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RESEARCH ARTICLE

Exploring the relationship between e-health literacy and online health information-seeking behaviour among pharmacy students in Indonesia

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Abstract

Background: Digital transformation has changed the health service system and how people search for health information. Digital health literacy provides basic knowledge that the prospective pharmacy workforce must have to provide comprehensive pharmacy service. **Objective:** This study aims to explore pharmacy students' eHealth literacy level and relate to their behaviour in accessing health information online. **Methods:** A cross-sectional survey was conducted on 314 pharmacy students at two pharmacy diploma schools in Jakarta and Bandung, Indonesia. A semi-structured questionnaire was administered to identify online health information-seeking behaviour and e-health literacy scores. **Results:** Out of 314 students, most were women (86.3%) and sophomores (43.3%). More than half have health applications installed on their smartphone and access health information online more than twice a week. There was a significant relationship between e-health literacy scores and student entry year (p = 0.000), the frequency of online health information-seeking practice (p = 0.001), and installed health apps on smartphones (p = 0.002). **Conclusion:** A future altered curriculum and the appropriate study materials on digital health must be implemented to equip pharmacy students with adequate skills before graduation.

Introduction

Pharmaceutical services are undergoing significant changes due to the increasing use of technology. Moreover, the rise of digital technology has made accessing health information easier through the internet (Jia *et al.,* 2021; Abdoh, 2022). To maintain the relevance of the pharmacy profession, pharmacists and pharmacy technicians must be willing to learn new skills related to digitalisation. Technological advances require pharmacy workforces to be proficient in accessing, understanding, and using online health information, referred to as e-health literacy (Mantel-Teeuwisse *et al.,* 2021).

Recognising that searching for health information online poses unique challenges is imperative. Unlike other forms of media, online health information can change rapidly and requires individuals to develop internet literacy skills. This is especially relevant for professional health workers who provide services to the community. Therefore, expanding and developing e-health literacy skills is crucial to ensure effective and safe use of online health information (Lee *et al.,* 2021).

Several studies were carried out to assess the e-health literacy of pharmacy staff and students in pharmaceutical services and education. A qualitative study in Scotland showed that most pharmacy staff lack access to technological equipment and are not confident using the available information technology platforms. However, the study suggests that pharmacy staff can use technology effectively if they receive sufficient training (MacLure & Stewart, 2018). Another study in the Malaysian population found that over a third of the 415 pharmacy students surveyed had low e-health literacy, with an average e-health literacy Scale (eHEALS) score of 31 out of 40 (Blebil *et al.,* 2023). Similarly, a study in Canada revealed that only 77% of pharmacy students were able to evaluate health

information sources on the Internet (Park & Min, 2020). Both studies highlight the lack of confidence among pharmacy students when making health decisions based on online information. Some factors might affect individuals' confidence levels when using the internet for health purposes. Studies revealed that computer knowledge and social media usage were significant factors that positively impacted their self-confidence when seeking health information on the internet (Choi & DiNitto, 2013; Tennant *et al.,* 2015).

There has now been enhancement in studies exploring e-health literacy and online information-seeking among health students, where those skills are also essential for providing health services to the community in the digital era (Islam *et al.,* 2017; Holt *et al.,* 2020; Tarihoran *et al.,* 2021; Makowsky *et al.,* 2022). However, limited e-health literacy studies have been conducted among pharmacy students in Indonesia. Therefore, this research aims to explore the concept of e-health literacy in more depth and analyse its relationship with internet usage behaviour among pharmacy students in Indonesia.

Methods

Study design and respondents

This study utilised a cross-sectional design, which involved a survey using a structured questionnaire. The target population comprised 773 pharmacy diploma students from two health polytechnic colleges in Jakarta and Bandung, Indonesia. The two regions were selected based on fast internet access and dynamic urban areas (Kartiasih *et al.,* 2023). The inclusion criteria for participants were students who actively attended lectures in the year the research was conducted, had searched for health information online, and provided their consent as research respondents. A consecutive sampling technique was used to select the sample, and the number of participants was determined using the Lemeshow formula to ensure a minimum sample size of 260 students. The sample size calculation is explained through the attached formula. However, researchers added 20% of the minimum sample calculation to avoid dropout, resulting in a minimum requirement of 314 respondents in total.

$$n = \frac{N.Z^2_{1-\frac{\alpha}{2}}\ x\ p\ x\ q}{d^2\ (N-1) +\ Z^2_{1-\frac{\alpha}{2}}\ x\ p\ x\ q}$$

n : sample size
N : population size (773)
$Z_{1-\alpha/2}$: z-score for type I error = 0,05 and two-tailed hypothesis is 1,96
p : given prevalence, if unknown assumed 0.50
q : 1-p; 0.50
d : precision for prevalence (0.05)

Survey instrument

An online survey was conducted from May to August 2023. The survey instrument was divided into three parts. The first part gathered sociodemographic data, the second part collected information about the respondent's health information access behaviour online, and the third part recorded e-health literacy using the e-Health Literacy Scale (eHEALS) questionnaire (Norman & Skinner, 2006). The Indonesian version of the questionnaire has been tested and validated by a research team from Airlangga University (Wijaya & Kloping, 2021). The questionnaire consisted of eight questions that were answered using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). This survey aimed to measure respondents' skills and confidence in finding, using, evaluating, and applying health information found online. Higher scores on the eHEALS indicate higher e-health literacy (total score range = 5-40). To increase the accuracy and consistency of the eHEALS instrument used, a reliability test was carried out which produced a Cronbach Alpha value of 0.902.

Data analysis

The research results were analysed by correlating digital health literacy scores with sociodemographics and internet access behaviour using Mann Whitney and Kruskal Wallis independent tests, as the data were not normally distributed.

Ethical approval and informed consent

Participation in this study was voluntary, and informed consent was provided. The study was conducted following the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of Poltekkes Kemenkes Jakarta II (LB.02.01/I/KE/39/413/2023).

Results

This research involved 314 students from the Health Polytechnic under the Ministry of Health. Most respondents were women (86.3%), and most were sophomores (43.3%). More than half of the respondents did not have a family with a health education background (59.9%), have a health application installed on their smartphone (56.7%), and

access health information on the internet more than twice a week (55.4%). The most frequently used social media is Instagram (48.4%). More than 90% of respondents have sought health information via social media. The most common purpose of accessing health information online is as a reference for college assignments (80.6%). The completed description is shown in Table I.

Table I: The characteristics of the sample study

Variables	Number	Percentage (%)
Sex		
Male	43	13.7
Female	271	86.3
Student entry year		
2020	95	30.3
2021	136	43.3
2022	83	26.4
Family educational background		
Health-related major	126	40.1
Non-health related major	188	59.9
Health application installed on smartphone		
Yes	178	56.7
No	136	43.4
Frequency of online health information seeking		
One to two times a week	140	44.6
More than twice a week	174	55.4
Most accessed social media		
Instagram	152	48.4
Tiktok	63	20.1
Youtube	44	14.0
Whatsapp	35	11.1
Twitter	19	0.3
Seeking health information through social media		
Yes	299	95.2
No	15	4.8
The purpose of online health information-seeking†		
Health issues	246	78.3
Assignment reference	253	80.6
Update health information	124	39.5

†Multiple responses

The study found that respondents' average digital health literacy score was 32.44 out of a maximum of 40, as shown in Table II below.

Table II: eHEALS scores of sample study

Variable	Mean	Median	Minimum	Maximum
eHEALS score	32.44	32.00	8	40

Most respondents (over 93%) agreed or strongly agreed with questions about finding health information online. They also demonstrated knowledge of using this information for their health needs (90%), as shown in Table III.

Table III: Percentage of respondents' answers to eHEALS questionnaire items

Description	Percentage				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I know what health resources and information are available on the Internet	0.6	0	6.1	68.8	24.5
I know where to find helpful health resources and information on the Internet	0.6	0	4.5	65.9	29.0
I know how to find helpful health resources and information on the Internet	0.6	0	2.9	64.6	31.8
I know how to use the Internet to answer my questions about health	0.6	1.6	7.6	66.2	23.9
I know how to use the health information I find on the internet to help me	0.6	0.3	7.6	65.3	26.1
I have the skills I need to evaluate the health resources and information I find on the internet	0.6	0.6	21.7	62.7	14.3
I can tell high-quality health resources and information from low-quality health resources and information on the Internet	0.3	0.6	25.2	57.6	16.2
I feel confident in using information from the Internet to make health decisions	0.6	2.5	32.8	51.9	12.1

However, respondents showed some doubt when asked about their ability to evaluate and select credible sources of information online. They also lacked confidence in using the available data to make decisions about their health.

The study also revealed a correlation between the student entry year and e-health literacy score (p = 0.000), shown in Table IV. Additionally, the number of health applications installed on a smartphone and the frequency of accessing health information online significantly correlated to e-health literacy with p = 0.002 and p = 0.001, respectively.

Table IV: The relationship between e-health literacy, sociodemographics and online health information-seeking behaviour

Variables	N (number)	eHEALS score (median; min–max)	*P-value*
Sex			
Male	43	32.00 (8 - 40)	0.298
Female	271	32.00 (9 – 40)	
Student entry year			
2020	95	34.00 (9 – 40)	0.000†
2021	136	32.00 (8 - 40)	
2022	83	32.00 (23 – 40)	
Family educational background			
Health-related major	126	32.00 (8 - 40)	0.732
Non-health related major	188	32.00 (9 – 40)	
Health application installed on the smartphone			
Yes	178	32.00 (9 – 40)	0.002†
No	136	32.00 (8 - 40)	
Frequency of online health information seeking			
One to two times a week	140	32.00 (8 - 40)	0.001†
More than twice a week	174	32.00 (9 – 40)	
Seeking health information through social media			
Yes	299	32.00 (8 - 40)	0.189
No	15	31.00 (26 – 36)	

†Mann-Whitney test; *p*-value less than 0.05 is considered to be statistically significant.

Discussion

Research on digital health literacy among pharmacy students in Indonesia is still uncommon. Pharmacy students who take diploma courses will become pharmacy technicians and be required to help the community with self-medication. Therefore, examining digital health literacy in this group of students can provide an idea about their preparedness to become potential health workers in the era of disruption. A study on e-health literacy was conducted on pharmacy students at the University of British Columbia, Canada. The results of the study were consistent with this research. Pharmacy students' self-confidence in using information online and making health decisions is relatively low (53%). After conducting in-depth interviews with the surveyed students, it was found that they still felt they had not received enough technology education in the health sector and needed more training in this area (Park & Min, 2020).

The development of technology and health services, especially pharmacy, requires changes to the pharmacy curriculum to adapt to the current health service system. Studying digital health literacy in students is also important and closely related to students' efforts to maintain their health (Britt *et al.,* 2017; Prihanto *et al.,* 2021). Bivariate analysis of the Mann-Whitney test stated that there was a comparative relationship between student entry year, frequency of internet access, and the presence of health applications on smartphones, with eHEALS scores ($p < 0.01$). The correlation between mobile applications on smartphones and digital health literacy levels in previous research also showed statistically significant (Üstün *et al.,* 2020). This phenomenon is likely because exposure to health information on this platform is more selective and convincing to users than accessing information directly from the internet.

It has been observed that searching for health information on social media is not significantly correlated with the eHEALS score ($p = 189$). Although many people use social media to find health information, limited studies have investigated the correlation between this behaviour and e-health literacy. A study in Bangladesh found that adults frequently use Facebook and Twitter to search for and share health information (Islam *et al.,* 2017). Students often access various information through the internet, but when they encounter health information, they tend to lack the ability to evaluate the validity of the source. The results of this study indicate that sex ($p = 0.298$) and the educational background of family members ($p = 0.732$) were not related to the eHEALS score, which is in contrast to a study in Turkey that found male pharmacy students had higher eHEALS scores (Üstün *et al.,* 2020). Sociodemographic factors were found to be related to the level of digital health literacy in a survey of a nursing study programme in Denmark (Holt *et al.,* 2020). In addition to observational studies, an experimental study was conducted to develop learning media related to e-health literacy. One such study used an e-health literacy educational website as a "*first aid communication-kid*", which showed that this media could increase digital health literacy in health students (Conte *et al.,* 2021).

Study materials on digital health literacy must be delivered to students in health-related majors, especially pharmacy. Digital health literacy should be basic knowledge given to pharmacy students before graduation and actively participate as healthcare providers (Mantel-Teeuwisse *et al.,* 2021)Universities, stakeholders, and the government need to collaborate to provide this essential provision to students. Providing material on digital health literacy is a multidisciplinary effort involving third parties outside campus who understand technology. Transforming learning by including e-health literacy study materials is essential for increasing students' self-confidence in dealing with hoax health issues rife on the internet. Further research must be conducted by formulating appropriate educational media and testing it on students to enhance pharmacy students' digital health literacy.

This study has limitations that need to be considered. Firstly, due to the uneven distribution of internet access in Indonesia, this research did not cover the e-health literacy of students from remote areas. Secondly, students' self-reported eHEALS may not reflect their digital health competency. To understand these issues more deeply, a qualitative study should explore stakeholders' perspectives, including programme coordinators, lecturers, and preceptors.

Conclusion

The study findings suggested that e-health literacy in pharmacy students is substantially correlated to online health information-seeking behaviour. Pharmacy students require digital health skill training to find, interpret, and evaluate online health information as preparation for becoming a future pharmacy workforce in a disruptive era.

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Conflict of interest

The authors declare no conflict of interest.

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