Technology Acceptance of Patient Portals by Providers and Medical Staff: A Case Study

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Abstract.

With the passing of the Affordable Care Act in the United States in 2010, electronic health records, including patient portals, were integrated into most medical practices with the hope that these systems would help to better manage and secure healthcare information. The shift over time from paper-based medical processes to electronic health records could help provide patients greater access to their Protected Health Information. A digital divide can occur in medical practices where only some patients have access to their health information. This case study involved physician-managed ambulatory clinics in Utah and examined provider and medical staff beliefs about the efficacy of patient portals. The variables identified in the technology acceptance model and some of its variants were used to formulate interview questions to better understand provider and medical staff acceptance of patient portals. Specifically, perceived usefulness, social norms, and social influence were TAM-related variables that were examined.

Keywords: Patient Portals; Meaningful Use; Technology Acceptance Model; Providers and Staff.

1. Introduction

Many healthcare organizations are trying to engage patients more fully in their own healthcare [6]. Patient portals or personal health records (PHRs) are software systems that can provide patients around the clock online access to their protected health information (PHI). Once a patient is registered with a healthcare organization, their clinical summaries, lab reports, prescription information and other medical procedures become integrated with their electronic medical record and accessible through their patient portal [18].

When first introduced into medical practices, adoption rates at which patients were accessing their PHI through patient portals was very low, usually below 10% of active patients in a medical practice [5]. Since 2011, many healthcare organizations have been consumed with meeting the Meaningful Use (MU) criteria for the EHR incentive program outlined by the Centers for Medicare and Medicaid Services (CMS) for eligible providers (EP) who adopt and meaningfully use certified Electronic Health Record (EHR) technology [3]. To this point, there have been three stages of MU identified with a stated final goal of achieving improved quality of care [4]. MU criteria, attempt to measure patient acceptance, and use of electronic healthcare information, but do not specify exactly how system software, and processes must map to those measures [8].

While medical providers have economic incentives to achieve MU, the driving factor behind purchasing decisions are often based on finding a PHR that integrates or is an extension of an existing EHR system. The MU measures are tied to patient adoption and use, and do not attempt to measure provider engagement with the PHR or their understanding or support for this type of system. Unfortunately, patient adoption and acceptance of a PHR are often determined by the day to day interactions between patients and providers [7]. When providers are ambivalent about inviting their patients to participate in a patient portal they are creating a digital divide where some patients are connected to these educational and information resources and others are not [17].

2.   Technology Acceptance of PHRS

In a patient portal usage survey conducted, participants reported that their beliefs as to the usefulness, dependability, and reliability of the system would be stronger if it was endorsed by their own provider [10]. Holden and Karsh [9] also argued that additional studies are needed that can identify practitioner beliefs about the use of patient portals; beliefs that will either cause them to become barriers to PHR adoption or vocal promoters of the system.

Besides MU measurements being applied to electronic health systems, information systems are often studied for technology acceptance by examining attributes defined in the technology acceptance model (TAM), the extended TAM model and also the Unified Theory of Acceptance and Use of Technology (UTAUT) [9]. While providers are unquestionably concerned with meeting their MU requirements, the researcher also wanted to capture beliefs and views of these medical professionals using the more traditional acceptance measures of TAM and its related models.

Much of systems development focuses on the actual analysis and design of the system. But after implementation, a system should be tested to determine the level of acceptance by users. This study focused finding answers to these two research questions:

What is the level of acceptance providers and medical staff have of patient portals?

What are the influencers in provider and staff acceptance of patient portals?

3.   Methodology

Rather than trying to meet the requirements of regulation and managing complex healthcare systems on their own, many physician-managed clinics are joining together to off load these burdens. One such organization, Revere Health a multi-specialty group of physician-managed independent clinics in Utah was the case study group used for this study. The goal of the study was used to select medical professionals and staff subjects for interviews, examine workflow processes and data analysis related to the PHR system. In physician-led clinics like Revere Health, the physician/providers are often the primary source for leadership and authority in the organization. Clinic staff provide the organizational positive core when it comes to internal patient portal training and evangelization [11].

Participants from these two embedded units were chosen through multi-level purposeful sampling in conjunction with recommendations from clinical management and examination of practice patient portal adoption rates [13]. A total of three physician/providers and six medical staff including office managers, receptionists, registered nurse, medical assistants, and a receptionist were interviewed. An appointment was made at the convenience and location chosen by each participant for a face-to-face or telephone semi-structured interview. Interview questions were framed to discover two viewpoints, a general acceptance of health information systems, and then more specific questions about the current patient portal and its integration into the medical practice.

Two TAM variables related to acceptance are perceived usefulness (PU) and perceived ease of use (PEOU) [14]. Because actual patients were not participants in the study, the PU measures of acceptance of medical personnel became the focus of the study.

Another set of questions asked the perspective of the clinical staff to provide valuable understanding of the perceived power and influence of physician/providers related to clinic PHR workflows. Reviewing the transcribed interview data for stories or examples where power irregularities come into play within the organization would be an example of critical analysis [2]. Both the subjective norm (SN) and social influence (SI) variables from TAM2 and UTAUT were applicable.

Stake [15] states that, "interpretation is an act of composition." In the analysis process, the researcher is the composer (p. 55). The semi-structured interview narratives from physician/providers and staff were recorded and transcribed by the researcher. These transcription files were then used as source documents for the Atlas.ti, software used for qualitative data analysis that supports a circular Hermeneutic analytical process [2]. Key stories and themes were categorized and grouped looking specifically for TAM descriptors related to PU, SN, and SI. Taking a constructivist view of the data analysis, community SN or aspects of SI as seen in UTAUT model are of specific interest as they play an important role in more fruitful organizational learning [16].

4.   Results

Terminology and phrasing used by interviewees helped map usability and acceptance criteria of the problem domain [12]. As the researcher processed each interview transcription, these codes were associated with related

quotes or partial quotes. In Figure 2, the Discovery Code Network output by Atlas.ti shows the categories used to tag or code transcription quotes related to discovery questions in the AI interview. Both providers and their staff freely shared their thoughts about the perceived usefulness of patient portals, the PU TAM attribute. A representative selection of quotes related to PU of PHRs is given next.

One provider thought their patients would be, *"more able to comply the regimen or suggestions that we're giving them."* Several providers thought patient engagement would be increased if patients could *"use that as a resource to look up and remind themselves of things that were said during their appointments.", "maybe being more proactive in their own health."* A medical staff member described the major role communication plays in the PU of the patient portal, *"we could communicate with you all the time in an ongoing way."* Another staff person referred to productivity gains with appointments, *"I love that I can send out a reminder you have an appointment with us next week.",* and with lab reporting, *"I can see whether your labs have been done or not. ."*

Both providers and staff alike seemed convinced of the potential of a PHR information system for encouraging patient-provider communication, empowering and engaging patients, and as an always available avenue for delivering educational materials. The pressures of governmental requirements like MU may have induced Revere Health to implement a patient portal, but both stakeholder groups involved in the study praised the capabilities of an ideal PHR.

Some of the TAM studies have addressed SN and SI in relation to two different situations, voluntary and involuntary adoption of technology. For Revere Health, a list of possible social influencers for medical staff when it came to patient portal usage might be department management, peers and colleagues, IT staff, regulatory agencies, and the medical profession as a whole.

Both providers and staff seem deeply influenced by the pressure they receive from IT management to encourage adoption and usage of the PHR with their patients. An office manager referred to "they" as management when saying, *"They were sold on it and they were basically selling us on it."* From another office manager again referring to the collective "they" when saying, *"They were all just all really on board with it. Very enthusiastic."* A receptionist discussed pressures from the "clinic" management, *"the clinic pushes so hard for the doctor's numbers to come up to show that this percentage of their patients are in the portal."*

A provider expressed frustration with regulations and their effect on provider workflow, *"But one of the hindrances with, at least for me, and some of my partners, I believe, using the patient portal more than we currently have has been with all the excessive changes we've had to implement because of meaningful use, we don't have time for one more."* The same provider also commented, *"There's been no validation at all. They come up with the legislation; everybody is going to start doing this. Who bears the cost? Who pays for it?"*

Patient feedback seems to have significant influence on staff and provider support for patient portals. From a medical staff member referring to the negative influence of patient frustration on providers, *"Once you have heard so many, I can't get ins. Then the doctors become just as negative."* An office manager reflected on the positive pressure patients might have on staff, *"So the more I think of patients would use it the more it would require the staff to stay on top of it."* The same office manager also, *"They have just done most of their complaining to the doctor and he has come and told me that."*

Peer pressure is intrinsic in staff-to-staff influence at Revere Health that promotes the train-the-trainer philosophy. From a staff member, *"I'm part of the super user group that meets every month. And so they kind of go over with us some of the updates and it's our job to kind of come back and show the staff."* Provider-to-provider negative support for the portal has a great impact on other providers in the practice, *"if only a couple of people in the practice are excited and doing it, it's hard to get those numbers."* Colleagues outside the practice also influence provider attitudes, *"I've had one patient who said he was in another provider's office and on his tablet he was able to pull to show his FMH and show his doctor his labs from our clinic and my notes. And the doctor, he sat there and went wow this is great."*

5. Conclusions

Interview responses from both Revere Health providers and staff showed they believed that a patient portal could be used to empower patients to be more proactive in their own health. The portal could also serve as a secure mechanism for communication between providers and patients. While are many methods that could be used to disseminate educational resources to patients, an online portal could provide just the right educational materials in context to the patient's specific conditions or medication.

Identification of pressures and issues related to social influences that affect PHR workflow and support within the clinic. Providers interviewed expressed frustration with governmental requirement for MU that placed an undue burden on record keeping. Pressures and issues related to social influences that affect PHR workflow and support within the clinic were identified. Providers and staff were heavily influenced by pressures form IT Management. Governmental requirements for MU attestation in order to receive incentives and later to prevent Medicare and Medicaid reimbursement deductions was a weight on providers. Some of the providers expressed burdensome regulations of which MU was just one more straw breaking the camel's back. These professionals are under pressure to provide quality patient care and also to meet measures like MU that may decrease their effectiveness and efficiency because of governmental regulation [1].

Patients had both a positive and negative influence on staff and provider engagement with the PHR. Patient complaining was a deterrent and expressions of patient satisfaction or interest were rewarding. Colleagues both inside and outside the organization had an impact on provider support for the PHR. Within a practice, complexities arose when some providers supported and encouraged portal usage and others gave little or no support.

The analysis of SN and SI on providers and staff is complicated. There are many negative and positive influencers on behavior of these key stakeholders. Providers rely upon each other, their staff and IT to support their efforts related to patient portal adoption and MU. Complexities within clinics arise when some providers are proactive in their backing of PHRs and others are less supportive. Revere Health has leveraged the use medical staff members to support and train their colleagues. These employees are the champions of IT strategies like the PHR at the operational level.

Recommendations for future study that would build on this case study include: A follow up study looking into Perceived Ease of Use (PEOU) of the patient portal technology [14]. Both providers and staff were negative about the authentication process their patient's experience, especially older patients and also complications related to login processes. A compare and contrast study with Revere Health and a physician-managed clinic group in another geographic region or country might yield helpful organizational learning and change measures. And finally, patient-focused studies of patient satisfaction and first-person accounts of patient engagement would be beneficial, but special institutional review board (IRB) consideration would need to be followed working with patients directly

References

[1] American Medical Association (2014). AMA's meaningful use blueprint. Chicago, IL: Madara, J. (ed). Retrieved February 15, 2016 from http://mb.cision.com/Public/373/9661589/9185dfb838c6fe9c.pdf.

[2] Butler, T. (1998). Towards a hermeneutic method for interpretive research in information systems. *Journal of Information Technology*, *13*, 285-300.

[3] Centers for Medicare and Medicaid Services (2015). Electronic health record incentive program – Stage 3 and modifications to meaningful use in 2015 through 2017. *Federal Register*, *FR* 20346 through 20399. Retrieved November 2, 2015 from https://www.federalregister.gov/articles/2015/10/16/2015-25595/medicare-and-medicaid-programs-electronic-health-record-incentive-program-stage-3-and-modifications.

[4] Centers for Medicare and Medicaid Services (2016). Electronic health records (EHR) incentive programs, 2016. Retrieved March 15, 2016 from https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/.

[5] Dixon, R. (2010). Enhancing primary care through online communication. *Health Affairs,* 29, (7), 1364-1369.

[6] eHealth Initiative (2011). Centering on the patient: How electronic health records enable care coordination. Retrieved October, 31, 2013 from http://chc1.com/Transformational/Pubs/eHEALTH_CenteringonthePatient-FINAL.pdf

[7] Emont, S. (2011). Measuring the impact of patient portals: What the literature tells us. California HealthCare Foundation, CA: Oakland.

[8] Eramo, L. (2011). Patient portals and meaningful use: Using portals to meet the patient access objectives. *Journal of AHIMA*, *82*(3), 42-43.

[9] Holden R. & Karsh, B.-T. (2010). The technology acceptance model: Its past and its future in health care. *Journal of Biomedical Informatics, 43*, 159-172.

[10] Kerns, J., Krist, A., Longo, D., Kuzel, A., & Woolf, S. (2013). How patients want to engage with their personal health record: a qualitative study. *British Medical Journal Open*, *3*(7).

[11] Krist, A., et al. (2014). Engaging primary care patients to use a patient-centered personal health record. *Annals of Family Medicine, 12*(5), 418–426.

[12] Moores, T. (2012). Towards an integrated model of IT acceptance in healthcare. *Decision Support Systems*, 53, (3), 507-516.

[13] Onwuegbuzie, A., & Leech, N. (2007). Sampling designs in qualitative research: Making the sampling process more public. *The Qualitative Report*, *12*(2), 238-254.

[14] Pai, F., & Huang, K., Applying the technology acceptance model to the introduction of healthcare information systems. *Technological Forecasting & Social Change*, *78*(4), 650-660, 2011.

[15] Stake, R., Qualitative research: Studying how things work. New York, NY: The Guilford Press, 2010.

[16] Willis, M., El-Gayar, O., & Bennett, D. (2008). Examining health care professionals' acceptance of EMR's using UTAUT. *Issues in Information Systems, IX*(2), 396-401.

[17] Yamin, C., Emani, S., Williams, D., Lipsitz, S., Karson, A., Wald, J., & Bates, D. (2011). The digital divide in adoption and use of a personal health record. *JAMA Internal Medicine*, *171*(6), 568-574.

[18] Yau, G., Williams, A., & Brown, J. (2011). Family physicians' perspectives on personal health records. *Canadian Family Physician, 57*(5), e178-e184.

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