Seniors, Health Information, and the Internet: Motivation, Ability, and Internet Knowledge

Xiaojing Sheng, PhD, and Penny M. Simpson, DBA

Abstract

Providing health information to older adults is crucial to empowering them to better control their health, and the information is readily available on the Internet. Yet, little is known about the factors that are important in affecting seniors' Internet search for health information behavior. This work addresses this research deficit by examining the role of health information orientation (HIO), eHealth literacy, and Internet knowledge (IK) in affecting the likelihood of using the Internet as a source for health information. The analysis reveals that each variable in the study is significant in affecting Internet search likelihood. Results from the analysis also demonstrate the partial mediating role of eHealth literacy and the interaction between eHealth literacy and HIO. The findings suggest that improving seniors' IK and eHealth literacy would increase their likelihood of searching for and finding health information on the Internet that might encourage better health behaviors.

Introduction

ACCORDING TO A RECENT SURVEY by the Pew Internet & American Life Project, looking for health information on the Internet is the third most popular online activity following e-mail and using a search engine.[1] Many consumers now routinely visit Web sites such as www.mayoclinic.com and www.cdc.gov to search for health information in general or for a specific medical condition. This suggests that the Internet is becoming a critical touch point for healthcare providers to actively engage consumers by disseminating health information that will empower them to take ownership of their health.

Providing health information to consumers is especially crucial because lower levels of health literacy have been associated with higher mortality rates,[2] poorer physical functions and mental health, and higher emergency room costs and other medical costs.[3] Connecting with seniors is even more critical as, in general, older consumers have more health concerns and therefore need more health information.

Increasingly, older consumers are becoming Internet users. In 2000, about 41% of consumers between 50 and 64 years of age and 12% of those older than 64 years of age reported using the Internet regularly. These numbers jumped to 85% and 58%, respectively, in 2012.[4] At the same time, fewer than half of the seniors who claim to be Internet users look online for health information.[1] So why are more older consumers not using the Internet as a health information source? What factors might prevent seniors from using the Internet for health information?

Researchers have investigated some variables that affect consumers' online health-seeking behavior. For example, one research stream shows that individuals who seek health information from the Internet tend to be younger and have a higher level of education and income.[5–9] Other studies have found that Internet experience has a positive effect on the likelihood of online health seeking[6] and on additional health information search beyond the doctor.[10] Still, other research emphasizes the role of eHealth literacy in understanding consumers' ability to engage in eHealth and search for health information on the Internet.[11,12]

These studies provide insights into the understanding of factors that influence online health-seeking behaviors but may not be generalizable to older consumers. Furthermore, an overarching theoretical framework seems to be lacking from past research. Our research fills this gap by proposing a research model grounded in Moorman and Matulich's[13] theory of consumers' preventive health behaviors and by empirically testing the model. The tested model includes the effect of health information orientation (HIO) as a motivating factor and that of eHealth literacy and Internet knowledge (IK) as ability factors on the likelihood of using the Internet as a source of health information for seniors. Results of the study should help provide a better understanding of which seniors are likely to seek online health information so that healthcare providers can target this market. Results should also identify factors in seniors that need development to encourage more online health information seeking to improve health decisions.

College of Business Administration, The University of Texas–Pan American, Edinburg, Texas.

Research Hypotheses

Health information searching on the Internet

Moorman and Matulich[13] posit that health motivation and health ability are two general categories of consumer characteristics that work both independently and jointly to impact consumers' health information acquisition and maintenance behaviors. The authors define health motivation as consumers' goal-directed arousal to perform health behaviors.

HIO is defined by Dutta-Bergman[14] as "the extent to which the individual is willing to look for health information" (p. 275). Past research demonstrates that HIO motivates consumers toward more actively looking for health information to inspire healthier behaviors.[15] Applying these findings to the context of seeking health information on the Internet, individuals with a stronger HIO will be more likely to search for health information on the Internet than individuals with a weaker HIO. Some research has found an association between HIO and searching for health information online[14,15] and on health information efficacy,[16] which provides support for the following hypothesis:

> **H1: HIO will positively affect the likelihood of searching for health information on the Internet.**

Health ability refers to the resources, skills, or proficiencies that consumers have for engaging in health behaviors.[13] IK emerges as an important variable that captures the extent to which consumers are able and proficient in using the Internet and navigating through Web sites to gather needed information, including health information.

Most likely, individuals who have better knowledge of the Internet will be more likely to use the Internet for health information. Research has found that consumers considering the Internet important in their life decisions are more likely to seek health information online,[17] consumers' perceived control of using Web sites impacts intentions to use health-related Web sites,[15] Internet engagement affects Internet use for health information,[18] and Internet knowledgeable older adults are more likely to be Internet health-information-seeking.[19] This evidence suggests that:

> **H2: IK will positively affect likelihood of searching for health information on the Internet.**

eHealth literacy is defined as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem"[11] (p. 2). Consumers who are eHealth literate likely use the Internet and Web sites as the primary, if not sole, electronic source of health information needed to help solve health problems.

This conjecture is supported by the functional theory of Internet use and the research finding that Internet searchers of health information are more health oriented than non-searchers.[14] Similarly, other researchers have found a relationship between health literacy in general and the willingness to search for written health information about topics such as medicine information.[20] Therefore,

> **H3: eHealth literacy will positively affect the likelihood of searching for health information on the Internet.**

eHealth literacy

The key components of eHealth literacy are the ability to find, analyze, and apply health information and the use of electronic sources to access that information. To fulfill these definitional requirements, eHealth-literate individuals should have a strong motivation to obtain health information and Internet proficiency. In fact, eHealth literacy requires computer literacy as a core skill.[11]

As theoretical support for the relationship, the model of eHealth use[21] posits a reciprocal relationship between health literacy and HIO. The model also notes the importance of computer literacy to health literacy and that "eHealth literacy is both a function and influencer of individual motivation and ability to use the Internet for health purposes" (p. 189). Accordingly,

> **H4: HIO will positively affect eHealth literacy.**

> **H5: IK will positively affect eHealth literacy.**

Moderating effects of HIO

Moorman and Matulich[13] also suggest that health motivation moderates the impact of health ability on health behaviors. The rationale is that health motivation stimulates consumers to put their knowledge and ability into practice such that the positive effect of eHealth literacy and IK on health behaviors will be strengthened when health motivation is high. If we apply this logic, then

> **H6: HIO will moderate the positive effect of eHealth literacy on the likelihood of searching for health information on the Internet.**

> **H7: HIO will moderate the positive effect of IK on the likelihood of searching for health information on the Internet.**

Hypotheses 1–7 are depicted in Figure 1.

Methods

Procedures

This study was conducted among winter migrants, generally retired seniors, 50 years of age and older, who spend their winter months in South Texas. About 25,000 surveys were inserted in a free, seniors-targeted publication distributed in restaurants, recreational vehicle/mobile home parks, and other venues where seniors typically visit. Participants were asked to complete the survey online or to send the completed survey by mail to a specified address. No envelopes or prepaid stamps were provided.

A total of 1,138 completed questionnaires were received. Of those, 844 (74.2%) respondents found the inserted questionnaire, completed it, and mailed it in using their own envelop and stamp. The remaining 294 (25.8%) respondents completed the questionnaire online. Only the 771 questionnaires with no missing data were used in the analysis to provide the most conservative results. Sample respondents were mostly Caucasian (97%) women (58%) with an annual household income of between $30,000 and $70,000 (56%). The age categories of respondents were as follows: 64 years or younger (26%), 65–69 years (32%), and 70 years or older (42%). Only three respondents were below the age of 50. Most respondents had some college education (28.7%) or a college degree (44.6%). About 25.2% had only a high school degree.
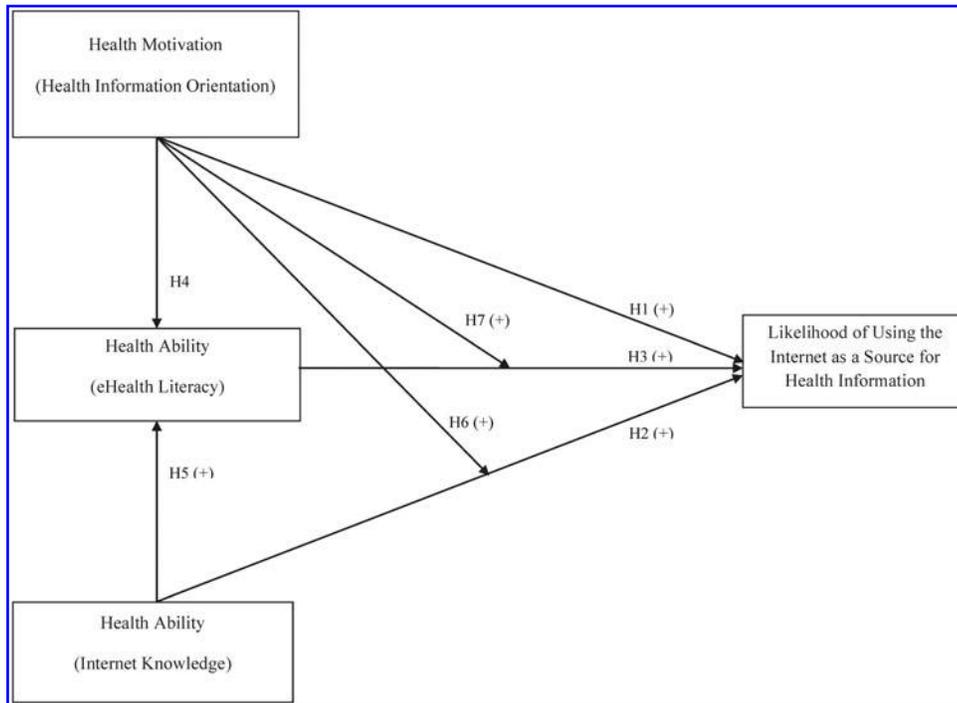
FIG. 1. Model of health information and the Internet: motivation, ability, and Internet knowledge.

Measures

Previously developed and validated scales were adapted to fit this study and were all measured using a five-point Likert or Likert-type scale. HIO was measured with nine items from Basu and Dutta.[16] IK was measured with five items of which four items were adapted from Bart et al.[22] to tap consumers' perceived ability and expertise in using the Internet. The fifth item intends to capture how often respondents use the Internet on a weekly basis. eHealth literacy (eHEALS) was measured with eight items from Norman and Skinner.[11] The likelihood of using the Internet as a health information source (ISEARCH) was assessed by a single item that asked respondents to indicate how likely they are to look for health information on the Internet.

Results

Measure validity

The items for measuring HIO, IK, and eHEALS were subjected to factor analysis using principal components analysis and Varimax rotation. All items loaded properly on the intended construct and were well above the recommended 0.4 threshold,[23] as displayed in Table 1. For reliability, all Cronbach's alphas were greater than the required minimum of 0.7.[24] Cronbach's alpha was 0.92 for HIO, 0.91 for IK, and 0.97 for eHEALS. The factor analysis results and alphas provide evidence of the validity and reliability of the study measures.

Hypothesis testing

The results of hypothesis testing are summarized in Table 2. Multiple regressions were conducted to test hypotheses 1, 2, and 3 together (i.e., the direct, positive effects of HIO, IK, and eHEALS on ISEARCH). All three hypotheses were supported ($F = 117$, $p < 0.001$, adjusted $R^2 = 0.33$), with a standardized β value of 0.12 for HIO ($t = 3.66$, $p < 0.001$), 0.41 for eHEALS ($t = 8.28$, $p < 0.001$), and 0.14 for IK ($t = 2.95$, $p = 0.003$). Multiple regressions were also conducted to test hypotheses 4 and 5 together (i.e., the direct, positive effects of HIO and IK on eHEALS). The results showed support for H4 and H5 ($F = 571.88$, $p < 0.001$, adjusted $R^2 = 0.62$), with a standardized β value of 0.24 for HIO ($t = 6.2$, $p < 0.001$) and 0.75 for IK ($t = 31.35$, $p < 0.001$).

To examine the proposed moderating effects of HIO, two interaction terms (i.e., HIO and IK, and HIO and eHEALS) were first formed. General linear model was then run to test hypotheses 6 and 7. Results in Table 2 show that the interaction between HIO and IK did not significantly affect ISEARCH ($F = 1.01$, $p = 0.46$). Therefore, H6 is not supported. However, the interaction between HIO and eHEALS did significantly affect the outcome variable ($F = 1.22$, $p = 0.045$), thus providing support for H7.

To understand the interaction effect, HIO was divided into high and low groups using median split, and the effect of eHEALS on the outcome variable was compared between these two groups. The results show that eHEALS carries almost the same weight in affecting ISEARCH for the low HIO group ($\beta = 0.542$, $t = 12.19$, $p < 0.001$) as for the high HIO group ($\beta = 0.535$, $t = 11.83$, $p < 0.001$), which does not provide a meaningful explanation for the interaction. The effect of HIO was then compared between the low and high eHEALS levels. As seen in Figure 2, when the eHEALS level is low, the effect of HIO was weaker, $\beta = 0.25$ ($t = 2.14$, $p = 0.03$); when the eHEALS level is high, the effect of HIO became stronger, $\beta = 0.41$ ($t = 4.10$, $p < 0.001$). In other words, eHEALS strengthened the positive effect of HIO on ISEARCH.

Finally, Baron and Kenny's[25] mediation testing procedure was followed to ascertain whether eHEALS partially mediated the effect of HIO on ISEARCH. A series of regression

Table 1. Factor Analysis Results

Items	Factor loadings[a]		
	Health information orientation	Internet knowledge	eHealth literacy
I need to know about health issues so I can keep myself and my family healthy.	**0.734**	0.149	0.012
When I am sick, I try to get as much information as possible about my disease.	**0.774**	0.170	0.089
I make a point to read and watch stories about health.	**0.778**	−0.080	0.138
To be and stay healthy, it is critical to be informed about health issues.	**0.801**	0.004	0.143
I really enjoy learning about health issues.	**0.773**	−0.104	0.169
When I take medicine, I try to get as much information as possible about its benefits and side effects.	**0.727**	0.127	0.043
It is important to me to be informed about health issues.	**0.846**	0.068	0.075
I like to get health information from a variety of sources.	**0.786**	0.037	0.105
Before making a decision about my health, I find out everything I can about the issues.	**0.778**	0.093	0.150
I consider myself to be quite knowledgeable about using the Internet in general.	0.090	**0.786**	0.357
I am confident in my ability to assess trustworthiness of Internet Web sites.	0.057	**0.749**	0.405
I am confident in my ability to assess the quality of information obtained on the Internet.	0.063	**0.727**	0.429
I know how to use the Internet to gather information.	0.089	**0.752**	0.375
How much time do you spend online on a weekly basis?	0.050	**0.618**	0.295
I know what health resources are available on the Internet.	0.167	0.357	**0.810**
I know where to find helpful health resources on the Internet.	0.153	0.384	**0.826**
I know how to find helpful health resources on the Internet.	0.121	0.394	**0.822**
I know how to use the Internet to answer my questions about health.	0.125	0.393	**0.818**
I know how to use the health information I find on the Internet to help me.	0.150	0.289	**0.828**
I have the skills I need to evaluate the health resources I find on the Internet.	0.118	0.179	**0.846**
I can tell high-quality health resources form low-quality health resources on the Internet.	0.144	0.147	**0.848**
I feel confident in using information from the Internet to make health decisions.	0.130	0.331	**0.844**

[a]Factor loadings for each dimension are boldfaced.

analysis was performed. The results in Table 2 show that HIO positively affected ISEARCH; HIO positively impacted the mediator, eHEALS; eHEALS positively affected ISEARCH when HIO was statistically controlled; and that the effect of HIO on ISEARCH was reduced but still significant. The Sobel test was then performed, and the results (Sobel statistic = 7.32, $p < 0.001$) provide support for the partial mediating effect of eHEALS.

The same procedure was applied to test whether the effect of IK on ISEARCH was partially mediated by eHEALS. The results in Table 2 show that IK had a direct, positive effect on ISEARCH; IK had a positive effect on eHEALS; eHEALS had a positive effect on ISEARCH when IK was statistically controlled; and that the effect of IK on ISEARCH was reduced but still significant. The Sobel test statistic was 8.93 ($p < 0.001$), thus providing support for the partial mediating effect.

Demographic effects

Additional analyses were conducted to examine whether age, income, gender, and education had effects on ISEARCH by running univariate analysis of variance using the general linear model. Only the age category had a significant effect on ISEARCH ($F = 6.04$, $p < 0.001$). An independent-samples t-test showed that the mean score of ISEARCH was 3.32 for those younger than 65, 3.09 for those between 65 and 69, 2.99 for those between 70 and 74, 2.69 for those between 75 and 79, 2.13 for those between 80 and 84, and 1.83 for those older than 84 years of age. As depicted in Figure 3, the likelihood that a

senior will use the Internet to search for health information becomes smaller as age increases. This result is consistent with previous works finding the negative effect of age on health information seeking.[13]

Discussion

As a group, the elderly are most in need of health information because of their propensity to have chronic diseases. Accordingly, healthcare researchers are increasingly calling for better efforts to communicate relevant health information that will empower elderly patients to better manage their diseases and to live healthier, independent lives. These communication efforts usually include technology and the Internet to efficiently deliver the needed information. For example, the American Heart Association created a team that developed a taxonomy for managing diseases.[26] One of eight domains of importance in the taxonomy was the "method of communication," which includes delivering information via the Internet. To this end, strides are being made to better push relevant medical information to patients for disease management purposes. New technology can convert medical text to more readable, everyday language especially suited for the elderly,[27] and telehealth systems are being developed that push customized, relevant health information to individual patients as a "cyber influence" to better encourage and persuade appropriate disease management behaviors.[28]

Although this push to provide appropriate health information to the elderly is crucial to empowering disease management, an understanding of the motivation and ability to

TABLE 2. SUMMARY OF HYPOTHESES TESTING RESULTS

| Hypothesis	Testing method	Results	Supported or not supported
	Multiple regressions conducted for testing H1–H3 together	$F=117$, $p<0.001$, $R^2=0.33$	
H1: Health information orientation→(+) likely use of Internet for health information		$\beta=0.12$, $t=3.66$, $p<0.001$	Supported
H2: Internet knowledge→(+) likely use of Internet for health information		$\beta=0.41$, $t=8.28$, $p<0.001$	Supported
H3: eHealth literacy→(+) likely use of Internet for health information		$\beta=0.14$, $t=2.95$, $p=0.003$	Supported
	Multiple regressions conducted for testing H4 and H5 together	$F=572$, $p<0.001$, $R^2=0.62$	
H4: Health information orientation→(+) eHealth literacy		$\beta=0.24$, $t=6.2$, <0.001	Supported
H5: Internet knowledge→(+) eHealth literacy		$\beta=0.75$, $t=31.35$, $p<0.001$	Supported
Test of mediation: eHealth literacy mediates health information orientation→(+) likely use of Internet for health information			Supported
• Health information orientation→(+) likely use of Internet for health information	Simple regression	$\beta=0.61$ ($t=7.47$, $p<0.001$)	
• Health information orientation→(+) eHealth literacy	Simple regression	$\beta=0.48$ ($t=8.20$, $p<0.001$)	
• eHealth literacy→(+) likely use of Internet for health information (controlling for health information orientation)	Multiple regressions	$\beta_{\text{eHealth literacy}}=0.72$ ($t=16.3$, $p<0.001$) $\beta_{\text{Health information orientation}}=0.26$ ($t=3.57$, $p<0.001$)	
Test of mediation: eHealth literacy mediates Internet knowledge→(+) likely use of Internet for health information			Supported
• Internet knowledge→(+) likely use of Internet for health information	Simple regression	$\beta=0.63$ ($t=14.81$, $p<0.001$)	
• Internet knowledge→(+) eHealth literacy	Simple regression	$\beta=0.73$ ($t=32.4$, $p<0.001$)	
• eHealth literacy→(+) likely use of Internet for health information (controlling for Internet knowledge)	Multiple regressions	$\beta_{\text{eHealth literacy}}=0.62$ ($t=9.28$, $p<0.001$) $\beta_{\text{Internet knowledge}}=0.18$ ($t=2.75$, $p=0.006$)	
H6: Health information orientation×Internet knowledge→likely use of Internet for health information	General linear model	$F=1.01$, $p=0.46$	Not supported
H7: Health information orientation×eHealth literacy→likely use of Internet for health information	General linear model	$F=1.22$, $p=0.045$	Supported
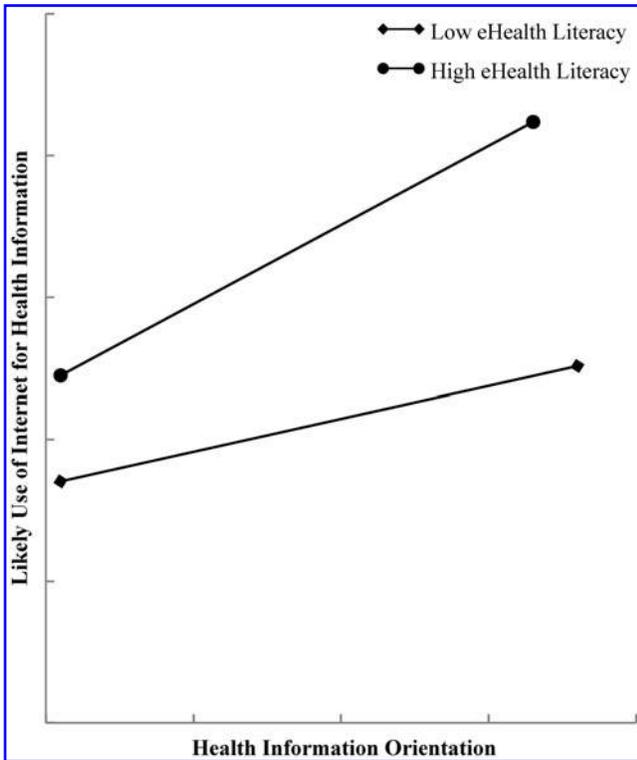
FIG. 2. Interaction effect of health information orientation and eHealth literacy.

access and use the online information is also critical so that the elderly will actually use the information delivered. This research addresses this need by examining the independent as well as joint effects of health motivation and health ability variables on seniors' online health information seeking. The results show that HIO, IK, and eHealth literacy positively influence the likelihood of using the Internet for health information. Moreover, a partial mediating process was uncovered whereby HIO and IK affect the likelihood of using the Internet for health information indirectly through eHealth
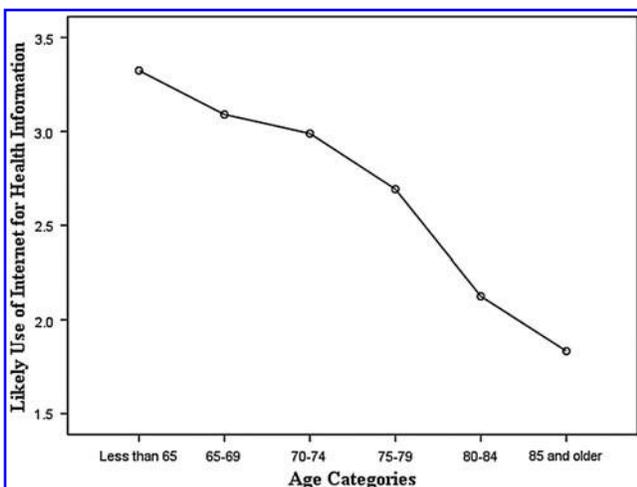

FIG. 3. Age and likely use of the Internet for health information.

literacy. eHealth literacy interacts with HIO so that the positive effect of HIO becomes stronger when the eHealth literacy level is high.

In light of the findings, healthcare providers and health Web sites should target seniors who are health information oriented, knowledgeable about using the Internet, and eHealth literate because they will be more likely to search for and read health information gathered from the Internet. Alternatively, for these older patients who will not seek out health information, healthcare providers can implement disease management programs, such as the cyber influence strategies, that push relevant health information content that may persuade appropriate health behaviors. The supported mediating effect of eHealth literacy further underscores the importance of enhancing consumers' skill sets in utilizing the Internet for health purposes. Education and trainings that aim to increase seniors' eHealth literacy levels provide an actionable intervention mechanism that can strengthen the positive influence of HIO and IK on online health information seeking.

The interaction between eHealth literacy and HIO suggests that positive effects of HIO will be magnified for consumers whose eHealth literacy level is high. This implies that eHealth literacy can be used as a segmentation variable that helps identify seniors who have the greatest potential to become users of health content on the Internet and those who need personalized attention to develop higher levels of HIO.

A theoretical contribution of the current research is the extension of Moorman and Matulich's[13] model of consumers' preventive health behaviors to the online, eHealth context, which suggests that the model can be used to help understand the influencing factors of seniors' online health information seeking. Additionally, this research enriches Moorman and Matulich's[13] theory by including eHealth literacy as an important variable that exerts direct impact on online health information seeking and through its role as a mediator. The finding that eHealth literacy interacts with HIO makes another contribution by identifying eHealth literacy as a boundary condition for the direct effect of HIO on online health information seeking.

This research is subject to the usual limitations associated with survey research. For example, respondents may not have understood questions as they were intended, respondents may have provided incorrect information, or data may have been incorrectly recorded. In addition, respondents were self-selected, and no attempt was made to determine differences between respondents and nonrespondents. Finally, the likelihood of searching for health information was assessed with a single item because of questionnaire space limitations. Ideally, multiple items would be used to assess constructs used in the study.

Author Disclosure Statement

No competing financial interests exist.

References

1. Fox S. (2011) Health topics. Pew Internet & American Life Project. http://pewinternet.org/reports/2011/healthtopics.aspx (accessed Oct. 24, 2012).
2. Baker DW, Wolf MS, Feinglass J, et al. Health literacy and mortality among elderly persons. Archives of Internal Medicine 2007; 167:1503–1509.

3. Wolf MS, Gazmararian JA, Baker DW. Health literacy and functional health status among older adults. Archives of Internal Medicine 2005; 165:1946–1952.

4. Pew Internet Research Report. (2012) Demographics of Internet users. www.pewinternet.org/static-pages/trend-data-(adults)/whos-online.aspx (accessed Oct. 24, 2012).

5. Lorence D, Park H. Study of education disparities and health information seeking behavior. CyberPsychology & Behavior 2007; 10:149–151.

6. Renahy E, Parizot I, Chauvin P. Health information seeking on the Internet: a double divide? Results from a representative survey in the Paris metropolitan area, France, 2005–2006. BMC Public Health 2008; 8:69–78.

7. Rice RE. Influences, usage, and outcomes of Internet health information searching: multivariate results from the Pew surveys. International Journal of Medical Informatics 2006; 75:8–28.

8. Weaver JB, Mays D, Linder G, et al. Profiling characteristics of Internet medical information users. Journal of the American Medical Informatics Association 2009; 16:714–722.

9. Ybarra ML, Suman M. Help seeking behavior and the Internet: a national survey. International Journal of Medical Informatics 2006; 75:29–41.

10. Dutta-Bergman MJ. Developing a profile of consumer intention to seek out additional information beyond a doctor: the role of communicative and motivation variables. Health Communication 2005; 17:1–16.

11. Norman CD, Skinner H. eHEALS: the eHealth literacy scale. Journal of Medical Internet Research 2006; 8:e27.

12. Stellefson M, Hanik B, Chaney B, et al. eHealth literacy among college students: a systematic review with implications for eHealth education. Journal of Medical Internet Research 2011; 13:e102.

13. Moorman C, Matulich E. A model of consumers' preventive health behaviors: the role of health motivation and health ability. Journal of Consumer Research 1993; 20:208–228.

14. Dutta-Bergman MJ. Health attitudes, health cognitions, and health behaviors among Internet health information seekers: population-based survey. Journal of Medical Internet Research 2004; 6:e15.

15. Yoo E-Y, Robbins LS. Understanding middle-aged women's health information seeking on the Web: a theoretical approach. Journal of the American Society for Information Science and Technology 2008; 59:577–590.

16. Basu A, Dutta MJ. The relationship between health information seeking and community participation: the roles of health information orientation and efficacy. Health Communication 2008; 23:70–79.

17. Leung L. Internet embeddedness: links with online health information seeking, expectancy value/quality of health information Web sites, and Internet usage patterns. CyberPsychology & Behavior 2008; 11:565–569.

18. Lee C-J. The role of Internet engagement in the health-knowledge gap. Journal of Broadcasting & Electronic Media 2009; 53:365–382.

19. Czaja SJ, Sharit J, Hernandez MA, et al. Variability among older adults in Internet health information-seeking performance. Gerontechnology 2010; 9:46–55.

20. Pharm MKB, Krass I, Aslani P. Enhancing patient education about medicines: factors influencing reading and seeking of written medicine information. Health Expectations 2006; 9:174–187.

21. Bodie GD, Dutta MJ. Understanding health literacy for strategic health marketing: eHealth literacy, health disparities, and the digital divide. Health Marketing Quarterly 2008; 25:175–203.

22. Bart Y, Shankar V, Sultan F, Urban GL. Are the drivers and role of online trust the same for all Web sites and consumers? A large-scale exploratory empirical study. Journal of Marketing 2005; 69:133–152.

23. Churchill GA. A paradigm for developing better measures of marketing constructs. Journal of Marketing Research 1979; 16:64–73.

24. Nunnally JC. (1978) *Psycholmetric theory*. 2nd ed. New York: McGraw-Hill.

25. Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. Journal of Personality & Social Psychology 1986; 51:1173–1182.

26. Krumholz HM, Currie PM, Riegel B, et al. A taxonomy for disease management: a scientific statement from the American Heart Association Disease Management Taxonomy Writing Group. Circulation 2006; 114:1432–1445.

27. Topac V, Stoicu-Tivadar V. Patient empowerment by increasing information accessibility in a telecare system. Studies in Health and Technology Informatics 2011; 169:681–685.

28. Lee D, Helal S, Anton S, et al. Participatory and persuasive telehealth. Gerontology 2012; 58:269–281.

Address correspondence to:
Dr. Penny M. Simpson
College of Business Administration
The University of Texas–Pan American
1201 W. University Blvd.
Edinburg, TX 78539

E-mail: pmsimpson@utpa.edu