

# Electronic health-literacy skills among nursing students

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

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**Background:** The Internet has become a major source of health-related information. In order to provide better health services and health-care education to society, nurses should have acceptable electronic health (eHealth) literacy.

**Objective:** The main aim was to measure eHealth-literacy skills among nursing students of Kathmandu Medical College Teaching Hospital, Nepal.

**Methods:** A cross-sectional study was conducted among 152 Bachelor of Science nursing students at the hospital. Data were collected using the self-administered eHealth Literacy Scale. This is an eight-item tool that is assessed on 5-point likert scale to measure consumers' perceived skills at finding, evaluating, and applying eHealth information to health problems. Demographical and personal variables were collected to explore their relationship with eHealth literacy.

**Results:** A total of 152 nursing students with mean age of 19.84±1.62 years participated in the study. While 44.7% perceived that they had average Internet skills, 65.1% found the Internet useful in helping them make decisions about their health. Nursing students had a moderate self-perceived level of eHealth literacy (median 3.69, IQR 0.87). Related factors included students' Internet skills, frequency of using the Internet for health related purposes, and self-perception of the usefulness and importance of the Internet.

**Conclusion:** This study represents a baseline reference for eHealth literacy among nursing students. Students have some basic necessary skills, while other skills still need to be improved. There is a need to pay attention to eHealth-literacy needs of nursing students.

**Keywords:** digitization, health literacy, Internet, nursing students, technology

## Introduction

Health literacy, a relatively new concept in health promotion, is recognized as one of the public health goals for the new century.<sup>1</sup> The level of health literacy signifies whether the public is able to access and process basic health information and services and thereby participate in health-related decisions.<sup>2,3</sup> Electronic resources are effective for providing health-related information.<sup>4</sup> Electronic health (eHealth) offers a medium of electronic tools by which people can navigate personal health-care information easily. Being aware of electronic resources in getting relevant health information is eHealth literacy.<sup>5,6</sup> In broader terms, eHealth literacy enables people to seek, find, understand, and appraise health information from electronic sources and apply this knowledge in addressing or solving health problems.<sup>7</sup>

With the rapid growth of information technology, the use of electronic resources in health is increasing. The benefits of using the Internet — low cost, high-speed searching, and the ability to access information anonymously — have made the

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Internet a preferable choice in searching for health information.<sup>8</sup> There is enough evidence that a large number of Internet users search for health information online.<sup>9–11</sup> With this in mind, the government of Nepal has also developed a digital framework in which the primary focus is digital health-care programs and mobile health.<sup>12</sup> In these scenario of increasing demand of digital health-care programs, it is necessary to be aware of and orient eHealth. In addition, eHealth literacy also has high significance in the self-management of patients with chronic diseases. It is estimated that 80% of people with chronic diseases manage their diseases themselves at home or with the help of friends, family members, or relatives.<sup>13</sup> However, for the self-management of diseases, it is very important to get the right information from reliable sources. Nurses are usually the primary contact for health information in the community, with whom people feel more comfortable in communicating regarding their health problems.<sup>14,15</sup> Therefore, in the present context of advanced communication and technology, nurses should have an acceptable level of eHealth literacy, in order to provide better health services and health-care education to the community. Nurses should be aware of the medium from which health information is accessible to majority of the population. Nurses should have skills that help their patients utilize eHealth information, and correct any misunderstanding of their diseases that could result from misinterpretation of information gathered from the Internet.<sup>16</sup>

However, many nurses lack the appropriate skills in using electronic resources for learning and decision-making regarding health-related issues. There is limited information on eHealth literacy among nurses in Asian regions and none in Nepal. The study aimed to measure eHealth literacy skills among nursing students of Kathmandu Medical College Teaching Hospital (KMCTH), Nepal and to determine factors that contribute to eHealth literacy.

## Methods

This was a cross-sectional study conducted among undergraduate nursing students of KMCTH. KMCTH was chosen purposively, considering the convenience of researchers. KMCTH is a private medical college affiliated with Kathmandu University in Nepal. The study was conducted from July 2018 to September 2018. Inclusion criteria were being enrolled in the undergraduate nursing program at KMCTH at the time of data collection and agreeing to participate. Since the nursing program is 4 years, students from the first to fourth years were

recruited, including the outgoing batch. The outgoing batch had already sat their final examinations, but were waiting on their results. The total number of students was 152. In the first round of data collection, information from 140 students was collected. We contacted those who were absent during the original data collection and arranged a second round of data collection with them, thus reaching the total.

A self-administered questionnaire was used for data collection. We used the eHealth Literacy Scale (eHEALS) to measure eHealth skills. This is a globally validated tool to assess skills and comfort in using electronic resources in health.<sup>17</sup> The eight-item eHEALS was used to assess combined knowledge and perceived skills to examine, evaluate, and apply health information from the Internet. Respondents needed to specify their opinions with eHEALS statements based on five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). This scale has been reported to have reliability  $\alpha$ -value 0.88 in a study on medical and dental interns in Nepal.<sup>18</sup> In addition to the eight items, this tool has two questions that rate the importance and usefulness of eHealth resources. Personal and demographic factors and items related to purpose of Internet use were also used to assess factors associated with eHealth literacy. Ethical approval for conducting the study was obtained from the Institutional Review Committee of KMCTH. Written informed consent was obtained from the nursing students after explaining the objectives of the study prior to administering the questionnaire. All responses were kept confidential and anonymity maintained.

## Statistical analysis

The collected data were entered into SPSS 20.0 for Windows. Descriptive statistics were used to examine demographic and personal variables, including means and SD. One way ANOVA and independent *t*-tests were used to examine significant effects of reported personal and demographic variables on eHealth literacy.  $P \leq 0.05$  was considered statistically significant.

## Results

A total of 152 nursing students completed the questionnaire (response rate 100%). The mean age of the participants was  $19.84 \pm 1.62$  years. All participants were female, and the mean aggregate of students' past academic years' achievement was  $74.13 \pm 7.09$ . An equal proportion of students (19.7%) were from each of the second, third, and

fourth year but 23.7% were first-years and 17.1% from the outgoing batch.

Most of the students (78.3%) reported smartphones as their primary means of Internet use. While 84.9% reported that they used the Internet several times a day, only 19.7% reported that for health purposes they used the internet this frequently. For health purposes, it was found that a quarter used the Internet fewer than three times a day, followed by 24.3% on alternate days, 17.8% for sometimes in a month, and 11.8% for once a week. Around 65.1% of the sample perceived that the Internet was useful for making health decisions. Similarly, 61.8% felt that it was important to be able to access health-related resources. However, 44.7% of the sample perceived that they had an average level of Internet skills (Table 1).

The overall median score for eHealth literacy was 3.69 (IQR =0.87), range 1–5 which indicates that nursing students in this study have a moderate perceived level of eHealth literacy. As shown in Table 2, most responses have similar moderate means scores.

The findings indicated that there were statistically significant differences between participants' self-perception of Internet skills, importance and usefulness of the Internet, and frequency of using the Internet for health purposes and eHEALS scores, as shown in Table 3. However, there were no statistically significant differences between eHealth literacy and average aggregate academic performance and frequency of Internet use for other purposes. Moreover, independent *t*-tests examining eHealth-literacy scores and devices for using the Internet showed no significant differences ( $P=0.8$ )

## Discussion

In this era, health-care services have changed from provider-centered to patient-centered, whereby information is the foundation of change in health behavior. The Internet has so far been the most potent information resource globally.<sup>9,19</sup> Nepal has achieved incredible success in digital adoption, with mobile penetration exceeding 100% and internet penetration reaching 60% in 2017, which is further expected to rise significantly in the next 5 years.<sup>12</sup> However, even though the use of the Internet has grown extensively, skills in using the Internet for basic health purposes have not been explored. As such, this study was conducted to assess the perceived eHealth literacy of Nepalese nursing students and to explore influencing factors.

**Table 1** Student characteristics regarding use of Internet

Characteristics	Category	Respondents, n (%)
Devices most used to access Internet	Laptops	33 (21.7)
	Smartphone	119 (78.3)
Frequency of Internet use for any purposes	Fewer than 3 times a day	13 (8.6)
	More than 3 times a day	129 (84.9)
	Sometimes	10 (6.57)
Frequency of Internet use for health purposes	Sometimes in a month	27 (17.8)
	Once a week	18 (11.8)
	Alternate days	37 (24.3)
	Fewer than 3 times a day	40 (26.3)
	More than 3 times a day	30 (19.7)
Usefulness of Internet in helping to make health decisions	Not useful at all	2 (1.3)
	Not useful	2 (1.3)
	Unsure	12 (7.9)
	Useful	99 (65.1)
	Very useful	37 (24.3)
Importance of Internet to access health resources	Not important at all	1 (0.7)
	Not important	5 (3.3)
	Unsure	7 (4.6)
	Important	94 (61.8)
	Very important	45 (29.6)
Perception of Internet skills	Poor	5 (3.3)
	Average	68 (44.7)
	Good	73 (48.0)
	Very good	6 (3.9)

Most of the nursing students accessed the Internet frequently. For health-related queries almost a fifth used the internet several times a day. This corresponds with a study among interns at the BP Koirala Institute of Health Sciences, Dharan, where almost all interns accessed the Internet daily and more than half used it for health purposes.<sup>18</sup> Similarly, a study done in Jordan among undergraduate nursing students also revealed that they

**Table 2** Self-reported eHealth Literacy Scale (eHEALS)

eHEALS statement	Strongly disagree, n (%)	Disagree, n (%)	Unsure, n (%)	Agree, n (%)	Strongly agree, n (%)	Median score (IQR)
I know what health resources are available on the Internet	1 (0.7)	5 (3.3)	32 (21.1)	105 (69.1)	9 (5.9)	4 (1)
I know where to find helpful health resources on the Internet	2 (1.3)	6 (3.9)	45 (29.6)	88 (57.9)	11 (7.2)	4 (1)
I know how to find helpful health resources on the Internet	1 (0.7)	7 (4.6)	37 (24.3)	91 (59.9)	16 (10.5)	4 (1)
I know how to use the health information I find on the Internet to help me	—	3 (2.0)	35 (23.0)	90 (59.2)	24 (15.8)	4 (1)
I know how to use the Internet to answer my questions about health	—	5 (3.3)	28 (18.4)	94 (61.8)	25 (16.4)	4 (0)
I have the skills I need to evaluate the health resources I find on the Internet	1 (0.7)	12 (7.9)	63 (41.4)	62 (40.8)	14 (9.2)	3.5 (1)
I can tell high-quality health resources from low-quality resources on the Internet	10 (6.6)	36 (23.7)	73 (48.0)	28 (18.4)	5 (3.3)	3 (1)
I feel confident in using information from the Internet to make health decisions	2 (1.3)	34 (22.4)	63 (41.4)	48 (31.6)	5 (3.3)	3 (1)

used the Internet frequently.<sup>16</sup> Apart from nursing and medical students, the trend of using the Internet for health information by other college students is also increasing.<sup>20</sup> These findings suggest the Internet's potential as a desired health-promotion channel for youth.

Smartphones were found to be the primary means of Internet use among nursing students. Almost 50% understood the usefulness and importance of the Internet to access health resources and make health decisions. With expanding use of the Internet, nursing students in different countries have responded that it is a useful tool in making health-related decisions and is equally important in being able to access health resources.<sup>16,21</sup> However, in other study in Nepal, almost 40%–60% of interns were unsure of how to use the Internet and where to find useful health resources. They also explained that they were not taught about the importance of knowledge and skills to find useful health resources on the Internet.<sup>18</sup> This shows that there is still a gap in knowledge of proper use of the Internet for health information, which must be explored. In addition, a little less than half our study participants perceived that they had average internet skills, which resembles other findings.<sup>22</sup>

Despite increased awareness of the usefulness and importance of the Internet in getting health information,

the findings show that nursing students still have a moderate perceived level of eHealth literacy. This finding is consistent with a study among nursing students in Jordan in 2016<sup>16</sup> and medical and health-science students in Mashhad, Iran in 2017.<sup>8</sup> However, a systematic review of college students that was done almost 9 years ago revealed low eHealth-literacy skills with poor ability in using, detecting, and evaluating health information on the internet.<sup>22</sup> This may be because with time, the rate of Internet usage is increasing and so could be the rise in eHealth literacy.

Factors that can influence eHealth literacy were also investigated in the present study. Participants' self-perception of Internet skills (<0.001), importance of the Internet (0.011), usefulness of the Internet (0.006), and frequency of using the Internet for health purposes (<0.001) were found to be significant. These findings are supported by a previous study among undergraduate nursing students in Jordan.<sup>16</sup> However, in other related literature, only students' academic level was associated with eHealth literacy.<sup>22,23</sup>

This study has some limitations. It was conducted in only one setting chosen purposively, and may not represent the real scenario for all nursing students in Nepal. The tool used in this study, though reliable and valid assesses

**Table 3** Factors associated with eHealth Literacy Scale (eHEALS)

Characteristics	Number, n (%)	Statistics (Kruskal–Wallis H)	eHEALS significance	Mean rank
Perceived level of Internet skills				
Poor	5 (3.29)	15.231	0.002	19.50
Average	68 (44.74)			75.41
Good	73 (48.02)			78.58
Very good	6 (3.95)			111.08
Perceived importance of Internet				
Not important at all	1 (0.65)	13.220	0.010	103.00
Not important	5 (3.28)			29.60
Unsure	7 (4.60)			46.57
Important	94 (61.84)			77.27
Very important	45 (29.60)			84.17
Perceived usefulness of Internet				
Not useful at all	2 (1.31)	11.929	0.018	24.00
Not useful	2 (1.31)			63.50
Unsure	12 (7.89)			49.83
Useful	99 (65.13)			77.06
Very useful	37 (24.34)			87.20
Frequency of using Internet for health-related purposes				
Sometimes in a month	27 (17.76)	15.153	<0.001	54.35
Once a week	18 (11.84)			67.33
Alternate days	37 (24.34)			91.47
Fewer than 3 times a day	40 (26.31)			79.93
More than 3 times a day	30 (19.74)			78.90

only students' self-perceived level of comfort with and knowledge of eHealth literacy, not the skills associated with it. Furthermore, self-reporting of data might have been affected by the subjectivity of the students, who may have given socially acceptable responses and limited their estimations. Also, as there was limited variation in age, sex, education, and marital status in our sample, associations could not be assessed.

E-learning has been suggested to be integrated into medical education<sup>24</sup> and continued nursing education.<sup>25</sup> In the longer run, nurses need to be updated with the knowledge and skills to develop competence in using eHealth resources for patient care and health education. The outcome of this study gives baseline information on the level of eHealth literacy of nursing students, and be used as evidence for integrating eHealth education into academic curricula, as well as for academic experts to design e-learning in Nepal. In addition, nurses' Internet skills and perception of its usefulness and importance should be considered when promoting eHealth literacy among them. Moreover,

iterating the study among clinical nurses and comparing them with nursing students would be interesting.

## Conclusion

This study represents a baseline reference for eHealth literacy among nursing students at Kathmandu Medical College, Nepal. Students have some basic necessary skills, while other skills still need to be improved. There is a need to pay attention to the eHealth-literacy needs of nursing students. Further research seems necessary to supply evidence on what interventions will be effective to meet the eHealth-literacy needs of nurses.

## Acknowledgments

We would like to express our gratitude to the nursing students of Kathmandu Medical College Teaching Hospital for their active participation in the study. We are also very thankful to Ms Sushmita Mali from Dulikhel Hospital, Kathmandu University Hospital, Nepal for her proofreading for language.



## Disclosure

The authors report no conflicts of interest in this work.

## References

- Nutbeam D. Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int*. 2000 [cited July 9, 2018];15(3):259–267. Available from: <https://academic.oup.com/heapro/article-lookup/doi/10.1093/heapro/15.3.259>.
- Lambert M, Luke J, Downey B, et al. Health literacy: health professionals' understandings and their perceptions of barriers that indigenous patients encounter. *BMC Health Serv Res*. 2014 [cited July 9, 2018];14:614. doi:10.1186/s12913-014-0614-1
- Berkman ND, Davis TC, McCormack L. Health literacy : what is it? *J Health Commun*. 2010;15:9–19. Available from. doi:10.1080/10810730.2010.499985
- Richtering SS, Hyun K, Neubeck L, et al. eHealth literacy: predictors in a population with moderate-to-high cardiovascular risk. *JMIR Hum Factors*. 2017 [cited July 5, 2018];4(1). Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28130203>.
- Norman CD, Skinner HA. eHealth literacy: essential skills for consumer health in a networked world. *J Med Internet Res*. 2006;8:2. doi:10.2196/jmir.8.2.e9
- Norman C. eHealth literacy 2.0: problems and opportunities with an evolving concept. *J Med Internet Res*. 2011;13(4). doi:10.2196/jmir.1658
- Robert Bautista J. From solving a health problem to achieving quality of life: redefining eHealth literacy. *J Lit Technol*. 2015 [cited July 9, 2018];16(2). Available from: [http://www.literacyandtechnology.org/uploads/1/3/6/8/136889/jlt\\_v16\\_2\\_bautista.pdf](http://www.literacyandtechnology.org/uploads/1/3/6/8/136889/jlt_v16_2_bautista.pdf).
- Dashti S, Peyman N, Tajfard M, Esmaeeli H. E-Health literacy of medical and health sciences university students in Mashhad, Iran in 2016: a pilot study. *Electron Physician*. 2017 [cited July 9, 2018];9(3):3966–3973. doi:10.19082/3966
- Mitsutake S, Shibata A, Ishii K, Oka K. Associations of eHealth literacy with health behavior among adult internet users. *J Med Internet Res*. 2016;18:7. doi:10.2196/jmir.5413
- Islam M, Touray M, Yang H, et al. E-health literacy and health information seeking behavior among university students in Bangladesh. *Int Med Inf Assoc IOS Press*. 2017;245:2–6.
- Gray NJ, Klein JD, Noyce PR, Sesselberg TS, Cantrill JA. Health information-seeking behaviour in adolescence: the place of the internet. *Soc Sci Med*. 2005;60(7):1467–1478. doi:10.1016/j.socscimed.2004.08.010
- Government of Nepal M of C and IT. *Digital Nepal Framework: Unlocking Nepal's Growth Potential*. Frost & Sullivan; 2018.
- Efthymiou A, Middleton N, Charalambous A, Papastavrou E. The association of health literacy and electronic health literacy with self-efficacy, coping, and caregiving perceptions among carers of people with dementia: research protocol for a descriptive correlational Study. *JMIR Res Protoc*. 2017 [cited July 9, 2018];6(11). Available from: <http://www.ncbi.nlm.nih.gov/pubmed/29133284>.
- Lundy KS, Janes S. *Community Health Nursing: Caring for the Public's Health*. Second. USA: Jones & Bartlett Learning; 2009.
- Amieva S, Ferguson S. Moving forward: nurses are key to achieving the United Nations development program's millennium development goals. *Int Nurs Rev*. 2011;59(1). doi:10.1111/j.1466-7657.2011.00944.x
- Tubaishat A, Habiballah L. eHealth literacy among undergraduate nursing students. *Nurse Educ Today*. 2016;42(July):47–52. doi:10.1016/j.nedt.2016.04.003
- Norman CD, Skinner HA. eHEALS : the eHealth literacy scale. *J Med Internet Res*. 2006;8(4):1–7. doi:10.2196/jmir.8.4.e27
- Pokharel PK, Budhathoki SS, Pokharel HP. Electronic Health Literacy Skills among medical and dental interns at B P Koirala Institute of health sciences. *J Nepal Health Res Counc*. 2016;14(3):159–164.
- Neuhauser L, Kreps GL. eHealth communication and behavior change: promise and performance. *Soc Semiot*. 2010;20(1). doi:10.1080/10350330903438386
- Escoffery C, Miner KR, Adame DD, Butler S, McCormick L, Mendell E. Internet use for health information among college students. *J Am Coll Health*. 2005;53(4):183–188. doi:10.3200/JACH.53.4.183-188
- Park H, Lee E. Self-reported eHealth literacy among undergraduate nursing students in South Korea: a pilot study. *Nurse Educ Today*. 2015;35(2):408–413. doi:10.1016/j.nedt.2014.10.022
- Stellesfson M, Hanik B, Chaney B, Chaney D, Tennat B, Chavarria EA. eHealth literacy among college students: a systematic review with implications for eHealth education. *J Med Internet Res*. 2011;13:4. doi:10.2196/jmir.1658
- Tomas CC, Queiros P, Ferreira TDJR. Analysis of the psychometric properties of the portuguese version of an eHealth literacy assessment tool. *Rev Enferm Ref*. 2014;4(2). Available from: <https://www.researchgate.net/publication/267267830%0AAAnalysis>.
- Masic I. E-learning as new method of medical education. *REVIEW*. 2008;16(2):102–117.
- Dalheme WA, Saleh N. The impact of eLearning on nurses' professional knowledge and practice in HMC. *Can J Nurs Inf*. 2014;9.

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