Understanding Patient-Provider Communication Entered Via a Patient Portal System

Si Sun, Xiaomu Zhou
School of Communication and Information
Rutgers, The State University of New Jersey
4 Huntington St., New Brunswick, NJ 08901
sisun@eden.rutgers.edu, xmyzhou@rutgers.edu

Joshua C. Denny, Trent Rosenbloom, Hua Xu
Department of Biomedical Informatics
School of Medicine, Vanderbilt University
2209 Garland Avenue, Nashville 37205
josh.denny,trent.rosenbloom,hua.xu@vanderbilt.edu

ABSTRACT
Our study examines patient-provider communication via a patient portal in a large medical center. Our study is based on 1172 interactions made among stakeholders concerning 100 patients who are randomly selected from the 2009 MyHealthAtVanderbilt.com (a patient portal at the Vanderbilt Medical Center) patient pool; among which, 35 use the patient portal for messages. The findings show a wide range of topics discussed and ways in which patients provide and seek information as well as express psychosocial and emotional needs. In addition, while the patient portal has advantages over traditional communication technologies, it was not the primary communication media for our study sample. More research is needed to better elucidate barriers to the use of patient portals and the optimal methods of communication in differing contexts.

Keywords
Patient portal, patient-provider communication.

INTRODUCTION AND BACKGROUND
Patient portals enable patients to access their test results, pay bills, check schedules, and most importantly, facilitate patient-provider communication by contacting their providers (similar to emails) and share medical information online. Comparing to Electronic Health Records (EHR) system that are designed to be used exclusively by providers in healthcare organizations, patient portals offer valuable recorded data on interactions between patients and providers. MyHealthAtVanderbilt.com (MHAV) is such a patient portal system that is integrated into the EHR system of the Vanderbilt Medical Center. It is used in Vanderbilt Medical Center which had over 1.5 million patient visits by 2010 (VMCH, 2011). As one of the first health organizations that started to offer online patient portal as an option for communication between patients and their providers, MHAV had enrolled 99,434 patients by 2009. All interactions made via the portal have been systematically recorded.

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While patient portal has been in practice for a few years, studies have already shown rich findings. To illustrate, some studies indicate that patient portal indeed offers patients more convenient access to health information, reduce missed appointments, improve timeliness and quality of care, and can be used for chronic illness management (e.g. Car, 2004; Miller, 2010), and patients and physicians are willing to adopt the system and had satisfactory experiences (e.g. Bollins et al., 2011, Ye et al., 2010). However, little is known about how the patient-provider interactions are carried out and how the communication process and the quality of care are influenced by the health information technologies Furthermore, researchers have argued for the integration of a social perspective (reflected in the rich narratives provided by patients) into the design of medical information systems in order to possibly improve medical outcomes (Plotnick, 2010) and the importance of patients' psychosocial information in understanding patients (Zhou et al., 2010).

We are interested in understanding themes, patterns, and nuances in the communication between patients and providers via MHAV. Our primary goal for this study is to discover 1) how patients use the patient portal, 2) what themes are discussed, and 3) how the patient portal may improve patient-provider communication.

METHODS
We drew a random sample of 100 patients in the MHAV 2009 database and examined all the portal messages exchanged in 2009 concerning these patients. Because one patient may interact with providers across multiple care episodes, the 100 patients contributed 1172 interactions in total. One interaction includes all the messages created during a complete conversation on the same subject matter. It may include several messages between two or multiple users or only one message (e.g. a simple notification etc.) Note that there can be multiple stakeholders involved in one interaction (e.g. the patient, patient's family, physicians, and nurses all involved in one interaction to discuss a problematic medication prescription). It is therefore evident that the interactions we are looking into are rich and complex, which necessitates the adoption of qualitative analysis.

We used grounded theory approach (Charmaz, 2006) and looked for recurring themes in the content of the messages,

coded all the interactions and went over them a second time for verification. Data was coded along three dimensions, including 1) Stakeholders – who participated or were mentioned in the interactions? 2). Communication medium – how was information distributed? 3) Content – what were the conversations about? We focused on understanding what has been communicated over the portal system and how this communication has contributed to the routine patient care.

RESULTS

Patient Portal Usage

Although MHAV provides a number of functions such as viewing test results, only patients' communication with their doctor's office has been captured in the dataset. The MHAV training materials show that when patients need to get in touch with their providers, they can contact secretaries who then forward the messages to nurses, physicians, or other ancillary staff if necessary. Nurses or other staff members often contact physicians as needed. When physicians need to contact patients, they send messages via the EMR (connected with the patient portal) to the nurses or ancillary staff who forwards the message via MHAV to patients.

Among the 100 patients we analyzed, 35 contacted with or were contacted by their providers via the patient portal at least once. Interactions about the other 65 patients recorded in the portal system were contributed solely by providers. 818 interactions were related to the 35 patients comparing to 354 interactions of the 65 patients who did not contact their providers via patient portal.

Among the 818 interactions concerning the 35 patients of our primary interest, only 409 directly involved the patients (patient as a sender or a receiver) in the interaction. That is, within a total of 1172 interactions that we examined, 763 (i.e. 354 plus 409) interactions either involved patients indirectly or did not involve patients at all. In the former situation, patients communicated with the providers via other media such as telephone, fax, and face-to-face; in the latter, the providers coordinated their care about the patients over the portal as a method of inter-office communication. Although our study emphasizes the 409 interactions that directly involved patients, we also provide some insights about the other 763 interactions.

Patients who used the patient portal to communicate with their providers might also use other media. Patients might start using the patient portal at any time. There were also some patients who switched back and forth between multiple media. This could cause problems in the communication process (i.e. information gap) as we will discuss later in more details.

Themes in Patient-Provider Interactions

There were 409 interactions that directly involved patients. We observed 11 themes among these 409 interactions. One interaction could include more than one theme. Table 1 lists these themes and their examples. It should be noted that "Administrative issues" in this context refer to issues such as admission, transferring, and discharge. "Information" means messages requested or delivered that are not directly related to medicine and are not administrative issues.

Themes	N	%	Examples from the portal messages directly involving patients
Medication	231	37.4	*Please fax a prescription over to my pharmacy. I would like to stay with the Brand name of X.*
Appointments	83	13.5	*Please set me up with a Dermatologist at the clinic, anytime after the 15th is fine.*
Lab test	81	13.1	*I looked over my lab report. How is it, is everything okay? Some of it I don't understand.*
Emotional needs	54	8.8	*I struggle...trying to keep weight on, it's so hard when you can't swallow well.*
Status	47	7.6	*I have trouble getting to sleep and staying asleep.*
Information	36	5.8	*What was the name of the physician that you recommended?*
Advises	28	4.5	*When do you want me to get a flu injection?*
Symptoms	25	4.1	*For the past week I have been experiencing coughing…*
Administrative issue	18	2.9	*Please authorize full access for me on this site.*
Insurance	10	1.6	*I am switching to a new insurance company for next year…*
Treatment	4	0.7	*I think I would like to get back on the treatment if you think that is okay.*

Table 1 Themes initiated by patients through patient portal (409 among 1172 interactions involved patients via portal)

What do Patients do with the Patient Portal?

Patients Providing Information

Patients used the portal system to initiate a conversation or be requested by clinicians to provide information. Most of the active contacts where patients kept their providers updated on their latest symptoms, status, and use of medications or medical equipments were followed by information seeking. For example, one patient mentioned in her message:

> "I have a sore throat, the chills and fatigue … Please let me know what you think." [1]

Sometimes patients' updates were accompanied by alleviated ailments and followed by further information seeking:

> "I am emailing to let you know that … I have been doing very good … do I still need to come in on the 23rd?

After reading this message, the provider decided that the upcoming appointment was no longer necessary and cancelled it. In both examples, the information provided by the patient elicited actions from the providers.

Note that patients often liked to share information such as recent social activities, working conditions, and salary and family issues that were not directly related to medical conditions. This type of information provided a larger context for understanding a patient's illness. Consider this message:

[1] All the date and names of people, organizations, medicine, web pages, phone numbers, and very specific text words quoted were replaced by synthetic identifiers.

> "…I had a lot of work going on, with some family situations … The ringing in my ears just will not go away. Is there anything that I can do?"

The physician offered a face-to-face re-evaluation and emphasized that "control of anxiety, stress and fatigue are very important for controlling the ringing". In this case, the information provided by the patient was useful for the physician to understand the patient's illness situation better in its social context and therefore able to provide targeted treatment.

Patients Seeking Information

Some patients and their family caregivers conducted research on their own. Their active participation could play an important role in helping providers make medical decisions. Consider this example from a message written by a patient:

> "…the problem I'm having is probably a side effect from the medication … I did some research on the Internet and came up with this…"

The patient listed the result of her research and the provider asked the patient to stop the medication because it was indeed possible that the symptoms were side effects. One week later, the patient contacted the provider again, stating that she was advised by another physician to take a different medication, which, according to her online search results, had terrible side effects. The physician responded to this second (patient) message with approval for the patient's decision of not taking the new medication, and further pointed out that the physician who prescribed the new medication was a specialist on a different health problem thus might not have the expertise on the patient's illness. In this case, the patient's initial message helped her elicit more information.

Patients Expressing Psychosocial and Emotional Needs

About ten percent of the interactions in which patients expressed emotions were accompanied by symptoms and status update. One patient mentioned in a message to her physician:

> "I'm at work today and feeling nausea … I've lost 5 or more pounds within the last 2 weeks. I struggle... it's so hard when you have stomach issues."

The providers expressed their emotional support for this patient, such as the portal message below from a nurse:

> "It was great to see you yesterday! … You are in great hands with Dr. Smith…"

Interestingly enough, this nurse even forwarded the patient's response to other related providers, adding a cheerful comment "FYI … She is a lovely person."

Patients were also eager to share their happiness when their ailments alleviated. The following example illustrates this:

> "Wow - who knew a small patch could numb the pain I'd had for weeks so quickly and effectively? … I actually enjoyed sleeping!"

The later portal messages showed that the patient and her provider established a close friendship, sharing news about vacation and even food. In both examples, the patients seemed to be building social capital with the providers over the patient portal. The trajectory of multiple messages in the portal system provided a sense of "being there" for both patients and providers who showed mutual understanding and appreciation.

In addition, slangs, humors, and emoticons were used fairly commonly by patients and providers in this type of messages, which convey a vivid picture about the patients' situation. This also manifested the richness of the original messages that patients wrote, as a comparison to the transcribed information by a third party.

Patients' Interaction with Providers via Other Medium

When patients initiated interactions through media (e.g. phone, email, fax, etc.), other than patient portal, their messages were passed from secretaries to nurses and finally to physicians via the patient portal. About 20% of the 1172 interactions were initiated by patients via other media. In this case, it was usually secretaries or nurses who took notes and typed the notes into the portal system. The following example illustrates this process.

> "**Secretary**: Dr Smith, pt … calling … regarding … swelling in her legs … and would like to know if Dr Smith would like for the patient to be discharged …
> **Nurse**: please advise if patient is to continue to visit or should be discharged…
> **Physician**: DC [discontinue] for now, if swelling returns then will start HH [a medicine] again.
> **Nurse**: called patient lm for call back"

It is evident in the example that the information recorded was reinterpreted by a third party and it was unclear from the reinterpreted message whether there were other nuances and richer context provided by the patient at the first place.

As described in the previous three sections, when patients initiated a message in the portal system, the message written by the patient was preserved as authentic and complete. Nurses might add a heading and a comment to the original message but would not change the content. However, when the message was reinterpreted (based on a patient's phone call) by a secretary or a nurse and then recorded in the portal system, it might result in information incompleteness and inconsistency. We discovered several instances where the secretary sent follow-up messages to make up for the missing information in the previous messages because they left out important information in the first place.

Unattended Portal Messages

Some messages sent by the providers via the patient portal were not attended by the patients timely. Usually the unattended messages were reminders of a prescription or refill. It is the policy that if a portal message sent by providers is not opened in 120 hours, the system sends an automatic alert to the sender. Solutions to the unread messages included 1) sending additional messages via the portal over and over, 2) calling the patient over the phone,

and 3) sending paper mails to the patients. Still, we observed a few unattended portal messages that did not have any follow-up solutions, and a few of such messages were on important topics such as appointments and requests for status update. Missing these messages could cause problems such as waste of resources and delay in patient treatment. We do not know whether the problems were indeed solved but were not recorded in the portal system, or the issues were just left unattended.

DISCUSSION

Communication Efficiency and Accuracy

A majority of the patient-provider interactions recorded by the patient portal were initiated via the telephone or the portal. Patients' phone calls recorded by the patient portal were notes taken down and synthesized by mediators. They were not as authentic as portal messages. Many details and nuances might be lost after reinterpretation, particularly when involving patients' complicated psychosocial and emotional status. Moreover, the transcribed messages might be interpreted differently by the transcriber (secretary) and the readers (nurses and physicians).

As our examples have shown, detailed information from patients can be used to make medical decisions and may also inspire physicians to notice hidden problems. Technologies that enable the documentation of such detailed information can help with medical diagnosis concerning complex chronic diseases (Chen, 2011; Veinot et al., 2010). Noting patients' emotional status and needs are important components of health outcomes and can be influenced by patient-provider communication (Stewart, 1995; Zhou et al., 2009, 2010). Furthermore, our examples illustrate the cases in which patients and providers establish social bonds during the interactions facilitated by the patient portal system. As well, accumulated messages in the portal system about the same patient can provide rich trajectory information that help providers and the patient better understand her illness management from a long-term perspective (Strauss et al., 1997)

Indeed, using patient portals for patient-provider communication can be beneficial for both patients and providers comparing to phone calls. However, phone calls are still used more often as noted in this study. This may be a result of lower accessibility to and uneasiness with computers and the Internet, fears of security issues, or lack of understandings of the patient portal's capabilities. Previous researches on email messages in facilitating patient-physician communications also revealed similar results (Andreassen, 2006; Car et al., 2004).

Multiple Media Use and Information Gap

Our findings suggest that in situations where one interaction involves several media, it is common that an information gap is created among participating providers. The manifestation of this problem is the unattended patient portal messages which are usually already sent to patients via other media and responded by patients, but no records are kept in the portal, which ultimately cause concerns for uninformed providers. The problem of information gap is two-fold. First, information fragmentation puts additional workload on providers. To synchronize the patient portal with other media, providers have to constantly update it. Second, when providers constantly check with patients to make sure that they read the portal message, patients may choose to avoid using the patient portal because of the constant interruptions.

FUTURE STUDIES

We will continue examining the issues identified in this study in more details and modeling the information flow between different stakeholders on a larger patient population. This will also enable us to gain a quantitative perspective of the patient-provider communication. The findings from our study, i.e. a better understanding of information practices from both patients' and providers' perspective, will lead to a better designed portal system to help achieve a better healthcare delivery.

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