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Assessing capacity to engage in healthcare to improve the patient experience through health information technology

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Abstract

Patient engagement is viewed as a means to improve patient care, increase population health, and decrease health care costs. Efforts to improve engagement are prevalent across healthcare, particularly through health information technology (HIT) tools such as patient portals. However, we know that not all patients have the same ability to engage, leading to potential disparities. We present the Engagement Capacity Framework and suggest that examining capacity for engagement would improve our ability to address currently unmeasured factors that facilitate engagement. The objective was to examine factors that influence an individual's capacity for engagement through HIT. We administered a paper survey to patients seen for care in a Family Medicine Clinic at a large Academic Medical Center, measuring potential components of the Engagement Capacity Framework. 142 patients completed the survey. Respondents reported high self-efficacy, high resilience, and good or better quality of life. Most were willing to use the Internet. Almost 30% of respondents did not use a patient portal and 37% of these respondents were very or somewhat unwilling to use a portal. We observed significant positive correlations (p > 0.05) between portal use and searching for health information online, using email and owning technology. For those who did not use a portal we asked about willingness to use a portal; portal willingness was positively correlated with willingness to use the Internet (p < 0.01). Our findings emphasize the importance of assessing capacity for engagement in order to target interventions to those most in need, connecting them to necessary resources to allow more full participation in their care.

Keywords

Patient experience, patient engagement, health information technology, digital literacy, health disparities

Introduction

Background

The emphasis on helping patients engage in their care continues to be strong across the health care system. Positioned as a means to improve the experience of care, increase population health, and lower per capita health care cost [1], interventions designed to increase patient engagement have been the subject of considerable attention. One common strategy to supporting patient engagement in health care has been to utilize Health Information Technology (HIT; e.g., electronic health records EHRs], or patient portals). Patient-facing HIT, such as patient portals, has proliferated and is now viewed as part of the ecosystem of care [2]. A portal tethered to the EHR allows patients to schedule appointments, track their health status (e.g., view test results, or see medications lists), and communicate with providers via asynchronous secure messages. Portals are increasingly utilized to extend the office visit [3, 4] and can facilitate greater patient engagement in their care [5, 6]. Their impact on the patient's

experience of care can be significant, resulting in greater convenience to patients and improving their trust in their physicians [4, 7-9].

However, not all patients have the same ability to make use of HIT tools. The evidence for sociodemographic disparities in access and use of HIT is clear. Studies document that African-Americans and Latinos are significantly less likely than Whites to have ever logged on to a portal, as are those without a college degree [10-13]. In fact, Ancker and others note that African-Americans are less likely than Whites to be offered access to the portal [14, 15]. This disparity extends to more advanced features of the portals, such as secure messaging: Lyles et al. found that African-American diabetic patients that use a portal are less likely to utilize secure messaging within the portal [16].

These sociodemographic differences in HIT access and use may be explained by variation in environmental and personal attributes that result in different use of new technology. For instance, broadband connectivity and

internet access vary significantly across the country [17, 18], likely contributing to differences in access to internet-based patient portal technology. Qualitative studies document patient-reported barriers to the use of patient portals, including lack of digital skills and concerns about the security of HIT [19]. Similarly, studies have found that patients with lower health literacy were less likely to use the portal [11, 13]. Importantly, while a patient's age and race may be readily accessible to their providers as fields in the EHR, their internet access, or availability of technology to support the use of portals, as well as their confidence in using them are not included in the EHR. These upstream factors, moreover, are potentially modifiable, making assessing and acting upon them critical to ensuring that vulnerable groups of the population are not left behind as health care increasingly relies on HIT to facilitate patient engagement in their care.

This study uses the Engagement Capacity Framework (ECF), previously developed by our team (blinded for review), as a lens to explain how these upstream factors can influence the capacity for patient engagement behaviors, particularly in regard to use of HIT. Through a descriptive analysis of the elements of the ECF, we identify individual patients' strengths and weaknesses in their capacity to engage. This analysis serves to motivate a discussion of interventions aimed at addressing these areas of weakness and suggestions for future work to improve our ability to identify and assist those most at need.

Conceptual Framework

Patient engagement research to date has largely disregarded the aforementioned upstream factors that contribute to engagement behaviors (i.e. use of patient portal). This dismissal may be a product of the inconsistent measurement of patient engagement [20]. The prevailing approach to measurement has been to use the related concept of patient activation [21], to use other psychological concepts [22], or to define engagement as participation in study activities, use of study tools, or behaviors such as preparing questions before medical appointments [23]. These measurement approaches represent different conceptual understandings of engagement, and offer insight into the types of behaviors that providers can encourage their patients to engage in. However, these approaches do not allow for identification of factors that contribute to either a patient's level of engagement or their capacity for engagement. Without an assessment of capacity, a health care provider's ability to understand why a patient does not engage, and then use this knowledge to help them to engage, remains limited.

We propose that shifting the focus to a patient's capacity for engagement can contribute to a deeper understanding of the issues that prevent engagement behaviors, such as use of a patient portal. This approach has the added benefit of allowing for the identification of the implicit components of engagement to identify areas in which patients may most need support, facilitating intervention on these components. In this way, providers and healthcare systems can better tailor their efforts to improve engagement and can have a significant impact on the lives of patients. We developed the Engagement Capacity Framework (ECF), based on Social Cognitive Theory [20, 24] to examine factors related to person (i.e. self-efficacy, willingness, and capabilities), environment (i.e. resources), and behavior that comprise their capacity to participate in their health care. To improve our understanding of capacity for engagement, we administered a survey in outpatient clinics to examine variables included this framework which may influence capacity to engage. In the current study, we focus specifically on patient portal use as a means of engagement.

Methods

Sample

We administered a paper survey to patients 18 years and older who could read English and were seen for care at one of nine Family Medicine Clinics at a large Academic Medical Center (AMC). The AMC includes seven inpatient hospitals and 53 ambulatory care locations, including the nine Family Medicine clinics in which our survey was administered. The AMC uses EPIC EHR and offers the MyChart patient portal in the outpatient setting, and MyChart Bedside to hospitalized patients.

Patient Recruitment

The research team visited each of the nine clinics on at least 3 different days. Patients were approached in the waiting room by a research team member and offered the opportunity to complete the survey on paper while waiting for their appointment. Participants received a $5 gift card for completing the survey.

Measures

The survey was developed to explore potential components of the person, environment, and behavior of the Engagement Capacity Framework. The survey drew upon existing measures where possible, including self-efficacy [24], resilience [25], locus of control [26] and trust in physicians [27]. Unless otherwise indicated, and with the exception of demographics, all items were on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). When appropriate, items were reverse-coded before computing mean scale composites.

Demographics
The survey solicited socio-demographic variables, including race, employment status, income, and health insurance status.

Person
Person measures included resilience, locus of control, trust in healthcare professionals, health, health status, self-efficacy, and willingness. Resilience (α = .86) was measured with Smith et al.'s (2008) six-item brief resilience scale [25]. A sample item is, "I tend to bounce back quickly after hard times". Locus of control (LOC) was measured using 11 items from the health locus of control measure) [26], which contains two subscales: internal LOC (α = .67) and external LOC (α = .71). Sample items include "No matter what I do, if I am going to get sick I will get sick" (internal LOC) and "When I feel ill, I know it is because I have not been getting the proper exercise or eating right" (external LOC). Trust in healthcare professionals (α = .77) was measured using 11 items adapted from Anderson and Dedrick's (1990) trust in physician scale [27]. A sample item is, "I trust my doctor, nurse, or other healthcare professional's judgments about my medical care".

Global health (α = .58) was a mean of three items asking about participants' frequency of emotional problems (1 = always to 5 = never), fatigue (1 = very severe to 5 = none), and pain (1 = worst pain imaginable to 5 = no pain). Health status was measured by asking participants to rate their health (1 = poor to 5 = excellent). Quality of life was measured by asking participants to rate their quality of life (1 = poor to 5 = excellent). Self-efficacy (α = .75) was measured using six items adapted from Bandura's work [28]. A sample item is, "I am confident that I can work with my provider to improve my health".

Willingness was measured by asking participants to what extent they were willing to (1) use the internet (mean of three items (α = .77): "I am willing to complete financial transactions on the Internet," "I am willing to track health-related information (e.g., FitBit) on the Internet," and "I am willing to post on social media (e.g., Facebook) on the Internet"), and (2) use a patient portal (among those who do not already use it; "I would be willing to use a patient portal if one were offered to me").

Environment
The Environment domain is captured by assessing resources. The survey asked whether participants had internet access for personal use; what technologies participants owned at home (i.e., tablet, smart phone, computer, none of these); and participants' usual source of care (i.e., no usual place, Emergency department, Urgent care center, Private doctor's office, Community health center, Hospital-based clinic, and Other).

Behavior
Behavior measures included portal use, source of health information, and use of email. Portal use was assessed by asking whether participants had ever used a patient portal (yes, no, don't know). To assess where patients seek health information, participants were asked if they had ever accessed health resources on the Internet (yes, no). Participants were also asked how frequently they used email (1 = never to 5 = very frequently).

Analysis

Responses to the survey were analyzed using SPSS version 25 [29]. For items that formed a scale, the mean scale score was determined for respondents. For other items that were measured on a five-point Likert scale, descriptive statistics were determined.

Additionally, we examined correlations between each of the portal use variables (i.e. used portal, and willingness to use portal) and elements of the Engagement Capacity Framework. In this analysis, the usual source of care variable was dichotomized into no usual source (0 = none, ER, urgent care, other) vs usual source (1= private doctor, community health clinic, hospital based clinic).

Results

A total of 142 patients responded to the survey. Table 1 shows respondent demographic characteristics. As some participants skipped some questions, sample sizes for each variable are displayed in the table.

Table 1. Participant Demographics (n = 142)

Race (n = 138)	*n*	%
White	100	72.5%
African-American	27	19.6%
Other	11	7.9%
Employment Status (n = 131)		
Employed	73	55.7%
Unemployed	12	9.2%
Student	6	4.6%
Retired	19	14.5%
Other	21	16.0%
Income (n = 130)		
<$20,000	42	32.3%
$20,001 to $50,000	31	23.9%
$50,001 to $100,000	34	26.1%
$100,001+	23	17.6%
Health Insurance (n = 134)		
Yes	126	94.0%
No	8	6.0%

We examined responses to items representing the elements of the Engagement Capacity Framework, as shown in Table 2. In the Person domain, means for resilience, overall health status and quality of life were all over 3, corresponding to good or better. However, 31% rated their health status as fair or poor and 12% rated their quality of life as fair or poor. Respondents scored fairly high on the self-efficacy scale (M = 4.50 out of 5, SD = 0.51). Regarding willingness, participants were very willing to use the Internet (M = 3.83 out of 5, SD = 1.16). Among the 30% of participants who do not use a patient portal, 37% were very or somewhat unwilling to do so.

Within Resources, nearly all have Internet access at home (95.5%) and over 96% have some type of technology available at home. Almost eighty percent access a private physician's office, hospital-based clinic or community health center for their care, however approximately 20% reported that they use the emergency department or an urgent care facility most frequently for their care.

In the Behavior domain, the majority have used a portal, searched for information on the Internet and used email, 73.2%, 77.0% and 87.3% respectively.

Correlations between each of the portal use variables and the Engagement Capacity Framework variables are shown in Table 3. Having used a portal showed positive correlations with searching for health information online, using email, owning technology (smartphone and computer) and willingness to use the internet. In addition, portal use was negatively correlated with not owning technology and reporting an external locus of control. For the subgroup of those who had not used a portal, we examined correlations among the Engagement Capacity Framework variables with willingness to use a portal. Only willingness to use the Internet was significantly correlated with this.

Discussion

This study applies an examination of individual strengths and weaknesses related to capacity for engagement with patient-facing HIT in a sample of patients seeking care in family medicine clinics. Our findings highlight some important areas that merit further investigation to identify potential intervention opportunities and facilitate more equitable access to HIT tools.

The majority of respondents to our survey reported having access to technology and Internet at home. Despite this access, 29% reported not using a portal, and within that proportion, 37% were strongly or somewhat unwilling to use one. Limited research describes reasons why patients may be uninterested or unwilling to use a portal, including concerns about security and preference for in-person communication [19]. Given the increased reliance on the

Table 2. Elements of the Engagement Capacity Framework

Dimension	Mean or Frequency	SD or %
Person		
Locus of Control- internal	M = 3.30	SD = 0.72
Locus of Control- external	M = 2.81	SD = 0.77
Resilience	M = 3.53	SD = 0.86
Trust in healthcare professionals	M = 4.47	SD = 0.49
Global Health	M = 2.70	SD = 0.80
Health status	M = 3.02	SD = 0.99
Poor/fair	n = 42	30.9%
Quality of life	M = 3.57	SD = 0.94
Poor/fair	n = 17	12.3%
Willingness		
To use internet	M = 3.83	SD = 1.16
To use portal (among those who do not already use it)	M = 2.97	SD = 1.35
Strongly Disagree	n = 6	20.0%
Somewhat Disagree	n = 5	16.7%
Neutral	n = 7	23.3%
Somewhat Agree	n = 8	26.7%
Strongly Agree	n = 4	13.3%
Self-efficacy	M = 4.50	SD = 0.51
Resources		
Internet access- Yes	n = 126	95.5%
Technology at home		
None	n = 5	3.7%
Computer	n = 112	82.4%
Tablet	n = 75	55.1%
Smartphone	n = 118	86.8%
Source of care		
None/Emergency Department/Urgent Care/other	n = 27	20.3%
Private Doctor's Office	n = 73	54.9%
Community Health Center	n = 5	3.8%
Hospital-based Clinic	n = 28	21.1%
Behavior		
Ever used portal- Yes	n = 101	73.2%
Search for health information online- yes	n = 97	77.0%
Use email occasionally, frequently, or very frequently	n = 117	87.3%

portal for actions such as medication refills, appointment scheduling and communication, understanding a patient's reasons for lack of use is critical to ensuring their equitable participation in their care. In addition, measurement of portal use is challenging and is often limited to obtaining a portal log-in code or successfully logging in once [30]. In the clinical encounter, a provider may only be able to view whether the patient has an account but would be unlikely to know whether the patient uses the account and even less likely to know why the patient is not using their portal account. Including more detailed assessment for lack of

Table 3. Correlations between portal use variables (Used a Portal yes/no and Willingness to Use a Portal scored 1-5, a high score denoting greater willingness) and ECF variables

Variable	Have you Used a Patient Portal? (n = 134)	To what Extent are you Willing to Use a Patient Portal? (n = 37)
Person		
Locus of Control- internal	-.06	-.27
Locus of Control- external	-.28*	-.24
Resilience	-.01	-.28
Trust in healthcare professionals	-.10	.18
Global Health	-.09	.03
Health status	.14	-.14
Quality of life	.08	-.03
Willingness		
To use internet	.52**	.47**
Self-efficacy	-.05	-.15
Resources		
Internet access	.13	-.02
Technology at home – Sum	.43**	.08
Owns no technology	-.33*	.09
Owns Computer	.23*	.03
Owns Smart phone	.33**	.11
Owns Tablet	.16	.02
Source of care – no usual vs. usual	-.02	-.11
Behavior		
Search for health information online	.46**	.28
Use email – frequency	.40**	.31

Note. Values reported are Pearson correlation coefficients, point biserial correlations, or Phi, as appropriate; *$p<.05$; **$p<.01$.

willingness to use a portal would allow providers to tailor their approach to encouraging portal use.

In our study, 20% of respondents use the emergency department or urgent care as their primary source of care. A consistent relationship with a provider can play an important role in the patient experience, and is particularly relevant to ways in which HIT can facilitate engagement [31, 32]. Lack of a usual source of care has been linked to health disparities [33, 34]. All patients in our study completed the survey while seeking care at an AMC clinic, yet a sizable portion did not perceive the clinic as their usual source of care, a perception that may not be known to their provider. By including usual source of care in an assessment of capacity to engage, providers may be better able to identify patients who may require greater efforts to establish an ongoing relationship.

Our study also identified elements of the Engagement Capacity Framework that were related to portal use. Owning most types of technology (e.g., smartphone or computer) was positively associated with portal use; those who owned such technology were more likely to use the portal while those without technology at home were less likely to use a portal. This association makes logical sense, since those without access to technology would face a

greater challenge in using it, and highlights the importance of assessing technology available in the home in order to understand a patient's capacity to engage in their care via technology mediated tools. In addition, willingness to use the Internet was the highest correlation for both portal use and willingness to use the portal, suggesting that whether a patient has technology available at home or not, a willingness exists which can serve as an initial point of leverage to encourage use of HIT.

Interventions to reduce the barriers associated with HIT include establishment of an opt-out approach to offering a portal in which an account is generated for all patients unless a patient expressly opts out, more focused training on digital literacy generally as well as specific to the use of HIT, and assistance with procuring low cost technology and internet access which is available through digital literacy partnerships [18, 35, 36]. However, successful and widely disseminated interventions that improve patient portal use remain elusive, and an important area for future research.

Limitations
Our study provides a preliminary examination of capacity for engagement and use of HIT. We note some limitations to our findings. Our sample size was relatively

small which limits our ability to observe statistically significant findings. This limitation is particularly the case for the small subgroup of portal non-users. However, our descriptive analysis revealed important potential gaps in who utilizes HIT that should be explored in future research. In addition, we administered our survey in just one AMC, which may limit the generalizability of our findings. The AMC in which this study was conducted has its own policies regarding use of HIT and its promotion to patients. Other institutions may utilize different policies that may impact patient use.

Conclusion

This study emphasizes the importance of assessing a patient's capacity to engage in order to improve the patient experience and promote equitable engagement in healthcare. This approach allows us to identify strengths and weaknesses with regard to engagement at both the individual and population level. Interventions to address these areas identified are increasingly available yet may be underutilized by the medical community. Through assessment of capacity to engage, including engagement through HIT, we can connect patients to necessary resources to help them participate more fully in their care.

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