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Capturing the Patients' Voices: Planning for Patient-Centered Electronic Health Record Use

Onur Asan, PhD^a, Jeanne Tyszka, MA^a, and Kathlyn E. Fletcher, MD, MA^{a,b}

^aCenter for Patient Care and Outcomes Research, Division of General Internal Medicine, Department of Medicine, Medical College of Wisconsin, 8701 Watertown Plank Road, Milwaukee, WI 53226

^bClement J. Zablocki VA Medical Center, 5000 West National Avenue, Milwaukee, WI 83295

Abstract

Objectives—To understand 1) the perceptions of patients regarding use of EHR during clinic visits, 2) the impact of the presence of EHR on patient interactions with physicians, and 3) the ways in which EHR usage might increase patient engagement.

Methods—We conducted semi-structured interviews of a convenience sample of patients of internal medicine resident doctors from three primary care clinics. Interviews were audio-recorded and transcribed verbatim. We used thematic analysis to identify themes from the transcripts. Informed consent was obtained from each participant.

Results—We interviewed 32 patients; 37.5% male. Our analysis revealed three primary themes: (1) the views and beliefs of patients on the use of EHR in clinics, (2) patients' perception of the communication skills of residents, and (3) patients' perceptions about information sharing, patient engagement, and health education related to the EHR. An invitation to patients to view the screen as the physician interprets its content increases patient satisfaction and understanding. Residents' possessed skills in communication is not impeded when using EHR.

Conclusion—Patients generally express a positive or neutral perception of EHR use during clinic visits. Using information voiced by patients, we can teach health providers EHR strategies that are likely to engage patients in the visit and engender their trust.

Keywords

Doctor-patient relationships; Electronic health records; Health communication; Patient education; Patient engagement

Corresponding author: Onur Asan, PhD, PCOR- Medical College of Wisconsin, 8701 Watertown Plank Road, Milwaukee, WI 53226, 414-955-8815, oasan@mcw.edu.

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1. Introduction

Electronic health records (EHR) have become the third party in primary care examination rooms over the last decade.^{1,2} The adoption of EHR has increased rapidly due to the American Recovery and Reinvestment Act of 2009 (HITECH), which provided an incentive program that offered payments to health care professionals who adopt and use EHR in a meaningful way.^{3,4} The promised benefits of EHR have been reported as improvements in quality, safety, decision making, information exchange and efficiency.^{5,6} Despite the increased use of computers and potential positive effects, downsides have also been reported.⁷⁻⁹ Specifically, the presence of computers in the examination room and documenting in the EHR during the visit can have adverse effects on physician-patient communication, developing rapport with patients, and psychological and emotional talk which are considered essential elements of patient-centered communication.^{7,10-12}

Patient-physician communication is the backbone of the primary care visit, since it influences patient satisfaction, adherence to treatment, clinical outcomes, and patient trust.¹³⁻¹⁶ There have been early studies focusing on the impact of computers in examination room¹⁷, video observation studies exploring impact of computers on doctor-patient interactions¹⁸, and quantitative studies examining satisfaction and perception of patients on exam room computers.^{19,20} With the increased use and capabilities of EHRs and attention on patient centered care, the role of EHRs on patient centered care and patient engagement have become more notable.²¹ Recent studies have increasingly focused on how EHR should be used and designed in more patient-centered ways.²² Some of the studies have reported that EHR should be used as a communication and patient education tool (i.e. through screen sharing).^{7,17} Screen sharing is reported as a way to involve patients and improve real time doctor-patient communication.^{7,10,23}

Several studies reported physicians' perceptions' of patient centered EHR use^{22,24}, and some other opinion papers showed the importance of screen sharing for patient centered-EHR use.⁷ However, we also need more comprehensive input from the patient for the current EHRs including its impact on patient engagement, their perception of providers' EHR use, as well as their perception on patient centered EHR use during the visit. Thus, more developmental research is needed on the potential for new information technologies to improve patient/family engagement. The purpose of this study is to understand patients' perceptions of providers' EHR use, the impact of the presence of EHR on their interactions with the doctor in the visit, as well as patient's suggestions for EHR use and design to improve their own engagement in the visit. The results of the study may help inform the design of the future EHR and also support training of more patient-centered EHR use.

2. Methods

2.1. Research Settings

To identify patients' perceptions of residents' EHR-based communication skills in primary care exam rooms, we conducted semi-structured interviews with the patients seen by internal medicine residents in primary care clinics. The study was conducted at three Medical

College of Wisconsin primary care clinics located in Milwaukee, WI. The same EHR system was used in all three clinics.

2.2. Data Collection

We recruited patients of 17 residents from three different clinics. These residents volunteered to have their patients be invited to join the study. We focused on resident physicians because we wanted to understand their emerging comfort and early experience with using the EHR as a communication/education tool, rather than focusing on physicians with established EHR-related practices. We recruited a convenience sample of patients. We invited patients to participate if they met the following criteria: They had to be 1) a patient of a resident who volunteered to participate, 2) age 18 or over, 3) able to read and understand English, and 4) able to take part in a 30 minute interview after their appointment. Patients who did not meet these criteria, or were unable to give informed consent were excluded. The Medical College of Wisconsin Institutional Review Board approved this study, with funding from the Clinical & Translational Science Institute of Southeast Wisconsin and the Medical College Physicians group.

This qualitative study was conducted using a semi-structured interview approach. This approach provided flexibility and allowed interviewer and participant to have open-ended dialogue to identify and explain important information. We developed an interview guide, which had 9 questions with probes. Questions centered on the patient's perceptions of the use of EHR in the examination room, the communication skills of the doctor, the impact of the EHR on patient engagement and education, and patients' suggestions for design improvements. The questions were initially based on the study team's research, team's review of literature and clinical experience. During the development of the interview guide, we held three pilot interviews to test the understandability and usefulness of the questions, and the interview guide was adapted based on those results. We also used an iterative approach to data collection, and we used that opportunity to adapt the interview guide to explore unexpected themes in subsequent interviews. The team reviewed transcripts of the first two interviews, after which the interview guide was further revised to elicit more detailed responses from subjects.

Over five months, we recruited patients on the days that participating residents had continuity clinic. The team arrived in the waiting room 30 minutes before appointments began and remained until all patients had arrived. The receptionist read a script to each patient who registered to see a participating resident, informing them of the study and directing them to the team for further questions. Patients who expressed interest were screened by the team to ensure eligibility. We provided the patients with a \$20 gift card for participating.

After completion of the clinic appointment, the RA met with the participant in a private room, explained the details of the study, and obtained written informed consent. The interviews were audio-recorded with the permission of the participants and transcribed verbatim. After concluding the interview, participants completed a short demographic survey.

2.3. Data Analysis

We used an inductive thematic approach to analyze the data.²⁰ Transcripts were uploaded into NVivo 10 and coded by using this qualitative analysis software. The steps followed to analyze the data were as follows. First, we identified “sentence” as the unit of analysis/meaning, which identifies the level of the detail in the analysis.²¹ Second, each transcript was reviewed several times to make sense of the data. Third, the entire team reviewed the initial 4 interviews for emergent codes and developed memos and preliminary interpretations. The team refined preliminary interpretations throughout this process and added new themes when necessary. Fourth, following this initial review process, we developed our code book with the definitions of each code. Fifth, systematic inductive coding was applied to the rest of the transcripts using the codebook. During team meetings, we reviewed the codes and text assigned to them and began with the process of identifying major categories. We also combined similar codes under categories/groups. Finally, the team summarized each utterance within each code for its condensed meaning. We discussed these condensed meaning units, came to consensus on discrepancies, and examined the range of opinions within each code. We then finalized our major categories and the codes under each. We discussed each new emerging condensed meaning units and added those codes until we achieved saturation. We conducted 32 interviews. Similar qualitative studies using semi-structured interviews reached saturation with 15-20 interviews.^{22, 23}

2.4. Ensuring quality in the data

We followed several criteria to ensure rigor and quality as well as trustworthiness of the qualitative research. We ensured credibility with analyst triangulation (multiple researchers engaged in data analysis), the team members reading the transcripts, creating condensed meaning units, presenting the study in local research progress meetings, and presenting direct quotes in the results to provide evidence for analytical categories. We ensured dependability (reliability) with having a written interview guide, keeping a research diary to write down the steps of data analysis, creating a coding book for the analysis with all team members, auditing study instruments and data collection process, external auditing (presenting the method and result in an external meeting). Finally, we ensured conformability (objectivity), testing the interview guide with patients to make sure they have a common understanding with the researcher, meeting and discussing all interpretation of the data with skeptical view, triangulation, and involving researchers from various domains such as informatics and clinical practice.

3. Results

3.1. Demographics and Baseline Data

Thirty-two out of 56 patients approached (57%) have agreed to participate. Table 1 provides participants' gender, age range, comfort with computers, and duration of treatment with the provider. Interviews lasted a mean of 22 minutes (range 10 – 36).

3.2. Interview Data Themes

Analysis of the interviews yielded three primary themes: (1) patient perception of, and beliefs about, EHR, (2) patient perception of resident communication skills and the impact of EHR on communication, and (3) patient views on information sharing and health education via EHR. Each theme has several subthemes (described below) with sample quotations.

Patient (mis)beliefs and perceptions of the EHR—The majority of patients stated that the presence of a computer in the room is acceptable; some think it is a necessity and benefits the doctors. Specifically, patients think that having the EHR in the room facilitates the doctor's ability to order labs and prescriptions, although a few patients did not know that the EHR had that function. One patient described this benefit as

“Well, it's, yeah, it's helpful to me because, like if they have a prescription, it goes right to the – right to the pharmacy and then that way I don't have to call them up.” Another patient stated “When he sent me out for labs and everything, once I come back from my follow-up, he'll let me know everything and it's right there on the computer.”

Furthermore, the majority of patients think that EHR are a useful tool for several reasons: 1) to record patient history, 2) to give doctors ready access to the patient's data, 3) to help both the doctors and the patient remember the patient's history and past data, and 4) to see how the patient's health is progressing. One patient emphasized this:

“... sometime patient forgot what has passed with them or whatever...they have – ask question about past service or past tests, they don't remember. The dates, the time or whatever. And, when you turn to the computer, you get everything for so many years back since the computer start. It's easy for patients and the doctor to see everything that has been going on with you.” Another patient also described her perception:

“I think that they have access to more things. You know, it used to be that they'd go out, they'd come back, you're waiting for them to come back. Here they're just right there and they pull up your record, it's right there, they're not paging through a big fat notebook. Yeah, he's just got such – so much better access.”

Patients also think that the EHR is helpful to share their data between hospitals or between doctors:

“It's very convenient that I know what she put in her notes 'cause I got scleroderma and I go see a rheumatologist and that's good that they can communicate with the computers and all like that.”

On the other hand, patients reported some negative perceptions of EHR. One such perception was related to the doctor paying more attention to the computer than to the patient:

“Well, I think it's a good thing, but it also can be a bad thing, because a lot of people can feel offensive about it, that they're not actually paying attention to the

patient, they're more focused on what they're typing into the computer versus what they're actually supposed to be doing.”

Other patients reported the experiences of computer glitches. A few patients expressed belief that the EHR is for doctors, not patients, and some patients felt frustrated when the same information was asked by different staff (nurse, receptionist, MD, etc.). Some patients offered suggestions for improving the experience of having the EHR in the examination room such as having EHR screens with user friendly language and inviting patients to view the screen.

Patient perceptions of residents' communication skills and the impact of the EHR on communication—Patient views fell into three main themes with respect to how the EHR impacts doctor-patient communication: 1) the computer had no impact on communication, 2) the computer facilitates communication, and 3) the computer impacted nonverbal communication and attention. The first theme was that patients thought that the EHR did not have an impact on communication and did not interfere with communication:

“It doesn't change communication with me and my doctors...we communicate at, talk about everything and whatever need to be entered into the computer, and he enters it.” Another patient said, “It didn't – it – I thought his interaction was perfect with the computer and without the computer, so I guess it didn't really have any impact on it, it didn't change anything.”

The second theme was that the patients who thought the EHR (computer) facilitated, enhanced or helped doctor-patient communication. As one patient expressed,

“I think it helped her a lot. Because... the computer had the information that we were both seeking. And, it sort of facilitated the interaction.”

A repeated point was the positive effect of having information easily accessible as this patient reported,

“When I have questions, he's able to pull up the answers and get them to me...like today, he told me that I had something that I didn't even know I'd had, because we were talking about something else, and.....it came up on the computer as something that I needed to know.”

Patients also consider that the doctor being able to access their history during the visit improves the communication:

“It helped though. 'Cause they knew where I went, where I been, what type of diagnose for the other doctor's opinion. They knew that I went to see another doctor, they know what type of medicine I have.”

Some patients noted the relationship (positive and negative) between computer use and their doctors' nonverbal communication. Positive impact included times when 1) the doctor engages the patient fully with eye contact when she is talking to patient, 2) during the conversation the doctor turned away from computer to focus on patient, and 3) the doctor's actions, motions and eye contact showed that the doctor was listening. This perception seemed to be related to the doctor's communication skills. If the patient believes that their

doctor's communication skills are great, they also think their doctor's computer use is fine regardless of the computer use style.

Some patients also reported a negative impact of the computer on interactions. Examples included 1) when the doctors focus more on the computer than on them, 2) when the doctor's eye gaze and focus shifted from the patient to the computer or if they had inconsistent eye contact, and 3) when the doctors spent more time looking at the computer than listening to the patients. As one patient said,

“It's like they push the patient aside and there's – they look at the computer as a patient because they see all the information on there...It's like the patient don't even exist. Because they see all that information, they think, oh, that's all I need to know about them, they don't even wanna hear from the patient.”

Some patients felt that the doctors spent a disproportionate amount of typing/documenting information:

“I don't know what she's typing, but she just types and types and types and types. And, I felt – we feel actually, kinda disconnected from her in that sense and she, and I – and I feel like I don't want to talk to her or distract ...her from what she is typing, because I have no idea what it is.”

Patient views on information sharing, patient engagement and health

education via EHR—This section includes themes regarding patients' perceptions of patient engagement and their own education, especially with respect to the role of screen-sharing. Patient perception of engagement in the visit came up several times. Some patients reported that they felt engaged with their doctors and the main focus of the visit whether or not the doctor used the EHR. Instead, they emphasized the importance of the doctor's verbal and nonverbal communication skills:

“He was very engaged. It seemed seamless to me that he was interacting with the computer. It was almost, incidental, – the focus was absolutely on me and his attention was on me and – and, he would just look at the computer and he would, just briefly, and, come right back to me then, he seemed very comfortable with it and, it didn't make me feel like I was being neglected at all.”

We identified two types of screen sharing behavior from the patients' viewpoint: being actively invited by the doctor to see the screen and share information from the screen versus “side seeing.” This occurred when they were not necessarily invited by doctors to share the screen, but they could still see the screen from the side and could see what the doctor was typing or doing:

“I, on my own, look at the computer screen. Even if I'm not invited. Because it's my information.”

The type of information that was actively shared with patients via screen sharing included labs, vitals, weights, EKGs, X-Rays, trends, medications, after-visit summaries/instructions, decision aid tools and plans for upcoming surgery.

Patients reported 21 perceived advantages of screen sharing (Table 2). Most of the patients felt more engaged and involved when the screen was shared. One patient stated:

“I felt involved. And I felt that it was very good of him to show me where it's going to, you know, on the actual thing, computer, I know the number's in there.”

They also felt like part of the team:

“...here at [this clinic], I always felt like I was part of it. Because they let – they show me and they let me see. And if I ask, they 'll show me on the computer.”

Some patients reported that screen sharing was a reminder for them:

“Well, it make you feel good and free to – to know what is going on with you. Because sometimes you don't remember the name of your medication, sometimes you don't remember what it was for but if you're in doubt, the computer, when they put it on, it shows everything without you talking or telling them.”

Others reported that they understand better with the visuals provided by screen sharing:

“I don't like to read, so...her showing it to me and explaining to me what – what it was, I understand it better.”

One of the most common upsides to screen sharing was that it creates a more collaborative environment, as this patient stated:

“I think when I'm able to look at the screen and they – they can pinpoint the information, it's, it clarifies things. I mean, I can look at it and just go, oh, that's where that – you know, that's where the pinch is or that's where the, you know, collapse is, and it might or might not be...but if it is, then I can say, yeah I saw that too, in – in there, so it's not the runs, just like shaking my head going, okay, you're the doctor, I'm the patient. You know, it feels much more collaborative.”

There were also several perceived downsides/disadvantages of screen sharing including unfamiliar names of medications, not understanding the displayed information unless interpreted, and not understanding medical jargon (less patient friendly). Some patients also felt that their doctors were frustrated when they asked questions prompted from the screen.

Some patients reported their desire to have the screen shared with them when it did not occur in the visit. The downsides of the doctor not sharing the screen included the following: 1) feeling that the information belongs to doctors, 2) too little attention on the patient and more focus on EHR, 3) feeling that the doctor was being secretive, 4) feeling frustrated when a non-screen-sharing doctor interacted with the EHR more than the patient, and 5) the patient feeling like a spy. As one patient explained,

“I was a spy, I was spying on my own record, and that's how I felt. And that's why I never asked or anything, they never turned the screen, they always sat there...”

Patients described how EHR/screen sharing could be better used for education. Many patients found the doctors' use of the computer to teach them useful and informative, although some felt that a verbal explanation alone was adequate. Some patients reported that reviewing the “after-visit summary” with the doctors on the screen or seeing their trends

helped them better understand their condition and the next steps in managing their health. One of the main suggestions for how to educate via screen sharing was that the doctors must interpret what is on the screen. As one patient noted,

“Screen sharing is useful as long as he explains it to me.”

Another patient stated,

“Actually looking at the screen is not useful for me. Because I don't know how to interpret those numbers or those figures or those comments...What was more important to me, was that he had access to it and he knew what the screen was and what the numbers meant so that we could have a personal communication about my health and my particular situation.”

4. Discussion

In this study, we elicited the opinions of patients with respect to EHR use during their primary care visits. In general, patients had positive or neutral feelings about residents using the EHR during the visit. Patients were able to describe many advantages to having the EHR available during the visit, and only a few disadvantages. Many patients expressed a desire to see the screen, and some noted that not being invited to see the screen resulted in negative feelings. Patients did not think that EHR use during their visit interfered with their ability to communicate with their doctors.

The literature contains many examples of how doctor-computer interactions can negatively impact doctor-patient interactions.^{12,25,26} Some of our patients noted downsides of the EHR, especially around feeling that the doctors did not pay as much attention to them because they were focused on the computer. Previous work found that 20% of patients seen by housestaff perceived that the visit was less personal because of the computer.²⁷ Interestingly, only 5% of patients seen by faculty reported feeling this way.²⁷ Recently, papers suggesting strategies for combatting these negative effects have published,^{22,10} but they are usually based on physician ideas of how to accomplish patient-centeredness. We have introduced the patient's voice into that discussion. For example, in addition to feeling that the computer took attention away from them, our patients also described wondering what the doctors were typing and not wanting to disturb them while they were typing. By asking the patients, we have identified a screen-sharing opportunity to make patients feel more connected with what documentation is actually taking place. Another common source of the problem is the current design and usability of the EHRs, which was designed for billing and documentation purposes rather than as a communication tool.^{28,29}

In our sample, most patients had positive feelings about the doctors' use of EHRs. The patients in our sample perceived an efficiency advantage to having the EHR available to the doctors during their visit, specifically noting the ability to share information about visits to other hospitals and other doctors. Physicians also see this as a benefit of screen sharing.²³ With more and more medical centers and doctors' offices incorporating EHR, it is helpful to know that patients value the ability of these systems to share information between each other, and ultimately between their own primary care doctors and themselves. This functionality exists in some locations (i.e. “Care Everywhere”), but is not universal. As

EHRs are developed, this patient-reported advantage should be kept in mind. However, we must also be mindful of the question “Who does this data belong to?” Some of our patients asked that question, and the dilemma of controlling electronic patient data has been eloquently described.²⁶ Patients in our study appeared to see the advantages to having their data available for their doctor at the point of care, but also wanted to see it for themselves.

According to the patients in our study, screen-sharing appears to have many advantages, provided that patients are invited to look at the screen and that the doctors provide an explanation of what is being shown, which when not present were the main disadvantages identified by patients. Physicians also believe that screen-sharing can be beneficial.²² One study videotaped primary care visits, and demonstrated that almost half of the visits included the physician actively sharing the computer screen with patients.³⁰ In our study, patients reported that screen sharing resulted in increased trust in their doctors, and that not sharing the screen made some suspicious. Trust in physicians is linked to better adherence^{31,32} and patient activation³⁰ in primary care settings. If screen sharing can promote these qualities, it seems wise to incorporate it into patient encounters more regularly. Patients also reported feeling more engaged in their care when their doctors shared the screen with them, consistent with physician perception about screen-sharing.²² Using the EHR to facilitate patient engagement has been recommended by others,⁷ and our data corroborates that recommendation. Patient engagement in their own health is a central tenet of the Chronic Care Model because it is thought to result in better health outcomes,³¹ providing even more impetus for screen-sharing during visits. EHR design that facilitates screen-sharing should be prioritized. Some ideas include using screens that can be swiveled for shared viewing and room layout that allows for sitting side-by-side.

The patients in our study all had residents as their primary care physicians. Even though patients were generally satisfied with the doctor-patient communication and the impact of the EHR on this communication, there are still opportunities for teaching these trainees more patient-centered EHR skills. Some patients specifically described improved learning with visual input, so educating doctors how to harness graphical features in the EHR for education is one strategy. In addition, our patients described wanting to see the screen but needing to have the physicians interpret what they were seeing. This is another skill that can be taught. Duke et al. described principles for teaching trainees how to use the EHR in patient encounters, including ideas for screen sharing such as risk-calculators, patient hand-outs and follow up plans.¹⁰ Our patients corroborated many of these ideas and expanded on them.

In addition to teaching physicians how to make use of current functionalities, EHR programs could be designed to include patient-centric features. One would be displays with font large enough for older patients to read it easily. Another feature could be graphic functions with displays that are clearly labeled with more understandable language for the lay public. This idea could even extend to radiology studies that could be labeled so that patients could more easily understand what they are seeing. If physicians could type an interpretation directly onto a graphic showing patient data trends and then print it out for the patient to take home, this would represent true patient-centered education.

4.1. Limitations

This study had limitations. First, it was conducted through a single residency program, which limits generalizability. However, we collected data from 3 different clinics and from the patients of 17 different physicians. Second, given the qualitative nature of this study, we cannot offer quantitative data on how many patients want to share the screen with their doctors or how strongly they feel about screen sharing. Finally, our convenience sample of volunteer patients may have led to the representation of more positive viewpoints than exist in the general population of patients. Those who chose to participate may have done so because they had something particular to say about EHR use during clinic visits, and patients with more negative feelings may have opted not to participate.

5. Conclusions

In summary, using rigorous qualitative methods, we have added patients' voices to the discussion of how the EHR could best be used to improve communication, education and engagement in primary care visits. Patients described many advantages and few disadvantages to EHR use during primary care visits. Patients feel that the EHR benefits both them and their physicians. Using information voiced by patients, we can teach trainees and practicing physicians alike EHR strategies that are likely to engage patients in the visit and engender their trust.

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Highlights

- Patients reported positive and negative perceptions of Electronic health record use.
- Physicians use style of EHR during the visit influences patient perception of EHRs.
- Improving design of EHRs in a more patient centered way requires obtaining patient perception.

Summary Table

What was already known

- Electronic health records systems have become third party in primary care examination rooms
- Studies reported positive and negative impact of EHRs on doctor-patient communication during the visit.
- We need more studies to understand patient perceptions of EHRs to improve the design and patient centered use.

What this study added to our knowledge

- We received patients' perceptions regarding the EHR use during the visit.
- Patients generally think EHR/computer has benefits for the visit, since the doctor can access all over their medical data with using the computer
- Patients think that doctors' communication skills are as important as how they use the computer in a patient centered way.
- EHRs can be used to educate patients and information sharing. Future design should address new functions which can be used to engage patients during the visit.

Table 1**Participant demographics**

	Male	Female	Transgender
Total	12	19	1
Age Range			
18 – 25	0	0	0
26 – 35	1	2	0
36 – 45	2	3	0
46 - 65	5	11	0
66+	4	3	1
Computer comfort			
Very comfortable	5	9	0
Comfortable	7	5	1
Varies	0	4	0
Uncomfortable	0	1	0
Very uncomfortable	0	0	0
Acquaintance with MD			
< 4 months	7	8	0
5 - 11 months	1	2	0
1 year	2	2	0
2 years	1	5	1
3 years	1	2	0

Table 2
Patients' perceived advantages of screen sharing

Patients feel they are learning
Patients feeling more involvement and engagement
Patients like being able to see own information
It demonstrates openness of MD (hiding nothing)
It feels like participating in own care
Screen sharing facilitates patient education
Patient feels comforted during screen sharing
Improves engagement in decision making
It gives patients confidence in choices during decision making process
Patients think it is more efficient than sharing with paper record
It prompts questions from patient to facilitate understanding
It improves trust in MD
Screen sharing helps patient remembering
Patient feels it is positive experience to see the screen
Patient found helpful to see the trends improving or worsening
Screen sharing creates more collaborative environment
Patient learns better about his condition when looking at visuals
Screen sharing via interpretation helps patient gain a complete understanding
Seeing screen reinforces verbal health education
It is good to see after visit summary while being typed to be on the same page
Patient likes seeing visuals on the screen such as X-rays