



Examining the Impact of E-Health Literacy on Indian Adults’ Patient Satisfaction: An Investigation of Intervening Communication Processes

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Abstract

Among those with chronic health conditions, the effective use of digital health services may foster more productive physician-patient encounters. This study examined the contribution of e-health literacy to patient communication behaviors and patient satisfaction. A cross-sectional survey was administered to a sample of Indian adults with chronic health conditions. Hierarchical regression analyses indicated that e-health literacy directly predicted increased communication self-efficacy, patient empowerment, and reduced communication apprehension. Subsequent indirect effects tests showed that through these motivating factors, e-health literacy indirectly predicted increased patient communication and patient satisfaction. Overall, the findings indicate that the benefits of e-health literacy extend beyond digital information seeking more favorable medical consultations. Overall, enhancing chronically-ill patients’ digital health skills can lead to more productive medical consultations and better long-term health maintenance.

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1. Introduction

Online health resources provide individuals with knowledge and motivation to engage in preventative health behaviors. Prior research indicates that digital health literacy is critical to maximizing the effectiveness of online health information searches (Neter & Brainin, 2012). However, the underlying processes linking digital health literacy to positive health outcomes are relatively unclear. The majority of e-health literacy investigations focus on digital health skills contributing to online health information seeking, with the implication that these actions lead to positive health decision-making. However, few studies (Suri, Majid, Chang, & Foo, 2016) specifically link patients' e-health literacy to favorable patient interactions with physicians. Increased patient satisfaction - a key factor determining treatment adherence (De Jager, Crowley, & Esterhuizen, 2018; Dubina, O'Neill, & Feldman, 2014) is a potential outcome of e-health literacy. Among those with chronic health conditions, the effective use of digital health services may foster more productive physician-patient encounters. The current investigation examines processes linking e-health literacy to greater patient satisfaction. Drawing from a sample of Indian adults with chronic health conditions, we assess e-health literacy as an indirect contributor to improved patient experiences through enhanced efficacy, empowerment, and reduced communication apprehension. While there exists substantial research exploring doctor-patient communication issues within an Indian context (e.g., Gopinath, Radhakrishnan, Sarma, Jayachandran, & Alexander, 2000; Gopichandran & Sakthivel, 2021; Paul & Bhatia, 2016), there is a lack of research examining the importance of e-health literacy in fostering improved patient experiences. Given some of the frustrations and unsatisfactory experiences often expressed by patients in India (Swaminath, 2007), it is critical to assess whether online health literacy skills drive patients to engage in more effective interactions with physicians.

2. Theoretical Framework

2.1. E-Health Literacy

E-health literacy reflects one's capacity to locate, comprehend, and assess digital health

information resources and apply acquired information to a health concern (Norman & Skinner, 2006). Conceptually, e-health literacy integrates 'e-health' with 'health literacy.' E-health entails utilizing emerging technologies (particularly the web) to improve individual health and health care environments (Eng, 2002). Health literacy addresses one's ability to locate and comprehend health information to assist in health decision-making (USDHHS, 2000). Individual characteristics (e.g., demographics and social/cognitive skills), as well as environmental factors (e.g., parents, peers, mass media, and health care), are determinants of e-health literacy (Paek & Hove, 2012). Past research indicates that e-health literacy contributes to positive health-related behaviors, including hypertension control and medication adherence (Bosworth et al., 2009; Ownby, Hertzog, & Czaja, 2012).

Bodie and Dutta (2008) note that e-health literacy "is a function and influencer" of one's skills and drive to utilize online health services (p. 189). Empirical research supports the relationship between e-health literacy and online health information seeking (Sheng & Simpson, 2013; Wong & Cheung, 2019). This association has broader implications for improved patient experiences. Specifically, previous investigations show that online health information seeking influences one's preparation for consultations, the nature of online information discussed with physicians, and the ability to integrate and/or challenge information provided by physicians (Hu, Bell, Kravitz, & Orrange, 2012; Moreland, French, & Cumming, 2015; Attfield, Adams, & Blandford, 2006; Caiata-Zufferey, Abraham, Sommerhalder, & Schulz, 2010). Although less frequently studied, one recent study indicates that e-health literacy directly contributes to effective patient communication experiences with physicians (Suri, Majid, Chang, & Foo, 2016). Overall, these findings suggest that e-health literacy may foster improved doctor-patient interactions; however, the process through which this occurs remains relatively unclear. We predict that through different communication motivation factors, e-health literacy contributes to improved patient communication and, ultimately, satisfaction.

2.1.1. Communication Self-Efficacy

Self-efficacy reflects one's perception of their capacity to perform actions required to obtain

certain goals (Bandura, 1997). Theoretical and empirical research identifies that self-efficacy has a central antecedent to health-related behaviors (see Bandura, 2004; Witte, 1994). Patients that perceive they have the ability to seek out, comprehend, and remember information from physicians are critical to productive medical consultations. Prior research indicates that patients report asking inadequate questions, high levels of miscomprehension, and poor recollection of health information provided during consultations (Davis, Wolf, Bass, Tilson, & Neuberger, 2006; Katz, Jacobson, Veledar, & Kripalani, 2007; Wolf et al., 2005). Therefore, to ensure better health outcomes, it is critical to stimulate greater perceived self-efficacy. Research shows that those with a greater feeling of control and self-efficacy are more likely to seek health information, whereas those in more powerless states are less likely (Harris, 1998; Lee, Hwang, Hawkins, & Pingree, 2008; Leydon et al., 2000; Lichter, 1987). As noted above, e-health literacy is linked to enhanced online health information seeking and greater health motivation overall. Consequently, we argue that e-health literacy should predict enhanced patient communication self-efficacy.

E-health literacy should foster increased patient communication through increased communication self-efficacy. The findings above indicate that communication self-efficacy drives health information seeking. Drawing from theoretical rationale (Bandura, 1997), perceiving one has the ability to communicate effectively should predict a greater likelihood of engaging in actual communication activity. We argue that patients with greater communication self-efficacy should be more inclined to communicate with the physician to obtain necessary health information.

2.1.2. Patient Empowerment

Increased e-health literacy should also be beneficial to patient empowerment, a key determinant of positive health outcomes (Nafradi, Nakamoto, & Schultz, 2017). Patient empowerment captures the patient's perceived ability to take an active role in personal health decisions (Schulz & Nakamoto, 2011). To the authors' knowledge, there is a lack of investigations assessing the relationship between e-health literacy and patient

empowerment. However, prior research indicates that general health literacy drives empowerment (Castro, Van Regenmortel, Vanhaecht, Sermeus, & Van Hecke, 2016; Porr, Drummon, & Richter, 2006). Furthermore, findings show that digital health services empower patients from underserved communities to communicate more frequently with health care providers (Kim & Xie, 2017). Oh and Lee (2012) found that computer-mediated social support fostered a greater sense of empowerment that, in turn, predicted intentions to actively communicate with the physician. Drawing from these investigations, we argue that possessing greater e-health literacy should lead to greater patient empowerment.

In addition to self-efficacy, empowerment should mediate the relationship between e-health literacy and increased patient communication. Empowerment promotes greater patient participation reflected in increased communication (Richard, Glaser, & Lussier, 2016). Those who are more empowered are likely to possess greater confidence, motivation, and a sense of control. This, in turn, should promote increased communication with the physician (e.g., expression, asking questions, information seeking; Oh & Lee, 2012). Furthermore, as indicated above, empowerment can trigger greater motivation to engage more actively with the physician (Oh & Lee).

2.1.3. Patient Apprehension

An impediment to effective doctor-patient communication is patient communication apprehension. Communication apprehension captures one's degree of anxiety or fear linked to other individuals (McCroskey, 1977). Research shows that patient communication apprehension contributes to reduced patient satisfaction with both medical professionals and medical care (Richmond, Heisel, Smith Jr., & McCroskey, 1998). In the current investigation, we focus specifically on contextual or state communication apprehension relating to communication with one's physician. Prior research shows that state communication apprehension predicts a decline in talking with physicians and seeking health information (Booth-Butterfield, Chory, & Beynon, 1997). Although there lacks research explicitly examining a relationship between e-health

literacy and communication apprehension, prior research indicates that both digital health literacy and general health literacy predict broader anxiety (Kugbey, Meyer-Weitz, & Asante, 2019; Leung et al., 2021). Leung et al. (2021) most recently showed that digital health literacy negatively predicted anxiety about the future among a senior population.

As noted above, communication apprehension contributes to reduced frequency of communicating with the physician (Booth-Butterfield et al., 1997). We argue that e-health literacy will indirectly contribute to increased patient communication with the physician by reducing communication apprehension. Overall, in addition to self-efficacy and empowerment, apprehension will operate as a mediating factor in the relationship between e-health literacy and patient communication.

2.2. Indirect Effect of E-health Literacy on Patient Satisfaction

Patient satisfaction reflects an immediate goal/outcome of doctor-patient interactions. Prior research documents that patient satisfaction is essential to treatment adherence and overall improved health (De Jager, Crowley, & Esterhuizen, 2018; Dubina, O'Neill, & Feldman, 2014). Numerous investigations show links between increased patient communication/participation during doctor-patient encounters and patient satisfaction (Dutta-Bergman, 2005; Street, 2001, 2003). Prior researchers argue that patients who are active communicators take greater control over decision-making and desired outcomes. Through this process, patients report increased satisfaction (Street, 2001; Thompson, 1994). Overall then, increased patient communication with the physician should serve as the central determinant of patient satisfaction. In particular, e-health literacy will increase communication motivations (greater efficacy and empowerment, reduced apprehension) that in turn predicts increased patient communication. Patient communication will then predict increased patient satisfaction.

2.3. Purpose of Study: Research Questions/Predictions

The review above addresses potential pathways whereby e-health literacy contributes to improved patient outcomes. First, we explore how e-health literacy drives more improved patient empowerment, self-perception of

communication skills, and lowered communication apprehension. As noted, increased e-health literacy predicts broader online health information-seeking intentions. By possessing greater literacy, patients possess greater health knowledge that allows them to take a more active role during doctor-patient consultations. Ultimately, digital health skills should promote increased feelings of patient agency and communication skills (efficacy) while reducing feelings of communication anxiety.

Second, we assert that e-health literacy will play an indirect role in fostering more effective doctor-patient communication and, subsequently, improved patient satisfaction. By helping patients feel more self-confident and less anxious, patients should be more likely to participate in consultations. By engaging more in the doctor-patient interaction, patients should hopefully obtain more comprehensive information and understanding of their health concerns, leading to greater satisfaction.

3. Methodology

3.1. Participants

Two hundred-sixty adults from the state of Tamil Nadu, India, participated in the cross-sectional survey. Participants ranged in age from 17 to 90 years old. The average age of respondents was 47 years, with roughly 53% (53.1%) male and 47% (46.9%) female. Sixty percent of the participants reported obtaining a college-level education. All participants noted having at least one chronic health condition. Among chronic conditions, blood pressure/hypertension issues were the most frequently reported; roughly 41% (40.8%) of participants acknowledged this condition, followed by diabetes (29.6%), cholesterol (18.5%), and asthma (12.3%). A little over five percent of participants (5.4%) noted having multiple chronic health conditions.

3.2. Instruments

3.2.1. E-Health Literacy

We assessed e-health literacy through the eHEALS instrument (Norman & Skinner, 2006). The scale is comprised of eight items measured from 1 (strongly disagree) to 5 (strongly agree). Example items include "I know what health resources are available on the

Internet” and “I know where to find helpful health resources on the Internet”. All items were summed together and averaged to create the e-health literacy scale ($\alpha = .92$, $M = 3.52$, $SD = .91$).

3.2.2. Patient Efficacy

Perceived patient efficacy was measured through the Perceived Patient Efficacy in Patient-Physician Interactions (PEPPI) scale (Maly, Frank, Marshall, DiMatteo, & Reuben, 1998). The five items were measured from 1 (not at all confident) to 5 (very confident). All items began with the stem “How confident are you in your ability to” followed by: “know what questions to ask a doctor,” “get a doctor to answer all of your questions,” “make the most of your visit with the doctor,” and “get a doctor to take your chief health concerns seriously.” The five items summed together and averaged formed the PEPPI scale ($\alpha = .77$, $M = 3.68$, $SD = .67$).

3.2.3. Communication Apprehension

We assessed perceived communication apprehension during doctor-patient interactions through the five-item patient report of communication apprehension with the physician (PRCAP) scale (Ayres, Colby-Rotell, Wadleigh, & Hopf, 1996). Item response options ranged from 1 (strongly disagree) to 5 (strongly agree). Sample items include “I was not nervous while I was participating in a conversation with the physician,” and “I was very calm and relaxed when talking to my physician.” All items were summed together and averaged to create the communication apprehension scale ($\alpha = .81$, $M = 3.79$, $SD = .89$).

3.2.4. Patient Empowerment

We utilized Schulz, Fitzpatrick, Hess, Sudbury-Riley, and Hartung's (2017) perceived gain in empowerment scale to assess patient empowerment. The seven-item measure had response options ranging from 1 (strongly disagree) to 5 (strongly agree). Example items include “I did my best for an effective consultation” and, “I asked my doctor specific questions about my health.” All items were summed together and averaged to create the patient empowerment scale ($\alpha = .82$, $M = 3.82$, $SD = .70$).

3.2.5. Patient Communication

To assess patient communication with the physician, we incorporated items from Dutta-Bergman (2005) and Tran et al. (2004). The scale consisted of five items measured from 1 (strongly disagree) to 5 (strongly agree). Sample items include “I did my best for an effective consultation,” and “I asked my doctor specific questions about my health.” All items were summed together and averaged to create this scale ($\alpha = .81$, $M = 3.76$, $SD = .76$).

3.2.6. Patient Satisfaction

We assessed patient satisfaction with the physician through Poulton's (1996) scale. Sample items include “I am totally satisfied with my visit to this doctor” and “I understand my illness much better after seeing this doctor.” Participants reported a degree of satisfaction on a 1 (strongly disagree) to 5 (strongly agree) scale. The average of six-items together formed the patient satisfaction scale ($\alpha = .88$, $M = 3.86$, $SD = .78$).

3.2.7. Control Items

We included age, gender, and education level as demographic control measures. Education level was broken down into: no formal schooling (1.2%), primary school (3.8%), middle school (6.9%), high school (28.1%), and college/university (60.0%).

3.3. Procedure

A multi-stage sampling technique was used to recruit the study participants from Chennai (capital city of Tamil Nadu, a state of India) and another Tier II city Vellore. In the first stage, three hospitals from each city were randomly selected by lottery method. In the second stage, the respondents were recruited using the convenience sampling method. Potential patients and/or family caregivers were approached by the research team in hospital premises, who were provided a description of the study and questionnaire, and requested to participate in the study. Inclusion criteria involved having received a diagnosis of at least one chronic condition. Prior to participation, respondents signed consent forms and indicated a chronic condition they had been diagnosed with. Eligible individuals completed a self-administered questionnaire. All statistical analyses were performed using SPSS version 27.

4. Results

4.1. Preliminary Analyses

Preliminary Pearson correlation analyses indicated that significant relationships existed

between all central study variables (see Table 1). The results of these simple correlation tests showed associations ranging from $r = .22$ to $r = .71$.

Table 1

Intercorrelations between Central Study Variables

Variable	EHL	PEFF	PAPPR	PEMP	PCP	PSAT
EHL		.40**	.32**	.32**	.37**	.22**
PEFF			.32**	.29**	.37**	.22**
PAPPR				.56**	.52**	.62**
PEMP					.68**	.72**
PCP						.63**
PSAT						

Note: Under 'Apprehension', higher numbers indicate reduced patient apprehension. The numbers reflect Pearson's r coefficients. EHL = E-Health Literacy; PEFF = Patient Efficacy; PAPPR = Patient Apprehension; PEMP = Patient Empowerment; PCP = Patient Communication with the Physician; PSAT = Patient Satisfaction.

* = $p < .05$, ** = $p < .01$

4.2. E-Health Literacy and Precursors to Patient Communication

The first analyses explored a direct relationship between e-health literacy and the motivating factors driving patient communication. To formally test these relationships, hierarchical multiple regression was performed. This allows the researcher to examine the incremental variance explained by a set of predictor variables after accounting for the variance explained by other measures (i.e., demographic measures). Age, gender, and education level were included in block one with e-health literacy the central predictor included in block 2. After controlling for demographic measures, e-health literacy emerged as an independent, positive predictor of patient self-efficacy ($\beta = .39, p < .01; \Delta R^2 = .12, \Delta F(1, 255) = 39.67, p < .01$), patient empowerment ($\beta = .32, p < .01; \Delta R^2 = .08, \Delta F(1, 255) = 24.67, p < .01$), and reduced patient apprehension ($\beta = .28, p < .01; \Delta R^2 = .06, \Delta F(1, 255) = 18.25, p < .01$).

4.2.1. Indirect Effects on Patient Communication

The next analyses examined indirect relationships from e-health literacy to increased

patient communication through the three communication motivation factors. We assessed these relationships simultaneously through a multi-mediator model via the PROCESS macro, model 4 (Hayes, 2012). Results of bootstrapping analysis showed that the indirect relationship between e-health literacy and patient communication with the physician through efficacy ($\beta = .14, p < .05$; 95% confidence interval: .08 to .22; see Figure 1) was statistically significant. The second bootstrapping test showed that the indirect relationship between e-health literacy and patient communication with the physician through patient empowerment ($\beta = .11, p < .05$; 95% confidence interval: .06 to .18) was also statistically significant. Finally, the third bootstrapping test showed that e-health literacy was a significant indirect predictor of patient communication with the physician through reduced patient apprehension ($\beta = .05, p < .05$; 95% confidence interval: .02 to .09). Additionally, results from the full model showed that e-health literacy was not significantly associated with patient communication with the physician ($\beta = .01, p > .05$) when the mediators were included (see Figure 1).

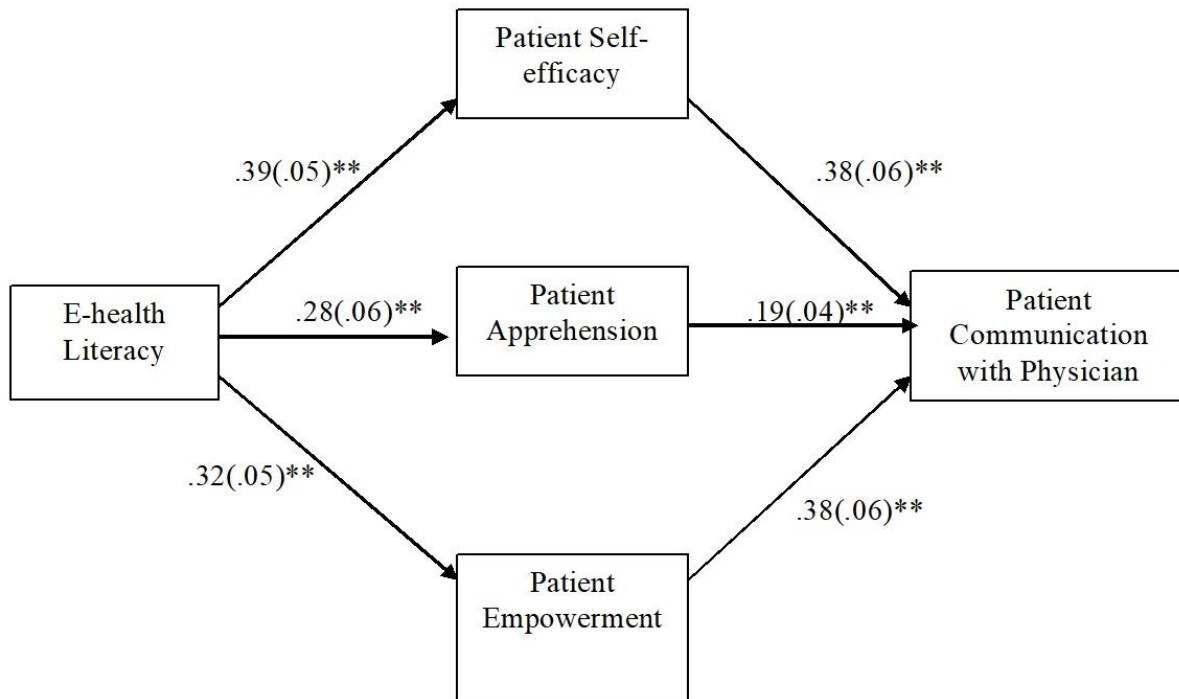


Figure 1

*Indirect Effect of E-health literacy on Patient Communication with Physician through Patient Motivational Factors (Note: For the full model, $R^2 = .60$. The direct relationship between e-health literacy and patient communication with physician was not significant ($B = .01$, $p > .05$). The numbers reflect standardized regression coefficients obtained through multiple regression analysis controlling for age, gender, and education. Numbers in parentheses denote standard errors. ** = $p < .01$)*

4.2.2. Three-step Model Predicting Patient Satisfaction

Finally, we argued that e-health literacy would indirectly predict patient satisfaction through a three-step process involving the patient communication motivation factors (efficacy, reduced apprehension, empowerment), followed by increased communication with the physician. Preliminary multiple regression analyses revealed that multicollinearity issues emerged when including all five measures as predictors of patient satisfaction. In particular, we identified suppressor effects falsely showing a significant, negative relationship between e-health literacy and patient satisfaction. To remedy this issue, separate serial mediation models – including one of the

motivational factors in each model - were tested using model 6 in the PROCESS macro. The findings from each serial mediation test supported the indirect effects of e-health literacy on patient satisfaction through the three-step model. In each model, e-health literacy had no significant direct relationship with patient satisfaction. However, results also showed that in models including either patient apprehension or patient empowerment as the direct mediator, the findings more strongly supported a two-step simple mediation model rather than the three-step serial mediation model (see Table 2). Results also showed that patient empowerment was a stronger predictor of patient satisfaction ($B = .61$, $p < .01$) than patient communication ($B = .28$, $p < .01$).

Table 2*Indirect Effects of E-health Literacy on Patient Satisfaction through Two-step and Three-step Models*

Mediator 1	Two-Step Model Effect through Mediator 1	95% CI for Two-Step Model	Three-Step Model Effect through Patient Communication with the Physician	95% CI for Three-Step Model
Patient Self-Efficacy	$B = .06(.03)^*$.02 to .13	$B = .10(.02)^*$.06 to .16
Patient Apprehension	$B = .10(.02)^*$.06 to .15	$B = .05(.01)^*$.03 to .08
Patient Empowerment	$B = .15(.04)^*$.09 to .24	$B = .05(.02)^*$.02 to .09

4.3. Post-hoc Tests

We explored potential interactions between e-health literacy and the demographic measures (age, sex, education level). Results of hierarchical regression analysis indicated a significant e-health literacy X age interaction predicting both self-efficacy [$\beta = -.18, p < .01; \Delta R^2 = .03, \Delta F(1, 254) = 9.91, p < .01$] and patient empowerment [$\beta = -.16, p < .01; \Delta R^2 = .02, \Delta F(1, 254) = 7.29, p < .01$]. To decompose significant interactions, the researchers ran separate regression tests at one standard deviation above and below the mean of the moderator variable (i.e., age; [51] Aiken & West, 1991). Results indicated that e-health literacy was a stronger predictor of self-efficacy among younger ($\beta = .59, p < .01$) than older patients ($\beta = .26, p < .01$). Similarly, e-health literacy contributed more strongly to patient empowerment among younger ($\beta = .50, p < .01$) than older participants ($\beta = .21, p < .01$). No other significant interactions emerged.

5. Discussion

This investigation examined how e-health literacy contributes to favorable patient medical consultations. Our analysis focused on Indian adults with at least one chronic health condition. Although scholars and practitioners have stressed the value of e-health literacy in fostering positive health outcomes, there lacks research examining how these skills translate to more favorable medical interactions. There were two key findings linked to the broader research goals. First, the results indicate that e-health literacy is a mechanism that directly predicts more favorable patient efficacy, empowerment, and lowered communication apprehension. Second, through these motivational factors, e-health literacy indirectly drives patient communication and subsequent

patient satisfaction. Overall, this suggests that e-health literacy is not only beneficial to producing more effective online health information seeking but also acts as an antecedent factor driving more positive patient experiences. Below we discuss the broader significance of the results of these two research goals.

5.1. Linking E-Health Literacy to Patient Skills, Empowerment, and Reduced Apprehension

Historically, research on doctor-patient communication centers on physicians' communication style and/or patient-centered communication (Clever, Jin, Levinson, & Meltzer, 2008; Derksen et al., 2017; Krasner et al., 2009). Although this offers some explanation on the level of patient participation, patient-specific characteristics, including information-seeking skills and motivations, also influence the effectiveness of these exchanges. Patients with higher levels of digital health knowledge and ability report greater communication efficacy and empowerment as well as reduced apprehension. Arguably, the direct link between e-health literacy and patient empowerment offers the clearest example of the importance of e-health skills. In particular, our findings show that patient empowerment was a stronger predictor of patient satisfaction than patient communication with the physician. Consequently, the process through which e-health literacy influences patient satisfaction more strongly supports a two-step rather than a three-step model.

Post-hoc tests revealed that e-health literacy was a stronger predictor of self-efficacy and empowerment among younger rather than older participants. Given that older adults are less likely to use digital technologies than those of

other age cohorts (Hunsaker & 2018), it is probable that digital health skills among younger adults play a more central role in driving patient confidence. However, as older adults engage more frequently in online health experiences (especially during the Covid-19 pandemic), these individuals are similarly likely to experience the benefits of e-health literacy skills for improving patient participation and patient satisfaction. Furthermore, the data showed a weaker but still significant relationship between e-health literacy and patient efficacy/empowerment, suggesting that developing and improving digital health skills remains important for all adult age ranges.

5.2. Indirect Contribution of E-Health Literacy to Patient Communication, Satisfaction

In addition to identifying direct links between e-health literacy and favorable patient judgments/perceptions, the current project indicates that possessing greater e-health literacy indirectly contributes to patients' tendencies to communicate more frequently during medical consultations and be more satisfied with these experiences. As online health platforms become patients' most immediate health information resource, those with increased e-health literacy stand to benefit through gaining preventative health knowledge, and ultimately, more satisfying interactions with physicians.

Those with chronic health conditions must make daily health decisions involving treatment adherence and illness management. Given that these individuals frequently interact with physicians (Broemeling, Watson, & Prebtani, 2008; Starfield, Lemke, Bernhardt, Foldes, Forrest, & Weiner, 2003), it is critical to isolate factors that maximize the benefits of these interactions. Prior research indicates that those with chronic health conditions benefit from physicians engaging in multiple components of patient-centered care (see Hudon et al., 2012 for review). In addition to the importance of provider communication skills, digital health resources provide immediate, convenient assistance to address patients' ongoing health issues. Our investigation suggests that training chronically ill patients to become more e-health literate can factor into improving patient experiences. Community health leaders and public health professionals should engage in

greater outreach efforts among this cohort to improve e-health literacy. Ultimately, enhancing patients' digital health skills can lead to more productive medical consultations and better long-term health maintenance.

Culturally, prior studies suggest challenges to effective doctor-patient communication in India (Fochsen, Deshpande, & Thorson, 2007; Swaminath, 2007) and that the Indian medical education system lacked sufficient focus on improving doctor-patient interaction (Agarwal, Agarwal, Nag, Chakraborty, & Ali, 2011). This study suggests that from a patient perspective, developing greater e-health literacy skills can strengthen patients' ability to improve these experiences. While digital health literacy skills hold value across all societies, they may yield the most dramatic effects in non-westernized nations such as India, a society with continued population growth (United Nations, Department of Economic and Social Affairs, Population Division, 2014) coupled with various public health challenges (Narain, 2016).

5.3. Limitations/Areas for Future Research

This investigation applied a cross-sectional design to examine links between patient e-health literacy and communication motivation factors (self-efficacy, empowerment, reduced apprehension), communication behaviors, and satisfaction. This particular design limits the ability to make judgments of longer-term communication outcomes and positive feelings towards physicians/medical institutions. Future projects should examine how e-health literacy skills at specific moments link to long-term favorable patient interactions with physicians. In particular, longitudinal assessments could provide clearer indications of how e-health literacy skills foster more confident and engaged patients. In addition, future studies may wish to employ more qualitative measures (e.g., interviews, focus groups) to obtain more detailed descriptions of how patients of varying levels of e-health literacy perceive their doctor-patient experiences.

In addition, we only surveyed adults from India. Future studies should examine the relationships across other countries to see whether the findings generalize to different geographical locations. Prior research has shown that patient judgments and expectations

vary greatly across countries (van den Brink-Muinen et al., 2000) and that cultural distinctions contribute to patient experiences (Lopez, 2016; Nguyen & Austin, 2018). Thus, it is critical to assess the importance of e-health literacy to beneficial doctor-patient interactions across a range of cultures and geographical locations.

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