

ORIGINAL ARTICLE

Evaluating Digital Health Literacy Among Patients Attending Outpatient Clinics

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ABSTRACT

Background: Digital health literacy is crucial for facilitating people to access, comprehend, critique, and use internet health information to make decisions. Digital health literacy is a potential barrier to using digital health resources and may negatively impact health outcomes. This study evaluated the level of digital health literacy in the outpatient clinics and explored the factors associated with digital health literacy. **Methods:** This was a hospital-based cross-sectional study of 280 adult patients visiting the outpatient department of a tertiary care teaching hospital from March to October 2023. Participants were selected using systematic random sampling. A structured questionnaire was used for data collection and contained sociodemographic data, usage of digital technology, and the eHealth Literacy Scale (eHEALS). The data was presented in descriptive statistics and associations between participant characteristics and digital health literacy were evaluated by the Chi-square test. The p-value of <0.05 was deemed to be statistically significant. **Results:** Of the 280 participants, 38.2% had adequate digital health literacy, while 41.8% had problematic and 20.0% had inadequate digital health literacy. Most of the participants had a smartphone (92.9%), internet access at home (83.6%), and searched online for health information (76.4%). Significant associations with sufficient digital health literacy ($p < 0.05$) included higher education level, younger age, and owning a smartphone as well as users seeking health information online. **Conclusion:** Despite the abundance of digital technologies, a significant percentage of patients who attended the outpatient clinics lacked digital health literacy or experienced problems with it.

Keywords: Digital health literacy; eHealth literacy; Outpatient clinics; Health information seeking; Internet use; Cross-sectional study.

INTRODUCTION

Digital technologies have rapidly changed the global landscape of health information access, communication and use ¹. Patients are increasingly turning to the Internet, their smart phones and digital health platforms to get information on diseases, medications, preventive measures and available health care services ². There are opportunities with these technologies to enhance health knowledge and engagement, however, people need to have sufficient digital health literacy to access, comprehend, assess, and use health information ³. Low digital health literacy can result in misinterpreting health information, making health-related decisions, poor medication adherence and heightened susceptibility to health misinformation ⁴. In the digital age, therefore, digital health literacy is growing increasingly a key factor of health in an increasingly patient-centered healthcare.

Digital health literacy is defined as the capacity to locate, understand, assess and apply electronic health information to make informed health choices ⁵. Some previous studies have indicated that age, level of education, socioeconomic status, internet access and previous experience with digital technologies all have a significant effect on digital health literacy ⁶. People with greater DHL tend to use telemedicine more and have better preventive health behaviors as well as better managing their chronic diseases ⁷. On the other hand, a lack of digital health literacy has been linked to suboptimal health outcomes, less use of digital health services and challenges in trusting online health information ⁸.

Even as digital health technologies are increasingly being introduced, there are significant gaps in digital health literacy, especially in low- and middle-income countries where education and digital infrastructure gaps and access to trusted online information are still large. There are comparatively few studies that examined digital health literacy in general outpatient populations, and most of the available studies have examined specific groups, such as university students, older adults, and patients with chronic conditions ^{9,10}. It is therefore important to comprehend what health-related digital literacy is and what factors can affect it, as this will help to inform the development of effective digital health education materials and the equal access to digital health services.

As digital technologies become more prevalent in healthcare delivery, digital health literacy (DHL) assessments are becoming more crucial. The relationship among sociodemographic characteristics, digital technology use and digital health literacy can be assessed to identify subgroups which might require specific educational actions. The aim of the present study was thus to evaluate the digital health literacy of the patients who attend outpatient clinics and to identify sociodemographic and digital technology-related factors associated with digital health literacy.

METHODOLOGY

A cross-sectional study with a hospital-based approach (March to October 2023) enrolled participants from the outpatient clinics of the authors' affiliated Tertiary Care Teaching Hospita (AHS/022F/2022)l. This study sought to evaluate the digital health literacy of patients at outpatient clinics and determine sociodemographic and digital technology-related factors related to digital health literacy. The number of adult patients (aged 18 years and above) enrolled was 280, calculated using the formula $n = Z^2p(1 - p)/d^2$, and selected through systematic random sampling. Patients who could communicate, comprehend the questionnaire, and sign informed consent were included in this study. Patients who had cognitive problems, severe illness that required immediate medical attention or those who did not complete the questionnaire were excluded. All participants signed informed consent forms, and information collected was kept anonymous and confidential throughout the study.

A two-part structured interviewer-administered questionnaire was used to collect data in this study. The initial section collected the participants' sociodemographic data such as gender, age, education, and employment. It also measured digital technology use, such as smartphone ownership, home Internet access, Internet use for health information, how often people use the Internet for health information (daily, weekly, or occasionally), and their level of confidence in finding useful health information online (high, moderate, or low). Digital health literacy was further evaluated with the use of the eHealth Literacy Scale (eHEALS), an eight-item instrument that has been validated to assess a person's perceived ability to find, comprehend, appraise, and apply e-health information in order to make informed health decisions. All items were measured on a 5-point Likert-scale (from strongly disagree to strongly agree), and higher total scores reflecting greater digital health literacy. Overall, eHEALS score was used to divide participants into three groups: Inadequate, Problematic, and Sufficient.

The data were entered and processed using Software Statistical Package for Social Sciences (SPSS) version 25.0 (IBM Corp., NY, USA). Frequencies and percentages were used to present descriptive data. The Chi-square test was used to evaluate the association between sociodemographic characteristics and digital technology-related factors and digital health literacy. A p-value of < 0.05 was deemed statistically significant.

RESULTS

There were 280 participants in total. As shown in **Table I**, most participants were aged 30–44 years (32.9%), followed by 18–29 years (30.0%). Of this group, females accounted for 55.0% of the sample, while 31.1% had a graduate-level education or higher. Almost half of those who participated in the activity were in the workforce (47.1%).

Table I: Sociodemographic Characteristics of the Participants (n = 280)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	18–29	84	30.0
	30–44	92	32.9
	45–59	66	23.6
	≥60	38	13.6
Gender	Male	126	45.0
	Female	154	55.0
Education level	Primary or below	38	13.6
	Secondary	76	27.1
	Higher secondary	79	28.2
	Graduate or above	87	31.1
Employment status	Employed	132	47.1
	Unemployed	72	25.7
	Student	43	15.4
	Retired	33	11.8

Table II reveals that 260 (92.9%) had a smartphone, 234 (83.6%) had internet access at home, and 214 (76.4%) used the internet to look for health information. The percentages of digital health literacy (DHL) were 38.2% sufficient, 41.8% problematic, and 20.0% inadequate, based on the eHealth Literacy Scale (eHEALS).

Table II: Digital Health Technology Use and Digital Health Literacy (n = 280)

Variable	Category	Frequency (n)	Percentage (%)
Owns a smartphone	Yes	260	92.9
	No	20	7.1
Internet access at home	Yes	234	83.6
	No	46	16.4
Uses the internet to search for health information	Yes	214	76.4
	No	66	23.6
Frequency of searching health information online	Daily	102	36.4
	Weekly	96	34.3
	Occasionally	82	29.3
Confidence in finding useful online health information	High	112	40.0
	Moderate	97	34.6
	Low	71	25.4
Overall digital health literacy level (eHEALS)	Inadequate	56	20.0
	Problematic	117	41.8
	Sufficient	107	38.2

The results indicated that age ($p = 0.035$), education level ($p < 0.001$), smartphone ownership ($p = 0.001$) and internet use for health information ($p < 0.001$) were significantly associated with digital health literacy, as presented in **Table III**. There was no significant difference in the association of gender with digital health literacy ($p = 0.321$).

Table III: Association Between Participant Characteristics and Digital Health Literacy (n = 280)

Variable	Sufficient Digital Health Literacy n (%)	Inadequate/Problematic Digital Health Literacy n (%)	χ^2	p-value
Age (years)				

18–29	42 (50.0)	42 (50.0)		
30–44	41 (44.6)	51 (55.4)		
45–59	18 (27.3)	48 (72.7)	8.62	0.035
≥60	6 (15.8)	32 (84.2)		
Gender				
Male	52 (41.3)	74 (58.7)	0.98	0.321
Female	55 (35.7)	99 (64.3)		
Education level				
Primary or below	5 (13.2)	33 (86.8)		
Secondary	20 (26.3)	56 (73.7)	26.44	<0.001
Higher secondary	33 (41.8)	46 (58.2)		
Graduate or above	49 (56.3)	38 (43.7)		
Smartphone ownership				
Yes	105 (40.4)	155 (59.6)	10.27	0.001
No	2 (10.0)	18 (90.0)		
Uses the internet to search for health information				
Yes	97 (45.8)	115 (54.2)	17.83	<0.001
No	10 (14.7)	58 (85.3)		

DISCUSSION

This study evaluated the digital health literacy of outpatients in outpatient clinics and examined the socio-demographic and digital technology-related factors that were associated with digital health literacy. The results showed that just 38.2 per cent of respondents had a good level of digital health literacy, with the majority having problematic (41.8%) or inadequate (20.0%) levels. Digital technology was present and widespread, but it did not always lead to good digital health literacy among participants. Age, education level, smartphone ownership and internet use for health information showed significant associations with digital health literacy, whereas gender was not significantly associated. These findings highlight the need to bolster digital skills as well as access to digital health resources. This aspect of effective patient engagement and informed healthcare decision-making has also been emphasized in previous studies ^{11,12}.

Despite the availability of smartphones and internet, a significant number of the participants in this study had problematic or insufficient digital health literacy. This indicates that use of digital technology is not sufficient to gain the capacity to find, understand, and use trustworthy health information from the internet. Many adults reported problems assessing the trustworthiness of health information from the internet, even though they used the internet a lot, and this was reported in a multinational study undertaken by previous studies ¹³. Likewise, previously it was determined that there were significant differences in digital skills among populations, and digital skills were significantly associated with the ways in which individuals can use online health information ¹⁴. A study in China also showed that having less digital health literacy was correlated with diminished confidence in managing health information retrieved online ¹⁵. Similarly, German studies indicated that a significant percentage of adults lacked digital health literacy, especially evaluating the trustworthiness of Internet health information ¹⁶. The results of these studies help reinforce the need for interventions to enhance digital health literacy beyond digital access.

In the current study, education level was one of the strongest predictors of digital health literacy, with participants who reported having a higher education level having significantly higher digital health literacy than participants with lower levels of education. Familiarity with digital health literacy also was higher among younger adults than older adults. These findings are similar to those of prior studies showing that higher education levels improve cognitive and analytical functions needed to comprehend and assess digital health information ^{17,18}. A population-based study in South Korea found that, when controlling for other factors, greater education was independent of higher levels of digital health literacy and confidence in digital health services ¹⁹. Likewise, it was emphasized that education plays a key role in eHealth literacy, affecting information-seeking and critical appraisal skills ²⁰. This is also evident in European populations, where older adults were less likely to be able to use digital health platforms effectively ²¹. These findings indicate that greater attention should be paid to older persons and those with less education to digital health education programs.

The study also showed that having a smartphone and using the Internet for searching health information was significantly related to digital health literacy as well. Active Internet search for health information was associated with having sufficient DHL compared to no search, with participants who actively searched more likely to have sufficient DHL. This has been echoed in Australian and U.S. studies that found that repeated interaction with digital health information boosted people's confidence in how to access and understand health information ^{22,23}. While smartphone users are more likely to be able to use digital resources, they also need to be able to find reliable information and be able to differentiate it from misinformation.

Interestingly, gender was not significantly correlated with digital health literacy in the present study, which suggests that digital competencies might be more related to educational and technological factors than to gender. Similar results have been seen in other international studies which did not find any consistent gender differences once controlling for education and internet use ^{24,25}. These results highlight the importance of interventions to enhance digital health skills for all patients, not just one gender.

There are some limitations in this study. Because of its cross-sectional design, it is difficult to determine causal relationships between participant characteristics and digital health literacy. Moreover, the study was undertaken in one tertiary care teaching hospital, which might limit the applicability of the results to other healthcare facilities. Self-reported measures were used to evaluate digital health literacy, which can be subject to reporting bias. Further multicenter studies with more diverse populations and the use of objective measures of digital health literacy are recommended to offer more comprehensive insights into digital health competency among patients and to guide the creation of targeted digital health literacy educational interventions.

CONCLUSION

The findings of this study showed that, although there was a high prevalence of smartphone and Internet use, a significant number of patients who go to outpatient clinics were not digitally literate or with poor digital health literacy. Gender was not significantly associated with digital health literacy, while higher level of education, younger age, owning a smartphone, and use of the internet for health information were significantly associated with digital health literacy. These results suggest the need for tailored interventions to enhance the capability of patients

to access, assess, and effectively use online health information. Digital health education in the mainstream of health care and community-based awareness campaigns could improve digital health literacy and make better use of digital health resources.

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