for health information seeking. Multiple linear regression technique was used to test the various hypotheses. All the related variables were included in each of the analysis.

Hypothesis H1 was supported - PHIM activities was positively associated with Patient portal readiness (t = 2.943; p <.01).

Hypothesis H2 was also supported - Attitude towards record keeping was positively associated with Patient portal readiness (t=4.668; p<.001).

Hypothesis H3 was not supported - Internet access was not positively associated with Patient Portal readiness, contrary to another study done among underserved population [14].

Hypothesis H4 was supported. Internet use for health information seeking (such as searching for health information, providers and health services) was positively associated with Patient Portal Readiness (t=2.193; p <.05).

Hypothesis H5 was partially supported: Age, race, education and income did not have any positive associations with Patient Portal Readiness. Chronic illness was positively associated with Patient portal readiness (t =2.394; p <.05).

### Table 1: Regression: Impact of PHIM, Attitude towards record keeping on Patient Portal Readiness (H1 & H2)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Beta</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIM</td>
<td>.233</td>
<td>2.943**</td>
</tr>
<tr>
<td>Attitude towards record keeping</td>
<td>.369</td>
<td>4.668***</td>
</tr>
</tbody>
</table>

n=132; standardized coefficients are reported *p<0.05; **p<0.01; p<.001***

### Table 2: Regression: Impact of Internet access & Internet use for health information seeking (H3 & H4)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Beta</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet access</td>
<td>-.010</td>
<td>-.087</td>
</tr>
<tr>
<td>Internet use for hlth info</td>
<td>.239</td>
<td>2.193*</td>
</tr>
</tbody>
</table>

n=132; standardized coefficients are reported *p<0.05; **p<0.01; p<.001***

5. Limitations

This study is an exploratory study that tried to look into new concepts that could impact patient portal readiness among the underserved. PHIM data was often collected through qualitative methods and this is the first attempt at a survey tool for collecting PHIM activities through a questionnaire. Similarly, attitude towards record keeping has not been studied in the context of patient portal use or readiness and this is the first attempt to develop such a variable. This exploratory study indicates the need for further development of these variables and survey tool for studying PHIM and attitudes.

6. Discussion

The results indicate that there are many factors that can impact patient portal readiness among the underserved. While demographics such as age, race, education and income were not positively associated with patient portal readiness, people’s attitude towards health record keeping, use of Internet for health information and personal health information management (PHIM) activities were positively associated with patient portal readiness. This study shows that people need to gain an understanding of how important it is to keep health records and understand their own health issues to actively use a patient portal. All the factors studied here such as attitudes, health information needs and PHIM activities could be improved by better outreach from providers showing people how beneficial it is for their treatment, if they had a better understanding of the disease and treatment protocol. The divide between people who use Internet for health information seeking and people who do not use Internet for health information seeking is far deeper than the digital divide [25] and that needs to be addressed before providing patient portal.

This study also indicates a need for better training to improve the three factors that impact patient portal use. One of the questions in our survey was whether the participants would be interested in keeping a health
record if they were provided with some help and support and 63.6% answered affirmatively. This indicates the need for training and education on how to keep records and what kind of records to keep. This is true in the case of health information seeking on the Internet. When asked whether they would like to use Internet for health related activities, majority (75%) answered affirmatively in our survey. There needs to be training in this area as well.

Future studies in this area could also focus on collecting more information on consumers’ PHIM activities and also focus on understanding the lack of PHIM activities among some patients. As previously mentioned, many studies in this area have used qualitative methods to collect PHIM activities. While qualitative studies are important, survey-based studies that involve larger study samples are equally important to develop an in-depth understanding of PHIM activities. The information captured through surveys can be used not only to improve training for these activities but also for patient portal design. A better understanding of PHIM activities can help designers customize the portals for different patient needs and also use the patient portals to lead them to better health information seeking.

Future studies should also focus on Patient Portal Readiness for other population groups. The factors used in this study are applicable for other population groups as well.

In conclusion, the findings from this study imply the need for consideration of factors related to PHIM activities and health information seeking in both the design and the diffusion of patient portals. Such a perspective also imply important issue for consideration in developing public policies – at the local, state, and federal levels – that would enhance or promote patient portal readiness among the underserved population across the nation.

10. References


