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Older Adult Internet Use and eHealth Literacy

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Abstract

We examine Internet use and eHealth literacy among older adults (aged 55+ years) who were patients at clinics serving low-income populations. Participants included 200 minority and White adults who completed interviews based on a technology acceptance conceptual model. A total of 106 participants (53.0%) used the Internet; utilization was associated with personal characteristics (age, ethnicity, education, poverty), computer characteristics (number of e-devices, computer stress), social support (marital status), and health knowledge and attitudes (health literacy, medical decision making, health information sources), but not health status. Of the 106 participants who used the Internet, 52 (49.1%) had high eHealth literacy; eHealth literacy was associated with computer characteristics (number of e-devices, computer stress), and health knowledge and attitudes (medical decision making, health information sources). In multivariate analysis, computer stress maintained a significant inverse association with eHealth literacy. Educational interventions to help older adults successfully use technology and improve eHealth literacy must be identified.

Keywords

health self-management; health literacy; eHEALS; digital divide

Introduction

Older adults often have multiple chronic conditions and are major users of health care (Ferris et al., 2018). Supporting the health self-management for older adults with multiple chronic conditions is a central component of improving the overall health of this population

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Human Subjects Approval

This research was reviewed and approved by the Wake Forest University Health Sciences Institutional Review Board (FWA00001435) as Human Protocol IRB00024562.

Supplemental Material

Supplemental material for this article is available online.

(Liddy, Blazkho, & Mill, 2014). However, several barriers compromise individuals' self-management of chronic conditions, such as lack of financial resources, poor access to medical resources, complexity of social support, and confusion due to contradictory information provided by multiple health care providers (Liddy et al., 2014). New electronic technology provides opportunities to help older adults address these limitations and improve their self-management of chronic conditions.

Although electronic technology has become nearly ubiquitous, older adults, particularly those age 75 years and older, still lag behind younger persons in its adoption, especially with regard to the Internet (Masterson-Creber et al., 2016). Commonly cited reasons for older adults' lack of electronic technology uptake include attitude, awareness, inappropriate design, cost, lack of self-efficacy, and a general lack of interest (Delello & McWhorter, 2017).

The term "eHealth" refers to electronic technology applications in the health domain, in particular opportunities for health care provided via the Internet (Scantlebury, Booth, & Hanley, 2017). The Internet can be a resource to individuals seeking knowledge about health conditions and their treatments; therefore, it is not surprising that the Internet is considered a tool for transforming the health care industry (Scantlebury et al., 2017). The Internet has extensive readily available information, but the reliability and accuracy of that information is difficult to assess (Nguyen, Mosadeghi, & Almario, 2017). This is problematic as most online health seekers believe all or most information they find on the Internet and do not assess the sources of the website they visit (Morahan-Martin, 2004; Sbaffi & Rowley, 2017).

eHealth literacy is "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" (Norman & Skinner, 2006b, p. e9). Research examining the levels of eHealth literacy among older adults and factors associated with eHealth literacy levels is limited. Choi and DiNitto (2013a) examined factors associated with eHealth literacy among adults aged 60 years and older receiving home-delivered meals in central Texas, and found only 17% of adults age 60 years and older used the Internet. In addition, they found that affordability was the primary barrier to Internet use with the number of older adults who had discontinued Internet use due to costs equal to the number who were currently using it (Choi & DiNitto, 2013a). Furthermore, eHealth literacy was negatively associated with age; those of older ages had lower perceived eHealth self-efficacy (Choi & DiNitto, 2013a).

It is necessary to assess patients' eHealth literacy and identify its determining factors to ensure they can use available eHealth resources effectively (Richtering et al., 2017). However, little research has examined the eHealth literacy of older adults, and the factors associated with eHealth literacy levels. This information is particularly important to address eHealth among the members of low-income and minority older adults who have had limited access to technology (Levy, Janke, & Langa, 2015). The eHealth Literacy Scale (eHEALS) is one of a few existing validated scales assessing eHealth literacy (Norman & Skinner, 2006a; Richtering et al., 2017). It includes eight items scored on a 5-point Likert-type scale and was developed to assess individuals' perceptions about their skills using information

technology to learn about health issues and evaluate the “fit” between eHealth programs and users (Norman & Skinner, 2006a).

Davis’s technology acceptance model (TAM; Davis, 1989) and the person-environmental interaction model (Lawton, 1989) together provide a conceptual framework for understanding technology adoption and proficiency among older adults (Adamson & Shine, 2003; Arcury et al., 2017; Bruner & Kumar, 2005; Chau, 1996; Darkins et al., 2008; Or & Karsh, 2009). Computer characteristics (including whether a person owns or uses electronic devices and stress in using these devices), social support, general health knowledge and attitudes, and health status shape eHealth technology adoption and proficiency, in conjunction with such personal characteristics as age, gender, ethnicity, education, employment, and poverty influence the degree to which older adults utilize personal health technology and their perception of its usability and usefulness (Venkatesh & Davis, 2000). The Internet is an important (perhaps necessary) means to utilize personal health technology, and eHealth literacy is an important indicator of effective personal health technology utilization.

This analysis examines the eHealth literacy levels of low-income and minority older adults and the factors associated with levels by addressing two aims. Among older adults (aged 55 years and older) who are patients at clinics serving low-income populations, the first aim is to determine Internet use, and to identify computer characteristics, social support, general health knowledge and attitudes, health status, and personal characteristics associated with Internet use. Among the older adults who use the Internet, the second aim is to identify the levels of eHealth literacy using the eHEALS scale, and to identify computer and Internet characteristics, social support, general health knowledge and attitudes, health status, and personal characteristics associated with eHealth literacy level.

Method

Participant Recruitment and Participation

The data for this analysis were collected as part of a larger study examining factors related to patient portal use among older patients (Arcury et al., 2017). We recruited participants from urban and rural clinics that primarily serve low-income patients and patients from minority communities. The urban clinic was the Outpatient Department (OPD) of the Wake Forest Baptist Health Internal Medicine residency program, located in Winston-Salem, North Carolina (NC). OPD serves ethnically diverse, low-income, predominantly Medicare and Medicaid patients. Two members of Community Partners HealthNet were the rural clinics. Community Partners HealthNet is a Health Center Controlled Network (established in 1999) to implement practice management systems for community health centers. Greene County Health Care, Inc., and West Caldwell Health Council, Inc., serve the rural areas of Greene and Caldwell Counties, NC, respectively. Greene County Health Care, Inc., has six clinic locations. West Caldwell Health Council, Inc., has two clinic locations.

Participants included community-dwelling adults aged 55 years and older, who were being treated for a chronic disease (diabetes, hypertension, dyslipidemia, or cardiovascular disease), who spoke English or Spanish, and were in sufficiently good health to give

informed consent and complete an interview. The sample included those 55 years and older because familiarity with and use of electronic media varies greatly by age among older adults starting at age 55 years. We recruited a majority of participants using a three-step process. First, with the assistance of clinic staff and physicians, we generated lists of patients who met the inclusion criteria. Second, we randomly selected potential participants from these lists and sent letters introducing and describing the study. Third, we made follow-up phone calls to describe the study and to schedule interviews with those who were sent the letters. In addition, we recruited Spanish-speaking participants as they came to one set of rural clinics. The clinics often do not have accurate telephone information for these participants due to the frequency with which they change telephone service. We approached individuals fitting the inclusion criteria described the study and scheduled interviews for a later date. The study protocol was approved by the investigators' Institutional Review Board, and all participants provided signed informed consent.

Participants included 200 minority (African American, Latino, American Indian, Asian) and White older adult patients who completed baseline interviews. Data collectors attempted telephone contacts with 628 patients who were sent a letter or who were contacted in a clinic. Of the 628 attempted telephone contacts, 110 had a nonworking telephone number, 111 could not be contacted by telephone, 13 were deceased, and 394 were contacted for a contact rate of 62.7%. Of the 394 who were contacted, 194 refused to participate, for a refusal rate of 49.2%, and 200 participants were successfully enrolled and completed interviews, for an overall participation rate of 31.8%. Those who refused to participate were equally divided among women and men. However, more White (42.2%) than African American (22.1%), Latino (0%), American Indian (0%), or Asian (0%) patients refused to participate, and more urban clinic (65.9%) than rural clinic (28.8%) patients refused to participate.

Data Collection

The questionnaire included items eliciting information on personal characteristics, computer characteristics, social support, health knowledge and attitudes, health status, and eHealth literacy. We used existing items and scales when available in developing the questionnaire.

Trained interviewers administered the questionnaires in person, usually at the participants' homes or at the clinic where they received medical care, from November 2014 through May 2016. The interview generally took 1 hr to complete and ranged in length from 45 min to 2 hr. We gave participants an incentive of US\$20 for completing the interview. REDCap (Research Electronic Data Capture), a secure web-based system, was used to record interview data (Harris et al., 2009).

Measures

We measured *eHealth literacy* with the eight-item eHEALS (Chung & Nahm, 2015; Norman & Skinner, 2006a). Among the 106 participants who used the Internet, this scale had a Cronbach's alpha of .73. Because the scores were not normally distributed, they were split at the mean, with high eHealth literacy defined as a score of 29 or greater on the eHEALS, and low eHealth literacy defined as a score of less than 29 on the eHEALS.

We included the participant *personal characteristics* such as age (in the categories 55-59 years, 60-64 years, 65-69 years, and 70 years and older), gender, ethnicity (White and minority), education (high school or less, and greater than high school), and employment (not employed vs. employed part-time or full-time) in the analysis. Poverty level, defined by the United States Federal Government and used to qualify for assistance programs, was based on the total household income adjusted for the total number of residents and for the year in which the data were collected (U.S. Census Bureau, 2017). Poverty level was placed in the categories less than or equal to 200% of poverty level and more than 200% of poverty level.

We included three *computer characteristic* measures. Number of e-devices at home included the number of desktop and laptop computers, tablets, and smartphones participants reported having in their homes; values are reported in the categories of 0, 1, and 2 or more. Frequency of Internet use had the values of less than once a day and at least once a day. Stress experienced when using a computer (Yagil, Cohen, & Beer, 2016) had the values of any stress (low stress, moderate stress, much stress, or very much stress) and no stress.

We included three *social support* measures. Marital status had the values currently married and not currently married. Having a care partner was dichotomous. A care partner was defined for the participants as

someone who helps you with activities and questions about your health. These activities and questions include simple things, like reminding you to take your prescription and about an upcoming doctor's appointment, or finding information about something the doctor has told you; they can include more substantial assistance, like taking you to an appointment, helping you take your medicine, and helping you exercise; and they can include personal assistance, like helping you get dressed and bathe. Those who help you can be your spouse, brothers or sisters, children, or friends. The person who helps you may live with you, but they may also live in another house. They might even live in another town or city and help you by phone or the internet.

Household structure had the values single person, two persons, or more than two-person household.

We included three measures of *health knowledge and attitudes*. The Newest Vital Sign was used to differentiate those with adequate versus inadequate general health literacy (Weiss et al., 2005). The scale had a range of 0 to 6, and had a Cronbach's alpha of .82. Based on the recommendation of the scale developers, those with a score of 4 to 6 were considered to have adequate general health literacy, and those with a score of 0 to 3 were considered to have inadequate general health literacy. Medical decision-making attitude was based on a dichotomous variable about participants' preference to rely on doctor's knowledge when making health-related decisions. The number of health information sources was calculated by asking what sources participants used to find information about a health condition including, but not limited to, the Internet, medical books and magazines, television programs, print literature in medical offices, and talking with health care providers.

We measured *health status* with the SF-12v2® (Ware, Kosinski, & Keller, 1996) and the Charlson Comorbidity Index (Charlson, Pompei, Ales, & MacKenzie, 1987). The SF-12v2® assesses general health-related quality of life and includes a mental component score (MCS) and physical component score (PCS). MCS and PCS were scored and standardized using Health Outcomes™ Scoring Software, Version 4.5 (2011). The Charlson Comorbidity Index is the sum of 18 different self-reported chronic conditions.

Analysis

All analyses were performed using SAS 9.4 (Cary, NC). Participants' personal characteristics, computer characteristics, social support, health knowledge and attitudes, and health status were described as frequency and percentages for categorical variables, and mean and standard deviation (SD) for continuous variables for the total sample, and were also compared between patients who had Internet use and those who had no Internet use, using chi-square tests for categorical variables and student's *t* tests for continuous variable(s). Similarly, comparisons were also made between patients who had high eHealth literacy and those who had low eHealth literacy. A multivariate logistic regression model was used to examine association between ethnicity, number of e-devices, frequency of Internet use, computer stress, general health literacy, medical decision-making attitude (doctor's knowledge) and number of health information sources, and high eHealth literacy. A characteristic was included in the logistic regression model if it had a statistically significance associations at 0.10 level with high eHealth literacy based on bivariate analyses. Odds ratios with the corresponding 95% confidence interval were estimated for each characteristic. The results of a sensitivity analysis for predicting eHealth literacy using eHealth literacy as a continuous measure are reported in the supplementary table. All tests were two-sided and performed at significance level of 0.05.

Results

Participant Characteristics, Computer Characteristics, Social Support, Health Knowledge and Attitudes, and Health Status

About one quarter (27.5%) of participants were aged 55 to 59 years, with 31.5% aged 60 to 64 years, 26.0% aged 65 to 69 years, and 15.0% were aged 70 years or older (Table 1). More participants were female (58.0%) than male (42.0%). Most (60.0%) were minority, 35.0% had greater than a high school education, and 80.0% were not employed. Most (83.3%) had household incomes at 200% of poverty or less.

More than one quarter (28.0%) of participants did not own an e-device, with 47.5% owning two or more (Table 2). Most participants (69.5%) used the Internet less than once each day, and 75.9% experienced stress when using a computer. Fewer than half (42.0%) were married, but 62.0% had a care provider. Thirty-five percent lived alone.

Almost three quarters (72.0%) had inadequate general health literacy, and 56.9% preferred to rely on the doctor's knowledge when making medical decisions. The mean of health information sources used by the participants was 3 ($SD = 1.7$). The mean for the MCS was

50.2 ($SD = 12.3$), and for the PCS was 37.6 ($SD = 12.2$). The mean for the Modified Charlson Index was 5.9 ($SD = 2.7$).

Factors Associated With Internet Use

A little more than half (53%) of the participants used the Internet (Table 3). A greater percentage of those less than age 65 years (65.5% of those aged 55-59 years, and 61.9% of those aged 60-64 years) used the Internet than those aged 65 years or older (42.3% of those aged 65-69 years, 30% of those aged 70 years and older). Internet use did not differ by gender. A greater percentage of White participants (67.5%) than minority participants (43.3%) used the Internet; comparison of African American and Latino participants showed no statistically significant difference (results not shown). Those with greater than a high school education (75.7%) were more likely to use the Internet than those with high school education or less (40.8%). Employment was not related to Internet use. Those with an income greater than 200% of poverty (75.0%) were more likely to use the Internet than those with a lower income (50.6%).

Computer characteristics were associated with Internet use (Table 4). Those with two or more e-devices in their homes were much more likely to use the Internet (82.1%) than those with one (25.5%) or no home e-devices (1.8%). Those experiencing any stress while using a computer (41.1%) were less likely to use the Internet than those who experienced no stress (91.7%). A greater percentage of those who were married (64.3%) used the Internet than those who were not married (44.8%). Having a care partner and household structure was not related to Internet use.

Fewer of those with inadequate general health literacy (42.6%) than those with adequate general health literacy (83.0%) used the Internet. Those who preferred to rely on their doctor's knowledge for medical decision making (42.9%) were less likely to use the Internet than those who did not prefer to rely on their doctor's knowledge (68.2%). Those who used the Internet had an average of 3.4 ($SD = 1.5$) health information sources; those who did not use the Internet used an average of 2.6 ($SD = 1.7$) health information sources (Table 5). Health status, as measured by the SF-12 MCS subscale and PCS subscale, and the Charlson Index, was not associated with Internet use.

Factors Associated With eHealth Literacy

Among the 106 participants who used the Internet, eHealth literacy scores had a range of 8 to 40, and an overall mean of 28.4 ($SD = 7.1$). Fifty-two participants (49.1%) had high eHealth literacy, and 54 (50.9%) had low eHealth literacy. Having high eHealth literacy did not differ in terms of personal characteristics among older adults who use the Internet (Table 3). However, having high eHealth literacy was associated with computer characteristics (Table 4). A greater percentage of those with two or more e-devices in their homes (46.7%) had high eHealth literacy than those with one e-device (33.3%) or no e-device (0). More of those experiencing no stress while using a computer (68.2%) had high eHealth literacy, compared with those who experienced any stress (36.1%). None of the social support measures were associated with high eHealth literacy.

Fewer of those who preferred to rely on their doctor's knowledge for medical decision making (38.3%) had high eHealth literacy than those who did not prefer to rely on their doctor's knowledge (58.6%). Those with high eHealth literacy used an average of 3.8 ($SD = 1.45$) health information sources; those who did not have high eHealth literacy used an average of 3.0 ($SD = 1.5$) health information sources. Health status, as measured by the SF-12 MCS subscale and PCS subscale, and the Charlson Index, were not associated with high eHealth literacy.

A multivariate model of the measures with a statistically significant bivariate association with high eHealth literacy shows that no computer stress was the one measure that remained significantly associated (Table 6). The odds ratio of no computer stress with high eHealth literacy was 3.05, with a 95% confidence interval of [1.13, 8.23], and a p value of .03. In addition, the number of health information sources had a marginal positive association with having a high eHealth literacy score. The odds ratio of health information sources with high eHealth literacy was 1.41, with a 95% confidence interval of [1.00, 1.99], and a p value of .053. A second multivariate model in which all measures with a p value < .20 in the bivariate analyses was also calculated (results not shown). This second model did not differ from the first; only no computer stress was significantly associated with having high eHealth literacy, and the association of number of health information sources remained marginally associated with high eHealth literacy.

Discussion

Little more than one half of the older adults participating in this study use the Internet, and about one half of those who use the Internet score high on the eHEALS, a measure of eHealth literacy. Therefore, one quarter of all the participants have high eHealth literacy.

The level of general Internet utilization among these older adult participants in terms of age, education, and income is not surprising for the patients who receive care at clinics focused on care for low-income populations relative to national surveys (Keenam, 2009; Pew Research Center, 2014). Other analyses find somewhat higher Internet use among adults age 65 years and older, 60% by AARP (Keenam, 2009) and 59% by the Pew Research Center (2014) compared with 53% among adults age 55 years and older in our study. However, our percentage of Internet use reflects the high percentage of low-income participants in our study compared with these national surveys. Our analysis finds lower general Internet use among older adults with increasing age, lower educational attainment, and minority ethnic status. These results are similar to those of other recent studies (Choi & DiNitto, 2013b; Hong & Cho, 2017; Vroman, Arthanat, & Lysack, 2015). We do not find gender differences in Internet utilization; gender differences are not consistent in the literature (Choi & DiNitto, 2013b; Kim, Lee, Christensen, & Merighi, 2016).

Our conceptual framework (Arcury et al., 2017) suggests several factors that should be considered in understanding the Internet utilization of older adults in addition to demographic characteristics, including computer characteristics, social support, health knowledge and attitudes, and health status. We find that general Internet utilization among older adults is associated with computer characteristics (number of e-devices, computer

stress), social support in terms of being married, and health knowledge and attitudes (general health literacy, participation in decision making, number of health information sources), but not with health status. Several of these factors are similar to other research results. In terms of computer characteristics, Vroman et al. (2015) report that those older adults not using the Internet reported feeling intimidated and anxious with technology. In terms of social support, Vroman et al. (2015) and Choi and DiNitto (2013b) found that those living with a spouse were more likely to use the Internet. Choi and DiNitto (2013b) report that Internet usage was associated with having greater social capital, with Kim and colleagues (2016) reporting that digital utilization was associated with social engagement of older adults, particularly among women. We do not find health status to be associated with Internet utilization. This result differs from analyses that find that health status is directly associated with general digital technology use (Berkowsky, Rikard, & Cotten, 2015; Choi & DiNitto, 2013b; Hong & Cho, 2017; Levine, Lipsitz, & Linder, 2017). This difference may reflect our sample design, which required that participants had to be treated for one of four chronic diseases (diabetes, hypertension, dyslipidemia, or cardiovascular disease).

Our older adult participants who use the Internet do not vary in eHealth literacy by such personal characteristics as age, gender, ethnicity, education, or poverty. This differs from other analyses that report that these personal characteristics are related to eHealth literacy (Choi & DiNitto, 2013a; Tennant et al., 2015); however, by limiting our analysis of eHealth literacy to those using the Internet, we account for these personal characteristic differences. Other factors included in our conceptual model are related to eHealth literacy among the older adult Internet users. Although neither social support nor health status measures are related to eHealth literacy, computer characteristics (number of devices, Internet utilization frequency, computer stress), and health knowledge and attitudes (shared medical decision making, number of health information sources) have positive associations with eHealth literacy. In particular, the multivariate model indicates that lack of computer stress is a key to eHealth literacy. This is similar to other analyses that indicate that those older adults with more technology knowledge and trust are more eHealth literate (Gordon & Hornbrook, 2018; Paige, Krieger, & Stellefson, 2017; Tennant et al., 2015).

This research should be evaluated within its limitations. The sample was drawn from patients receiving care at three sets of clinics (one urban, two rural), and the participation rate is limited. These factors limit the generalizability of the results. At the same time, this survey did recruit a large, multiethnic, low-income sample that included both rural and urban patients. The measure of eHealth literacy, the eHEALS, is a validated scale that is becoming widely used (Chung & Nahm, 2015; Norman & Skinner, 2006a).

Conclusion

Increasing older adult Internet use can improve access to health information and improve health self-management (Delello & McWhorter, 2017; Masterson-Creber, Hickley, & Mauer, 2016). It is essential that older adults have the eHealth literacy to understand and determine the veracity of information that they find through Internet and other digital sources (Norman & Skinner, 2006b). Determining personal characteristics that are associated with limited Internet use and eHealth literacy among older adults is important to understanding their

prevalence, but these personal characteristics do not provide leverage points to improve use or literacy. This conceptually based analysis (Arcury et al., 2017) indicates that improving computer skills and limiting computer stress may be the keys to improving older adults' eHealth use and understanding. Cotten (2017) argues that we must identify ways to help older adults successfully use technologies, but that current design impedes this use. At the same time, in their review of eHealth literacy intervention, Watkins and Xie (2014) conclude that existing interventions are neither theory based nor use high-quality research design. Future research and intervention must continue to delineate leverage points for improving technology use and eHealth literacy among older adults, and conceptually based interventions that use these leverage points should be developed and tested.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.Participant Characteristics for Total Sample ($n = 200$).

Participant characteristics	<i>n</i>	%
Age in years		
55-59	55	27.5
60-64	63	31.5
65-69	52	26.0
70 and older	30	15.0
Gender		
Male	84	42.0
Female	116	58.0
Ethnicity		
White	80	40.0
Minority ^a	120	60.0
Education		
High school or less	130	65.0
Greater than high school	70	35.0
Employment		
Not employed	160	80.0
Employed	40	20.0
Poverty level		
200% of poverty or less	160	83.3
Greater than 200% of poverty level	32	16.7

^aParticipants include 90 African American, 26 Latino, two American Indian, and one Asian.

Table 2.

Participant Computer Characteristics, Social Support, Health Knowledge and Attitudes, and Health Status for Total Sample ($n = 200$).

	<i>n</i>	%
Computer and Internet characteristics		
Number of e-devices		
0	56	28.0
1	49	24.5
2 or more	95	47.5
Frequency of Internet use		
Less than once a day	139	69.5
At least once a day	61	30.5
Computer stress		
Any stress	151	75.9
No stress	48	24.1
Social support		
Marital status		
Married	84	42.0
Not married	116	58.0
Care partner		
Yes	124	62.0
No	76	38.0
Household structure		
1 person	70	35.0
2 persons	78	39.0
3 or more persons	52	26.0
Health knowledge and attitudes		
General health literacy		
Inadequate	136	72.0
Adequate	53	28.0
Medical decision-making attitude		
Prefer to rely on doctor's knowledge	112	56.9
Do not prefer to rely on doctor's knowledge	85	43.1
	<i>M</i>	<i>SD</i>
Health knowledge and attitudes		
Number of health information sources	3.0	1.7
Health status		
SF-12		
Mental component score	50.2	12.3
Physical component score	37.6	12.2
Modified Charlson Index	5.9	2.7

Table 3.

Associations of Personal Characteristics With Internet Use and High eHealth Literacy.

Personal characteristics	Internet users			High eHealth literacy		
	<i>n</i> = 200			<i>n</i> = 106		
	<i>n</i>	%	<i>p</i> value ^a	<i>n</i>	%	<i>p</i> value ^a
Total	106	53.0	—	52	49.1	—
Age in years			<.01			.40
55-59	36	65.5		14	38.9	
60-64	39	61.9		22	57.9	
65-69	22	42.3		12	54.5	
70 and older	9	30.0		4	44.4	
Gender			.67			.61
Male	46	54.7		21	46.7	
Female	60	51.7		31	51.7	
Ethnicity			<.01			.10
White	54	67.5		31	57.4	
Minority	52	43.3		21	41.2	
Education			<.01			.14
High school or less	53	40.8		22	42.3	
Greater than high school	53	75.7		30	56.6	
Employment			.18			.53
Not employed	81	50.6		41	51.3	
Employed	25	62.5		11	44.0	
Poverty level			.01			.16
200% of poverty or less	81	50.6		37	46.3	
Greater than 200% of poverty level	24	75.0		15	62.5	

^a chi-square test.

Table 4.

Associations of Computer Characteristics, Social Support, and Health Knowledge and Attitudes With Internet Use and High eHealth Literacy.

	Internet users <i>n</i> = 200		<i>p</i> values ^a	High eHealth literacy <i>n</i> = 106		<i>p</i> value ^a
	<i>n</i>	%		<i>n</i>	%	
Computer characteristics						
Number of e-devices			<.01			.03
0	1	1.8		0	—	
1	27	25.5		9	33.3	
2 or more	78	82.1		43	46.7	
Frequency of Internet use						.06
Less than once a day	—			17	38.6	
At least once a day	—			35	57.4	
Computer stress			<.01			<.01
Any stress	62	41.1		22	36.1	
No stress	44	91.7		30	68.2	
Social support						
Marital status			<.01			.38
Married	54	64.3		24	45.3	
Not married	52	44.8		28	53.8	
Care partner			.09			.48
Yes	60	48.4		31	52.5	
No	46	60.5		21	45.7	
Household structure			.08			.53
1 person	32	45.7		18	56.3	
2 persons	49	62.8		21	43.8	
3 or more persons	25	48.1		13	52.0	
Health knowledge and attitudes						
General health literacy			<.01			.09
Inadequate	58	42.6		24	42.1	
Adequate	44	83.0		26	59.1	
Medical decision-making attitude			<.01			.04
Prefer to rely on doctor's knowledge	48	42.9		18	38.3	
Do not prefer to rely on doctor's knowledge	58	68.2		34	58.6	

^a chi-square test.

Table 5.

Associations of Health Status With Internet Use and eHealth Literacy.

	No		Yes		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i> value ^{<i>a</i>}
Internet use (<i>n</i> = 200)					
Health knowledge and attitudes					
Number of health information sources	2.6	1.7	3.4	1.5	<.01
Health status					
SF-12					
MCS	50.8	13.4	49.7	11.4	.55
PCS	37.4	11.9	37.8	12.5	.84
Modified Charlson Index	5.8	2.9	6.1	2.6	.37
	Low		High		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>p</i> value ^{<i>a</i>}
eHealth literacy (<i>n</i> = 106)					
Health knowledge and attitudes					
Number of health information sources	3.0	1.5	3.8	1.4	<.01
Health status					
SF-12					
MCS	48.1	12.2	51.2	10.4	.17
PCS	37.0	13.3	38.5	11.7	.53
Modified Charlson Index	5.8	2.5	6.4	2.7	.19

Note. MCS = mental component score; PCS = physical component score.

^aTwo-sample *t* test.

Table 6.

Multivariate Logistic Regression Analysis Results for Predicting High eHealth Literacy Among Internet Users ($n = 101$).

	Odds ratio	95% confidence limits	<i>p</i> value
Personal characteristics			
Ethnicity: White (vs. minority)	1.18	[0.40, 3.47]	.77
Computer characteristics			
Number of e-devices: 2 or more (vs. 1)	2.04	[0.67, 6.23]	.21
Frequency of Internet use: ≥ 1 /day (vs. < 1 /day)	1.06	[0.37, 3.03]	.91
No computer stress (vs. any stress)			
Health knowledge and attitudes	3.05	[1.13, 8.23]	.03
General health literacy: Adequate (vs. inadequate)	1.12	[0.39, 3.25]	.84
Prefer to rely on doctor's knowledge for medical decision making	0.62	[0.24, 1.62]	.33
Number of ways tries to find information about health conditions	1.41	[0.99, 1.99]	.053