



Original research

Web-based patient portal access in an orthopedic adult reconstruction patient population

Nicholas L. Kolodychuk, MD ^a, Michael Wong, BA ^b, George Chimento, MD ^b, Tyler Adams, BS ^b, Mariella Gastanaduy, MPH ^c, Bradford S. Waddell, MD ^{d,*}

^a Department of Orthopedics, Cleveland Clinic, Akron, OH, USA

^b Department of Orthopedics, Ochsner Medical Center, Jefferson, LA, USA

^c Department of Behavioral and Community Health Sciences, Louisiana State University Health Sciences Center, New Orleans, LA, USA

^d Department of Orthopedics, Hospital for Special Surgery, New York, NY, USA

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ABSTRACT

Background: We surveyed patients in an adult reconstruction practice as to their use of the Web-based portal provided by our electronic health record, seeking to reveal patterns of use and helpfulness.

Methods: A total of 150 completed surveys were received. The survey queried demographics, the number of clinic visits, Internet access, portal activation, portal use frequency, and portal information questions and how patients answered them. Helpfulness was rated from 1 (not helpful) to 5 (very helpful). Statistical analysis included bivariate analysis and logistic regression, with odds ratio (OR) and 95% confidence interval (CI) reported.

Results: The mean age was 67.6 years. Most were females (n = 97, 65.1%). Most (68.7%) patients used the portal. Younger age (OR, 0.94; CI, 0.90–0.99) and access to Internet (OR, 31.8; CI, 8.5–119.4) predicted portal use ($P < .005$), whereas gender and number of clinic visits did not ($P > .373$). Of all, 47.5% of patients were unclear about online chart information. Older age indicated being unclear of portal information (68.5 vs 66, $P = .0002$). Of those who clarified doubts regarding information (n = 67), 23 used the Internet (34.3%), 32 (47.7%) called the physician, and 12 (17.9%) asked a friend and/or family member. Most (90.3%) patients felt the portal was helpful in gathering health information.

Conclusions: Age and Internet access affected portal usage; ability to understand chart information decreased with age. Most patients used the Internet or a family member to clarify doubts regarding portal information. The use of portal data resulted in 32 extra communications to the physician.

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Introduction

The use of electronic health records (EHRs) has rapidly expanded in the United States in recent years due to government incentives and penalties [1–6]. As of 2015, 75% of US hospitals had adopted at least a basic EHR system. At that time, however, only

40% met stage-2 meaningful-use criteria, which emphasizes online communication between health-care providers and patients via secure messaging [1]. As EHRs become the standard, hospitals are increasingly offering patients access to their medical information through patient portals, which patients are beginning to expect from their health-care provider. The type of information accessible to patients and the timing of patient access to information can vary considerably between institutions. Patient use of these portals is not mandatory; therefore, many factors may influence patient participation in online patient portals.

Providing patients direct access to their health information can improve their understanding of their health, encourages health literacy, and increases active participation in their care [7–11]. Conversely, patient access to radiology, laboratory, and pathology results marked abnormal can increase patient anxiety and

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* Corresponding author. Department of Orthopedics, Hospital for Special Surgery, 1 Blachley Road, Stamford, CT 06902, USA. Tel.: +1 203 705 0715.

E-mail address: brad.waddell1@gmail.com

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uncertainty when the implications of the results are not contained in the online chart [9,12]. However, inclusion of a brief interpretation of the results can help to alleviate patient anxiety [13,14]. It is important for physicians to understand the use of patient portals and the factors that influence usage in their patient population as it can affect the care they provide. Some factors known to influence participation in online patient portals are age, race, gender, socioeconomic status, and number of medical conditions [15–20]. There may be differences in the factors influencing patients in different specialty clinics; therefore, we aimed to examine online patient portal usage in an orthopedic clinic.

In this study, we surveyed patients in an orthopedic surgery adult reconstruction practice on their usage of the online patient portal (“Portal”) (Epic Corporation, Madison, WI). Our survey collected demographic data from patients and asked several questions regarding their use of the online patient portal.

Furthermore, we assessed helpfulness of the Portal in this patient population. We hypothesized that there would be differences in patient usage of the online patient portal based on age, gender, and Internet connection.

Material and methods

All patients seen over a 6-month period were mailed a survey (Fig. 1) created by our research team. In all, 900 patients were mailed a survey, no reminders or follow-up contact was made regarding the survey. Those patients seen during the study period were included. Exclusion criteria were non-English speakers, those aged less than 18 years, and those unable to comprehend the survey. Furthermore, all incomplete surveys were eliminated. Twenty surveys could not be delivered as the patient had changed addresses, and 24 surveys were removed for being incomplete.

EMR Portal Survey

1. What is your age?
2. What is your sex?
 - Female
 - Male
 - Prefer not to say
3. What city do you live in?
4. How many times have you been to ***Blinded*** in the past 3 years?
 - 0-5
 - 6-10
 - >10 occasions
5. Do you have access to a computer with an internet connection at home?
 - Yes
 - No
6. Do you have a Portal account?
 - Yes
 - No
7. If “No” to question 6, why?
 - Note: If you answered No to question 6, you do not have to answer questions #8-14.
8. Do you use the Portal to gather health information?
 - Yes
 - No
9. If “No” to question 8, why?
10. If yes, how often?
 - Every day
 - A few times a week
 - Once a week
 - Less than once a week
 - Only after I have a doctor visit
 - Other:
11. Have you ever read information on your chart that you did not understand?
 - Yes
 - No
12. If you answered “Yes” to question 11, what was that information?

Check all that apply.

 - Diagnosis
 - Orthopedic physician note
 - Test ordered
 - Test result (example: lab work)
 - Medication
 - Radiology report
 - Other:
 - Any additional comments:
13. If you answered “yes”, how did you clarify the information?

Check all that apply

 - Internet Search
 - Contacted the physician
 - Talked to family or friend
 - Other:
14. Overall, how satisfied and helpful would you rate your experience with gathering health information on the

Figure 1. The survey that was mailed to the patient.

Table 1
Demographics.

| Demographics/category | Values |
|---------------------------------|--------------|
| Age years, average (range) | 67.6 (29–90) |
| Sex | |
| Male | 53 |
| Female | 97 |
| Internet connection (n, %) | 121 (80.7%) |
| Portal account activated (n, %) | 103 (68.7%) |

The survey queried their age, sex, zip code, number of visits to the clinic, presence of Internet connection, activation of the Portal, frequency of Portal use, and questions surrounding information they found on the Portal and how they answered those questions (ie, method of clarification). Comments were also collected surrounding the Portal. Overall helpfulness of the Portal was rated from 1 (not helpful at all) to 5 (very helpful). One hundred and seventy four patients responded to the survey in its entirety, with incomplete responses being eliminated, leaving 150 surveys included in the study.

Descriptive statistics were performed for the entire sample. Bivariate analysis based on Portal categories was conducted with independent Wilcoxon ranked sum tests comparing medians of continuous variables (ie, age) and Pearson's Chi-square test or Fisher's exact test comparing proportions for categorical variables. Variables were considered significant and included in the multivariate analysis at $P < .05$. Logistic regression was used to predict having Portal access based on variables found to be significant in the bivariate analysis. Finally, logistic regression was used to predict

patients being unclear about information on their Portal based on variables found to be significant in the bivariate analysis.

Results

Demographics are listed in Table 1. The mean age was 67.6 (29–90), with the majority being females ($n = 97, 65.1\%$). Overall, 121 of the patients had an Internet connection at home, whereas 29 did not. Twenty-six patients stated they had been to our hospital/clinic 0–5 times within the last 3 years, 46 stated they had visited 6–10 times, and 78 patients stated they had visited the hospital/clinic over 10 times in the last 3 years.

Overall, 68.7% stated they had activated and used the Portal (103 out of 150). For those who had not activated their Portal, 38 comments were listed as to why they had not activated or used the Portal (Table 2). Fourteen patients' comments stated they had no computer, whereas 11 were simply not interested in using the Portal. Nine patients had tried to set up the Portal but were confused or could not get it to work. Two patients stated they had no Internet, whereas two stated family members took care of their medical issues.

Regarding the use of the Portal by patients, 4 patients stated they used the Portal daily. Nineteen used it a few times a week, 10 used it once a week, and 23 used it less than once a week. It was most common, 47 of 103 (45.6%), for patients to use the Portal only around the time of their physician visits.

Age was significantly younger in those who used the Portal (67 vs 72 years, $P = .0002$), and those who had an Internet connection at home were more likely to use the Portal (80.7% with Internet

Table 2
Responses to the question: "Why have you not activated or used the Portal?"

| Age | Sex | Response |
|-----|--------|---|
| 74 | Female | I live in a senior retirement home, they have a computer room for residents. I do not know computers. |
| 74 | Male | Because every time that I set this up does not work because I use my wife's email |
| 66 | Female | Because I don't understand what and how to use it |
| 86 | Female | Because I don't |
| 76 | Male | Because I just don't have one |
| 55 | Female | Been busy dealing with my brother who has cancer and not doing well |
| 82 | Male | Can't seem to get a password; don't know how |
| 73 | Female | Computer down now |
| 83 | Female | Do not have computer |
| 57 | Male | Don't know how to use it. Don't have internet in the house |
| 66 | Female | Don't know |
| 60 | Male | Have not activated account |
| 67 | Female | Have not set up account online |
| 80 | Female | I am computer illiterate |
| 73 | Male | I don't have a computer |
| 73 | Female | I don't have access to a computer |
| 82 | Female | I don't know how to do it |
| 66 | Female | I don't know how to use it. I don't know how to get online. You need to train old people on it |
| 82 | Male | I find it's hard to keep things straight. Could not get the right help |
| 72 | Female | I never tried for it |
| 72 | Male | I tried and could not get in |
| 54 | Female | I use the Portal—but only as a guest—had not yet set up account but soon I will |
| 80 | Female | I'm not sure why |
| 70 | Female | Just got my tablet and don't know how to get it |
| 83 | Female | My age + no computer |
| 80 | Female | My computer is down right now |
| 86 | Female | My daughter handles all this medical stuff |
| 64 | Male | Never thought about it |
| 75 | Male | Never thought of it |
| 62 | Male | No Computer |
| 86 | Female | No computer, no access |
| 71 | Female | No computer, use phone only for calls and texts |
| 79 | Female | No computer |
| 60 | Female | No internet access |
| 63 | Female | Not interested in setting it up |
| 81 | Female | Not interested |
| 84 | Female | Not interested |
| 55 | Female | No computer or internet connection |

Table 3
List of items patients were unclear about on the Portal.

| Confusion category | Number of patients reporting confusion |
|---------------------------|--|
| Diagnosis | 14 |
| Orthopedic physician note | 8 |
| Test ordered | 7 |
| Test result | 23 |
| Medication | 7 |
| Radiology report | 15 |
| Other | 1 (financial) |

used the Portal vs 13.8% without the Internet used the Portal, $P < .0001$). No significant differences were found in regard to gender ($P = .695$) or the number of clinic visits ($P = .373$) between those who used the Portal and those who did not. Logistic regression analysis found that age and access to Internet were significant predictors of using the Portal ($P < .005$). The odds of using the Portal were 31.8 times higher for those with access to Internet than for those without access. The odds of using the Portal decreases by 0.06% with a one unit increase in age.

Forty-nine of 103 patients (48%) stated they were unclear about something they read on the Portal. In responding, some patients selected more than one item that was unclear, leading to a total of 75 instances of being unclear about something on the Portal. In regard to what they were unclear about (Table 3), most were unclear about a test result ($n = 23$) or a radiology report ($n = 15$).

A significant difference was found in the median age between those who were not clear about something they read in their medical record versus those who were (66 vs 68.5 years, $P = .0002$). No significant differences were found in being not clear on patient portal information between gender ($P = .1$), number of visits ($P = .4$), frequency of use (ie, every day, a few times a week, once a week, less than once a week, other) ($P = .9$), type of information searched for (ie, diagnosis, physician note, test ordered, test results, medications, radiology result, other, multiple) ($P = 1$), and method of clarification (ie, Internet search, contacted physician or staff, family or friend, other) ($P = 1$). Logistic regression analysis showed that the odds of being unclear increased by 0.04% with a unit increase in age; however, this was not statistically significant (95% confidence interval: 0.996–1.075).

Of the 49 patients who stated that they were unclear or confused about something they read on the Portal, the majority (67/103) sought another resource to research and clarify doubts regarding information they read. Twenty-three used the Internet (34.3%), 32 (47.7%) called the physician, and 12 (17.9%) asked a friend or family member for clarification. Four comments were written in regard to confusing information found on the Portal. One patient expressed a desire for information to be in more “layman” terms. Another stated they called about all information they saw on the Portal. One patient wished for information regarding their therapy, and finally, a single patient stated the Portal “never answered any of their questions.”

Overall helpfulness was rated 1 (not very helpful) by a single patient (1%), 2 (not helpful) by 1 patient (1%), 3 (neither helpful nor unhelpful) by 8 patients (7.8%), 4 (helpful) by 30 patients (29.1%), and 5 (very helpful) by 63 patients (61.2%). Overall comments were limited to only 4 comments, with two patients praising the system, one commenting on outage being an issue for them, and one person reporting they were planning to get the Portal activated.

Discussion

Adoption of EHR systems is believed to significantly improve patient care and the overall efficiency of the health-care system [21]. The Health Information Technology for Economic and Clinical

Health (HITECH) Act passed in 2009 along with the Medicare and Medicaid EHR Incentive Program provides financial incentives for physician and hospital use of EHRs and penalties for not using them [1–6]. Jamoom et al. [22] surveyed physicians on their adoption of EHR finding that over 70% of physicians were influenced by financial incentives or penalties. These incentives have likely contributed to the widespread adoption of EHRs across US hospitals [1].

Similar to many technologies, EHR and patient portal adoption in the United States has alleviated some problems, such as difficulty with illegible handwriting, while raising new concerns. The use of patient portals has provided patients with greater access to their health information than in the past. Patient usage of these portals can improve care coordination between patients and multiple providers [7]. In addition, releasing test results directly to patients through an online portal increases patient engagement [8,13]. In particular, patients with chronic conditions, such as diabetes, perceive value in access to visit notes through patient portals [11]. Patients with diabetes believed that they would have better control of their health and be more likely to take their medications as instructed if they had access to patient portals. Another study examined the use of patient portals by cardiac patients, finding increased health literacy and improved patient education among the patients who used the portal [23]. Other possible benefits of patient portals include minimization of duplicate laboratory or radiographic tests and a decrease in incorrect information being included in the patient chart [24].

Despite the benefits of increased patient engagement, there are challenges regarding the use of patient portals. In one study, patients reported that the availability of test results marked abnormal without physician interpretation in the patient portal caused them significant anxiety [8]. The same study noted that viewing automatically released test results by patients in the patient portal was associated with an increase in telephone calls and office visits; however, this increase was not seen when the test results were released by the physician [13]. This result mirrors that of other studies detailing patient viewing of physician notes [25,26]. In one study, 56% of patients receiving abnormal results experienced negative emotions, and 44% of patients with abnormal results called their physician [27]. Another possible concern involves patients self-medicating after seeing abnormal results, which may lead to harm to the patient [24].

A recent systematic review of studies on electronic patient portals use found mixed effects on patient outcomes and satisfaction [28]. This review found 4 randomized studies evaluating patients with diabetes. Of these studies, one showed significantly lower hemoglobin A1C levels in the group using a patient portal, whereas the others did not show significant improvement. Despite this, other benefits such as treatment satisfaction and patient empowerment were seen in the portal group in all 4 studies. Overall, most studies in this review found little or no benefit in health outcomes for patients using a patient portal but did find an increase in patient satisfaction.

Our study of orthopedic surgery patients in an adult reconstruction practice followed trends found in previous studies. Most of our patients used the Portal. We found that younger patients and patients with access to the Internet at home were significantly more likely to use the Portal than older patients and those without Internet access at home. Our results of increasing age correlating with decreased patient portal use are similar to those found in the literature [29–31]. Goel et al. [32] found that older patients were significantly less likely to both enroll in the patient portal and, for those who did enroll, communicate with their physician through the patient portal. Their results included a large proportion of patients aged below 35 years, making the study less applicable to the patient population in our study. A survey of patients aged between

65 and 79 years also had concordant results with our study, with patients aged below 70 years being more likely to use the patient portal [15]. The strongest predictor of patient Portal use in our study was access to Internet at home, and 80.7% of surveyed patients had access to the Internet. This rate of Internet access is similar to reports in the literature [15]. Non-Internet use has been shown to be a significant factor in lack of patient portal use [15,33].

In our study, the use of the Portal generated confusion or questions regarding what the patient was reading in nearly half of patients. A total of 67 patients clarified doubts regarding information they found on the Portal, and most called the orthopedic surgeon to get clarification (32 patients). The Internet was used by 23 patients and a friend and/or family member was consulted by 12 patients to clear up confusing information found on the Portal.

Our study is not without limitations. Although we mailed out prepaid envelopes expecting a higher return of survey, we had only a 17% response rate for the entire cohort mailed. Response rates, however, are typically low in physician-mailed surveys [34]. In addition, no mailed reminders were sent after initial mailed surveys. Follow-up mail reminders may have led to improved response rate. Additional factors correlated with patient portal use reported in the literature are socioeconomic status and ethnicity. One weakness of this study is the lack of inclusion of these factors in our survey. Further limitations of our study come from our study design and the self-reported nature of answers to survey questions. Finally, our study is based in the Southern Region of the United States, and other regions could have different responses based on location.

Our study demonstrated that the use of the Portal was high in our patient population, and helpfulness was also high among the Portal users. We found that access to a home Internet connection and younger age were associated with increased patient Portal utilization in this adult reconstruction practice. We did find, however, that Portal use was associated with a high degree of confusion among patients, and opportunities exist for improving how we disseminate information to our patients so as to not create confusion and increased burden on the physician and their staff.

Conclusions

In our sampled adult reconstruction practice, most patients used the Web-based patient Portal to access their health information. Most patients felt the Portal was useful in gathering health information; however, when confusing information was found, most patients did not consult their physicians to clarify.

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