

# Internet use and eHealth literacy among health-care professionals in a resource limited setting: a cross-sectional survey

This article was published in the following Dove Press journal:  
*Advances in Medical Education and Practice*

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**Background:** Health-care professionals should be able to identify and use reputable health care–information sources from the Internet and other relevant sources of information, in order to make good medical decisions. The level in health professional eHealth literacy and the extent of Internet use in a resource-constrained setting is not well documented. The aim of this study was to assess the extent of Internet use and eHealth literacy among a cross section of health-care professionals at the University of Gondar Comprehensive Specialized Hospital, northwest Ethiopia.

**Methods:** An institution-based cross-sectional study was conducted to assess Internet use and eHealth literacy among health professionals working at the hospital from November 20 to January 17, 2018. Descriptive analysis was used to describe Internet use and eHealth literacy. Multivariable logistic regression was done to identify which factors were associated with the eHealth literacy of participants.

**Results:** In total, 291 study subjects were approached and included in the study, with a response rate of 98.6%. The majority of respondents were female (53.7%) and the mean age was 30.09±5.025 years. Only 47.4% of survey respondents said that they used the Internet regularly for professional/medical updates. The mean eHealth literacy was 27.840±5.691. The majority of participants with high eHealth literacy were aged 21–29 years, and females were slightly more literate regarding eHealth than males (33.1%). Age, type of profession, salary, and years of experience were significantly associated with eHealth literacy.

**Conclusion:** The present data confirm that Internet use and eHealth literacy of health professionals is noticeably good, which clearly suggests that there is an opportunity for eHealth to be integrated in the health-care system in tertiary-health facilities in northern Ethiopia if appropriate training and education is provided.

**Keywords:** Internet use, eHealth literacy, health professionals, Ethiopia

## Introduction

The Internet is one of the main sources of information that enables users to have access to a larger volume of information in many sectors, regardless of geographic location. Surveys have indicated that most Internet users in the world have used the Internet to get health information.<sup>1–3</sup> Developments in Internet access and improvements in performance due to new technologies have made the Internet the focus of many new health-care improvements.<sup>3–7</sup> As a result, the Internet is having a significant impact on health and health care, as it has the potential to advance the health-care delivery and support the decision-making of health-care providers.<sup>8</sup> When compared with other professionals of different disciplines, health-care

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professionals use the Internet more.<sup>9</sup> The impact of the Internet on the health-care profession looks to increase as health-care professionals use it more as an instrument to them stay informed and up to date on recent improvements in their respective specialties.<sup>9–11</sup>

According to Internet World Stats, the number of Internet users in Ethiopia has increased from 10,000 users to more than 16 million in the past two decades, with 15% Internet penetration.<sup>12</sup> Although there have been no studies done in the areas of Internet cost and availability in Ethiopia, it is relatively costly when compared to other developed nations. The concept of eHealth literacy is defined as “the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to address or solve a health problem.”<sup>13</sup> eHealth literacy includes six basic skills: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy. As a result, eHealth literacy is affected by such factors as age, sex, education, availability and accessibility of the Internet, and income.<sup>13–16</sup>

Studies have shown that distorted information may influence health beliefs and behavior of individuals negatively.<sup>17,18</sup> Health-care professionals should be able to identify and use reliable health care–information sources from the Internet, in order to make sound decisions and interventions.<sup>19</sup> The existing literature has mainly focused on developed countries. There have been few studies done in developing countries, particularly in sub-Saharan Africa. Studies have been conducted regarding computer literacy and utilization among Ethiopian health professionals and medical students, which were reported to be low.<sup>20–23</sup> However, health-care professionals’ perspectives on Internet use and their eHealth literacy are lacking. The aim of this study was to assess the extent of Internet use and evaluate eHealth literacy among a cross section of health-care professionals at the University of Gondar Comprehensive Specialized Hospital (UOGSH), northwest Ethiopia.

## Methods

### Study design and setting

An institution-based cross-sectional study was conducted to assess Internet use and eHealth literacy among health professionals working at the UOGSH from November 20 to January 17, 2018. During the study period, the UOGSH had 834 permanent health-professional employees. The majority were nurses (483), medical laboratory

technicians (110), and midwives (95). All health professionals who were on annual and sick leave were excluded. There were desktop computers in some departments, and very few of them had Internet connections. Most of the departments did not use the computers for information-seeking or quick referencing; rather, they used them for recording purposes only.

### Sampling and participants

The sample for this study was calculated by using a single population–proportion formula, with finite population correction,<sup>24</sup> 95% confidence level, and a proportion of Internet use of 50%, since there had been no previous study done in the same population, with relative precision of 5% and 10% nonresponse rates. The sample-size formula was valid for this study, because the calculated sample was >5% of the total study population. As such, we needed to use the formula with finite-population correction:

$$n' = \frac{NZ^2P(1 - P)}{d^2(N - 1) + Z^2P(1 - P)}$$

where  $n'$  is sample size with finite-population correction,  $N$  population size,  $Z$  the  $Z$ -statistic for level of confidence,  $P$  expected proportion, and  $d$  precision.

Accordingly, the total sample was 291. A simple random-sampling technique was performed to select study participants.

### Data acquisition and analysis

A self-administered structured questionnaire was adapted after reviewing the relevant literature.<sup>9,25,26</sup> It had been validated and pretested on 30 health professionals working at Debre Markos Referral Hospital for its consistency.<sup>27</sup> The questionnaire has three main parts. The first part contains items on sociodemographic information of participants. The second part is related to participants’ use of the Internet, and the third part contains items to evaluate eHealth literacy of the participants. We asked participants 15 categorical (yes/no) items to determine their use of and access to the Internet. The eHealth literacy scale (eHEALS) was used as a measuring tool, as it has high internal consistency ( $\alpha=0.88$ ).<sup>25</sup> The eHEALS measures the ability to locate, evaluate, integrate, and apply information gained from the Internet. Respondents evaluate their level of agreement with alternatives (strongly agree, agree, undecided and disagree) on the eight items. One can score a minimum of 8 and a maximum of 40 in this section. After collection, data were checked, cleaned, and

analyzed using Epi Info and SPSS version 20. Descriptive analysis was performed to describe Internet use and eHealth literacy. Binary logistic regression was done to identify which factors were associated with eHealth literacy.

## Operational definitions

In this study, “Internet use” referred to health professionals’ practice of using the Internet for browsing health-related information to make sound decisions, whereas “eHealth literacy” referred to participants’ ability to locate and use credible information from the Internet. An eHealth-literacy score of 26 was used as a cutoff point to determine the level of eHealth literacy of participants. After a relevant-literature review, we labeled eHEALS score  $\geq 26$  as high eHealth literacy and eHEALS score  $< 26$  as low eHealth literacy.<sup>28–31</sup> Ethical clearance was secured from the Department of Health Informatics, College of Medicine and Health Sciences, Debre Markos University ethical review committee. Additional permission was obtained from the offices of UOGCSH hospital directors, and verbal informed consent from respondents was also attained. Verbal informed consent was acceptable and approved by the ethical review committee.

## Results

In total, 291 study subjects were approached and included in the study from November 20 to January 17, 2018. The response rate was 98.6%. The majority of respondents (154, 53.7%) were females, and the mean age was 30.09

$\pm 5.025$  years. A large number of respondents were bachelor's degree holders (220, 76.7%). Most study participants were nurses 88 (30.7%), and regarding work experience, employees with  $< 5$  years of work experience (167, 58.2%) comprised the majority. A total of 191 (66.6%) respondents were employees earning a monthly salary of ETB 3,500–5,500 (Table 1).

## Internet use

Overall, 100% of health professionals reported that they had access to the Internet, of which 41.5% used smart phones and 54% of them a wi-fi connection to access the Internet. In sum, 41.8% of respondents had Internet access in their office, and 42.2% reported that they used the Internet several days a week. Only 47.4% of survey respondents said that they used the Internet regularly for professional/medical updates, while 66.2% stated that they would take certified web-based courses. See Table 2 for details.

## eHealth literacy

Of the 287 participants, 199 (69.3%) reported that they had high eHealth literacy. Mean eHealth literacy was  $27.840 \pm 5.691$ . The majority of participants with high eHealth literacy were aged 21–29 years, and females (104, 36.2%) were slightly more literate regarding eHealth than males (95, 33.1%). A total of 128 (44.6%) health professionals with less  $< 5$  years' work experience reported that they possessed high eHealth literacy. Among various health professionals, Nurses and degree holders

**Table 1** Participants’ sociodemographic characteristics

	n	%		n	%
<b>Sex</b>			<b>Profession</b>		
Male	133	46.3%	Medical doctor	19	6.6%
Female	154	53.7%	Nurse	88	30.7%
<b>Age, years</b>			Health officer	9	3.1%
21–29	171	59.6%	Lab technician	50	17.4%
30–39	94	32.8%	Midwife	64	22.3%
>39	22	7.7%	Pharmacist	57	19.9%
<b>Education</b>			<b>Years of experience</b>		
Diploma (certificate)	55	19.2%	<5	167	58.2%
Degree (BSc)	220	76.7%	5–10	86	30.0%
Master's (MPH/MSc)	12	4.2%	>10	34	11.8%
			<b>Salary (ETB)</b>		
			1,500–3,500	54	18.8%
			3,500–5,500	203	70.7%
			>5,500	30	10.5%

**Table 2** Internet access and use

Questions		n	%
Do you have Internet access?	Yes	287	100
	No	—	—
If yes, select the type of connection	DSL/cable	78	27.2
	Wi-fi	155	54.0
	Mobile data	54	18.8
If you have Internet access, where do you have it?	Office	120	41.8
	Cafés/hotels	28	9.8
	Campus lab/wi-fi	100	34.8
	Home	39	13.6
If you use the Internet, how frequently do you use it?	Daily	67	23.3
	Several days a week	121	42.2
	Weekly	61	21.3
	<One day a week	38	13.2
By what means do you access the Internet?	Smartphone	119	41.5
	Laptop	113	39.4
	Tablet	14	4.9
	Desktop	41	14.3
Do you use the Internet regularly for medical/professional updates?	Yes	136	47.4
	No	151	52.6
Does information from websites influence your decision-making?	Yes	173	60.3
	No	114	39.7
Have you ever advised a website for a patient?	Yes	7	2.4
	No	280	97.6
Has a patient ever asked for the name of a website for more information on their condition?	Yes	—	—
	No	287	100
If yes, have you ever recommended any?	Yes	—	—
	No	—	—
Do you trust the general quality of medical websites?	Yes	96	33.4
	No	191	66.6

reported higher level of eHealth literacy. For more detail, see [Table 3](#).

From the eHEALS, the statement “I know what health resources are available on the Internet” had the highest level of agreement (254 of 287, 88.5%). The two statements that health professionals had the highest level of disagreement with were related to confidence in using information received from the Internet to make health decisions (129 of 287 [45.5%] disagreed and strongly disagreed) and ability to find helpful resources on the Internet (103 of 287 [35.9%] disagreed and strongly disagreed). On binary logistic regression, age 20–29 years, physicians, and those with <5 years' work experience demonstrated

a higher likelihood of self-reported eHealth literacy. See [Table 4](#) for details.

## Discussion

The findings from this study revealed that although health professionals have access to use the Internet, most do not use it for searching reputable health information from online databases like PubMed and websites. Their self-reported eHealth literacy was also found to be reasonably good. Internet access in this study was 100%, but in other relevant studies conducted in developed countries, there was relatively less access. This disparity could be because of study setting: this study was conducted at a single institution.<sup>9,32</sup> In sum, 47.4% of

**Table 3** eHealth literacy—response frequency and percentage

	High eHealth literacy (%)	Low eHealth literacy (%)
<b>Sex</b>		
Male	95 (33.1%)	38 (13.2%)
Female	104 (36.2%)	50 (17.4%)
<b>Age, years</b>		
21–29	127 (44.3%)	44 (15.3%)
30–39	62 (21.6%)	32 (11.1%)
>39	10 (3.5%)	12 (4.2%)
<b>Educational status</b>		
Diploma	31 (10.8%)	24 (8.4%)
Degree	159 (55.4%)	61 (21.3%)
Master's	9 (3.1%)	3 (1.0%)
<b>Profession</b>		
Medical doctor	19 (6.6%)	—
Nurse	65 (22.6%)	23 (8.0%)
Health officer	9 (3.1%)	—
Medical lab technician	35 (12.2%)	13 (4.5%)
Pharmacist	35 (12.2%)	22 (7.7%)
Midwife	36 (12.4%)	28 (9.8%)
<b>Years of experience</b>		
<5	128 (44.6%)	39 (13.6%)
5–10	56 (19.5%)	30 (10.4%)
>10	15 (5.2%)	19 (6.6%)
<b>Salary (ETB)</b>		
1,500–3,500	31 (10.8%)	23 (8.0%)
3,500–5,500	141 (49.1%)	62 (21.6%)
>5,500	27 (9.4%)	3 (1.0%)

participants in this study confirmed that they used the Internet for regular medical/professional updates, which is very low compared to health-care professionals in developed countries like the UK, where it is 97%.<sup>33</sup> A possible reason for this could be the poor computer hardware and very slow Internet connection at the hospital. More than half the participants in this study were willing to take certified web-based courses, similar to online surveys among health professionals in other countries.<sup>34,35</sup> The effect of Internet use on clinical decisions was also notably significant and confirmed studies conducted in the US and Taiwan.<sup>36,37</sup> On the contrary, the quality of health-care information was less trusted, similar to findings of Benigeri and Pluye.<sup>38</sup> Only 2.4% of health professionals recommended a website for their patients. On the other hand, patients never asked health professionals for a website recommendation to get more information on their condition, and this could have been due to the socioeconomic and infrastructural limitations of the underdeveloped world.<sup>35,39</sup> Our

findings in this study illustrate that physicians use the Internet for medical updates more and other professionals like pharmacists and medical laboratory technicians use the Internet for finding health-related information less, which is similar to studies in Nigeria and Malaysia.<sup>40,41</sup>

Regarding eHealth literacy, this study found that most health professionals (69.3%) reported high eHealth literacy, which confirms other findings.<sup>42</sup> This study revealed that doctors and nurses had higher eHealth literacy than pharmacists and other health professionals, which confirms a Scottish study.<sup>43</sup> Monthly salary and years of experience were predictive of low eHealth literacy. This could be due to lower-paid health professionals not usually being degree holders, which implies that they do not have college education. Aside from the concept of digitizing health care being a new concept for underdeveloped countries like Ethiopia, health professionals with more work experience are unwilling to use new technologies.

**Table 4** Multivariable logistic regression for eHealth literacy

Independent variables	Dependent variables(eHealth literacy)			
	Coefficient estimate	Lower confidence level	Upper confidence level	P-value
<b>Age, years</b>				
21–29	1.182	1.320	8.058	0.010*
30–39	0.844	0.907	5.960	0.079
<b>Sex</b>				
Male	0.243	0.771	2.108	0.345
<b>Education</b>				
Degree	0.657	1.051	3.543	0.034*
Master's	0.843	0.566	9.524	0.242
<b>Profession</b>				
Physician	1.889	1.409	31.029	0.017*
Nurse	0.788	1.107	4.363	0.024*
Health officer	0.820	1.368	6.025	0.084
Medical lab technician	0.596	0.831	3.962	0.135
Pharmacist	0.213	0.598	2.560	0.566
<b>Salary (ETB)</b>				
3,500–5,500	0.523	0.911	3.126	0.096
>5,500	1.311	0.166	1.243	0.020*
<b>Years of experience</b>				
<5	1.392	1.872	8.639	0.000*
5–10	0.810	1.002	5.039	0.049*

**Notes:** Reference groups: age (>39 years), sex (female), education (diploma), profession (midwife), salary (ETB1,500–3,500), years of experience (>10). \*P<0.05).

Although it was not on the regression table, Internet use significantly predicted the eHealth literacy of health professionals, which coincides with other research.<sup>42</sup> Finally, although the majority of health professionals have access to the Internet, most of them do not use it for finding health information from credible sources. Findings from the eHEALS indicate high potential for future developments in eHealth interventions. The hospital might consider conduct training on how to find credible health information from reputable online sources.

## Limitation

The major limitation of this study was the small sample, which was due to limited resources, and it was conducted among health professionals working at the UOGSH. For this reason, the results may not be attributable to the entire health-professional population. It would be more useful and generalizable if this study were conducted in the Amhara region as a whole with appropriate stratum samples to determine the extent of Internet use and eHealth literacy of a larger sample of health professionals in more facilities than we were able to cover.

## Conclusion

Besides the mounting indication of efficacy, the present data confirm that Internet use and eHealth literacy of health professionals are noticeably good. This clearly suggests that there is an opportunity for eHealth to be fully integrated into the health-care system at tertiary-health facilities if appropriate training and education is provided.

## Availability of data and material

All data generated or analyzed during this study are included in this published article.

## Acknowledgments

The authors of this study would like to thank all health professionals for their time and effort spent during the data-collection period.

## Author contributions

All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

## Disclosure

The authors report no conflicts of interest in this work.

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