

eHealth Literacy and Lifestyle Behaviours among Undergraduate Students in Nigeria: A Cross-sectional Study

ABSTRACT

Background and Objectives: Lifestyle choices influence health and wellbeing, and accessing health information online requires skills to use effectively. This study aimed to assess eHealth literacy and its association with lifestyle behaviours among undergraduate students in Nigeria.

Materials and Methods: We employed a cross-sectional study design using questionnaires to gather responses from undergraduate students across 15 faculties at the University of Nigeria, Nsukka. The calculated sample size was 630 participants, but to account for a 50% potential loss, 1250 students across all levels were selected for the study. A random sampling technique was used to select six faculties: three health-related and three non-health-related. A structured demographic questionnaire was used to record sociodemographic information, lifestyle behaviours, internet access, and use; the e-health literacy scale (eHEALS) was used to record e-Health literacy. The data was analysed using IBM SPSS version 25.0. Descriptive (mean, frequency, percentage) and inferential statistics (Chi square) were employed, where appropriate, with statistical significance set at $p < 0.05$.

Results: Out of the 1250 students that participated in the study, 1233 (98.7%) had internet access, while 791 (63.5%) used the internet to assess health information regularly. A total of 648 (51.8%) and 573 (45.9%) students, respectively, exercised regularly and slept regularly. A total of 913 (73%) participants ate regular breakfast. Most of the students did not consume alcohol regularly (91.9%) and were non-smokers (95.9%). The mean eHEALS score was 27.77/40 points. Students in health-related courses had better eHealth literacy than others ($p < 0.05$); a higher level of study led to higher eHealth literacy ($p < 0.01$); and those who exercised once a week or more had better eHealth literacy ($p < 0.01$).

Conclusion: Study participants demonstrated good eHealth literacy, associated with course, level of study, exercise, and sleep patterns. Future nationwide studies on the impact of eHealth literacy education are needed to prove causation and develop an intervention.

Paper Type: Research Article

Keywords: eHealth Literacy, Lifestyle, University Students, Nigeria.

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Introduction

Modern communication technology has undeniably aided in the social realm, as well as the health and educational sectors, by linking individuals and serving as a medium of connection. The Internet provides access to large volumes of information across many sectors. Most internet users around the world are said to utilise the internet to access health information (1, 2). The attention of many new healthcare improvements has been focused recently on the internet due to increasing internet access and improved performance because of modern technologies (3-5). In January 2022, the global internet penetration rate was estimated to be around 62.5 (6), while Nigeria's internet penetration rate stood at 51% of the total population of 214.1 million, an increase of 4.6% over the 2021 rate (6).

The ability to receive, analyse, evaluate, and use health information is known as health literacy, and it has been positively associated with healthy lifestyles (7). The younger generation, especially university students, are increasingly using the internet to acquire health information (8). The difference between finding health information online and through more conventional channels like books is that the latter calls for specialised knowledge on how to locate, comprehend, and evaluate material utilising online tools and services (9). A person's ability to use the internet to find, evaluate, and use health information to address health issues is known as eHealth literacy (10). Given the current emphasis on patient-centered care, it is expected that individuals will be able to find and use health information, make decisions, and navigate around the healthcare system.

Lifestyle behaviours are daily habits that individuals make that can significantly impact their health and wellbeing. These behaviours encompass various aspects of life, including diet, physical activity, sleep patterns, stress management, substance use, and social interactions (4).

Studies have shown that university life entails varying levels of academic pressure, deadlines, and stress. As a result, undergraduate students may be more susceptible to adopting unhealthy coping strategies such as poor dietary habits, inadequate sleep, and increased substance use as they strive to manage their academic demands (8).

The internet offers a lot of access to health information, but if the intended user lacks the skills to extract the information from electronic health resources, the information is either limited or nonexistent. An average university student has easy access to a wealth of health information online; however, this does not imply that they are all competent at using the search engine to find information on specific health topics (11).

Recent studies in Taiwan (12), Greece (13), the USA (14), and Japan (15) have shown an association between eHealth literacy and lifestyle behaviours.

This cross-sectional study represents a pioneering investigation into the intersection of eHealth literacy and lifestyle behaviours among undergraduate students in Nigeria, filling a critical gap in the existing literature. This study aimed to determine the level of eHealth literacy and its association with lifestyle behaviours. This will help inform targeted interventions and health promotion strategies aimed at enhancing eHealth

literacy and promoting healthier lifestyle behaviours among undergraduate students in Nigeria.

Materials and Methods

Study design and participants

A cross-sectional survey was conducted among undergraduate students at the University of Nigeria, Nsukka (UNN) in 2022. UNN is Nigeria's first indigenous federal public university (post-independence in 1960), with its main campus located in Nsukka, Enugu State, Nigeria.

The university offers a wide range of undergraduate and postgraduate programs in the arts, sciences, social sciences, education, law, engineering, and medicine. UNN is known for its strong emphasis on research and has several research centers and institutes dedicated to various fields of study.

Eligibility criteria

Eligible participants were undergraduate students at the university who had given informed consent to participate in the study. Participants unable to complete the questionnaire were excluded from the study.

Participant recruitment

A random sampling technique was used to select six faculties: three health-related and three non-health-related. This was done by writing out each faculty on a piece of paper, folding the paper, and asking a 5-year-old to pick a paper at random. The first three health-related faculties and non-health-related faculties were used for the study. The health-related faculties selected were medicine, pharmacy, and veterinary sciences; the non-health-related faculties selected were arts, education, and vocational teaching education.

Sample size calculation and data collection

The sample size was calculated with a confidence interval of 99%, a margin of error of 5%, and a population proportion of 50% using the Raosoft online sample size calculator. With a total population of 12351, the calculated sample size was 630. However, to allow for a 50% loss, 1250 students across all levels were chosen to participate in the study. All data collection was undertaken between January 2022 and April 2022. Participants were approached during the lunch period in their respective lecture rooms. The study was well explained to them, and if willing, they gave informed consent to participate in the study. The average response time to complete the questionnaire was ten minutes, with little or no assistance from the research team.

Instruments for data collection and outcomes

Sociodemographic information, lifestyle behaviours, internet access, and use were evaluated using a structured questionnaire; eHealth literacy was measured using the eHealth literacy scale (eHEALS). There are ten questions in the eHEALS questionnaire; the first two questions are supplementary items and are not a formal part of the eHEALS scale, as they help to understand the participant's interest in using eHealth in general. Therefore, the eHEALS scale is comprised of eight questions, four of which are related to internet access (e.g., I know where to find helpful health resources on the internet) and four of which are about using health information (e.g., I know how to use the health information I find on the internet to help me). For each question, the answer

choices ranged from "strongly disagree (1)" to "strongly agree (5)" on a 5-point scale. The minimum score obtainable was 8, while the maximum score obtainable was 40. With a content validity index of 0.88 using a 5-point scale and all eight items having a content validity ratio above the critical value of 0.49, the eHealth Literacy Scale (eHEALS) was chosen as an assessment tool as it had modest stability over time (16).

Data analysis

Data were analysed using the IBM Statistical Product and Services Solution for Windows version 25.0. Descriptive statistics (frequencies, percentages, and means) were used to summarise sociodemographic, lifestyle behaviour, internet access, and use data.

A total score for the eight-item eHEALS was calculated for each participant, with a higher score indicating a better eHealth literacy level. The participants were grouped into two groups based on the overall mean eHEALS score: a high score group (\geq mean score) and a low score group ($<$ mean score) (15). Inferential statistics (Chi-square) were used to evaluate the factors that contributed to participants' eHEALS scores. For all analyses, p-values less than 0.05 were considered statistically significant.

Results

Socio-demographic characteristics

1250 students participated in the study. 58.4% of the participants were females, 71.1% were aged 18 to 24 years, and 93.6% (1171) were not married (Table 1).

Table 1. Socio-demographic characteristics of participants

Variable	N (%)	
Age (in years)	18-24	890 (71.1)
	25-29	269 (21.6)
	> 29	91(7.3)
Gender	Male	520(41.6)
	Female	730(58.4)
Faculty	Pharmacy	329(26.3)
	Medicine	181(14.5)
	Veterinary medicine	153(12.2)
	Arts	223(17.8)
	Education	187(14.9)
	VTE	177(14.1)
Level	100	180(14.4)
	200	251(20.1)
	300	249(19.9)
	400	301(24.1)
	500	216(17.3)
	600	53(4.2)
Residence	Campus	507(40.6)
	Off-campus	674(53.9)
	With family	69(5.5)

VTE – Vocational Teaching Education

Internet access and use

Most of the study participants reported high internet access (98.7%), with a majority using their mobile data for internet access (51.2%).

A total of 791 (63.5%) of the students admitted using the Internet to source health information, especially lifestyle-related information (36.5%) (Table 2).

Table 2. Internet access and use by the participants

Variable		N (%)
Internet access	Yes	1233(98.7)
	No	17 (1.3)
Type of internet connection	Wi-Fi	60(4.8)
	Mobile data	640(51.2)
	Both	550(43.98)
Regular use of the internet for health information		791(63.5)
Most often accessed online information	Preventive measures	315(25.0)
	Diagnosis	392(31.1)
	Disease treatment	493(39.1)
	Lifestyle management	460(36.5)
	None	130(10.3)

Lifestyle behaviours

A total of 648 (51.8%) participants exercised for more than a day per week; 913 (73.0%) ate breakfast for more than five days per week; 677 (54.1%) agreed that they do not

get adequate sleep (< 6 hours per day). 100 (8.0%) participants admitted having consumed alcohol for more than three days a week, while 50 (4.0%) of the study participants were smokers (Table 3).

Table 3. Lifestyle behaviours of participants

Variable		N (%)
Exercise	< 1 day per week	602(48.2)
	> 1 day per week	648(51.8)
Breakfast	< 5 days per week	337(27.0)
	> 5 days per week	913(73.0)
Sleep	Insufficient sleep (\leq 6 hours per day)	677(54.1)
	Sufficient sleep	573(45.8)
Alcohol consumption	< 3 days per week	1150(91.9)
	> 3 days per week	100(8.0)
Smoking	Non-smokers	1200(95.9)
	Smokers	50(4.0)

eHEALS score and factors associated with eHealth literacy

The average eHEALS score was 27.77/40 points. Most of the participants had a high

level of eHealth literacy (52.6%). Higher eHealth literacy was reported in: participants in health-related faculties compared to non-health faculties (64% vs 39.7%, $p < 0.05$), those

in the penultimate and final years compared with others, those who exercise more than once a week compared to others (56% vs 48.8%, $p < 0.05$), those who had regular

breakfast compared with others (54.2% vs 48.1%, $p < 0.05$), and those who drank alcohol less than three days in a week (53.3% vs 44%) (Table 4).

Table 4. Relationship between eHealth literacy and lifestyle behaviours^a

Characteristics		Low eHealth literacy	High eHealth literacy	p-value
Age	18 - 24 years	433(48.7)	457(51.3)	0.113
	25 - 29 years	113(42.0)	156(58.0)	
	> 29 years	47(51.6)	44(48.4)	
Gender	Female	355(48.6)	375(51.4)	0.173
	Male	238(45.8)	282(54.2)	
Faculty	Health-related faculties	239(36.0)	424(64.0)	<0.001*
	Non-Health related faculties	354(60.3)	233(39.7)	
Levels	100 Level	100(55.6)	80(44.4)	<0.001*
	200 Level	131(52.2)	120(47.8)	
	300 Level	139(55.8)	110(44.2)	
	400 Level	142(47.2)	159(52.8)	
	500 Level	62(28.7)	154(71.3)	
	600 Level	19(35.8)	34(64.2)	
Marital status	Single	554(47.3)	617(52.7)	0.939
	Married	36(49.3)	37(50.7)	
	Divorced	3(50)	3(50)	
Residence	Campus	254(50.1)	253(49.9)	0.245
	Off-campus	310(46.0)	364(54.0)	
	With family	29(42.0)	40(58.0)	
Exercise	<1 day per week	308(51.2)	294(48.8)	0.006*
	> 1 day per week	285(44.0)	363(56.0)	
Breakfast	< 5 days per week	175(51.9)	162(48.1)	0.031*
	> 5 days per week	418(45.8)	495(54.2)	
Sleep	Insufficient sleep	312(46.1)	365(53.9)	0.162
	Sufficient sleep	281(49.0)	292(51.0)	
Alcohol	<3 days per week	537(46.7)	613(53.3)	0.046*
	>3 days per week	56(56.0)	44(44.0)	
Smoking	Non-smoker	574(47.8)	626(52.2)	0.111
	Smoker	19(38.0)	31(62.0)	

* $p < 0.05$

^aChi test

Discussion

We assessed the association between eHealth literacy and lifestyle behaviour among undergraduate students. This study identified the students' mean eHealth literacy score as 27.77/40 points. More than half of the students had an eHealth literacy score that was above the mean. The course of study, level of study, regular exercise, regular breakfast, and occasional consumption of alcohol were associated with higher eHealth literacy scores, and these were statistically significant.

This study reported a moderate eHealth literacy score (16), which suggests that students perceive themselves to have a moderate level of eHealth literacy. This finding was comparable to those reported by undergraduate students in Bangladesh (17), but higher than those reported by undergraduate students in Japan (15). However, studies from Ethiopia (18), Malaysia (19), and the United States (14) reported higher eHEALS scores, with the access to the internet being linked to eHealth literacy. To enhance eHealth literacy levels among undergraduate students, it may be beneficial to explore factors contributing to the observed differences in scores across countries. For example, the influence of cultural norms, educational systems, and access to resources, such as the internet, on eHealth literacy levels could be further investigated.

In this study, the course of study was associated with eHealth literacy, as students who were studying health-related courses reported a higher eHEALS score when compared to participants studying non-health-related courses. This underscores the

importance of educational background in shaping individuals' digital health literacy skills. Our finding is consistent with other studies that showed that students who were admitted to science courses at the university had higher eHealth literacy when compared to students enrolled in arts and humanities courses (12, 15). The reason for this has been attributed to the fact that students in health-related subjects have a better understanding of and exposure to health-related information, which facilitates decision-making (20). Educational institutions could consider integrating eHealth literacy training into the undergraduate curriculum, particularly for students in non-health-related courses, to ensure that all students have the necessary skills to navigate and critically evaluate online information effectively.

Level of study was also associated with eHealth literacy, as undergraduate students who were in their penultimate year and final year reported higher eHealth literacy compared to those in their earlier years of study. This highlights the importance of progressive exposure to health-related information throughout the academic journey. This finding is consistent with studies conducted in Turkey (21) and Japan (15), which reported a direct association between the school year and eHealth literacy. Students in health-related courses are exposed to more health information as they undertake courses in pharmacology and therapeutics in their penultimate and final year of study.

Our study showed that positive lifestyle behaviours such as regular exercise and having sufficient sleep were directly associated with eHealth literacy. Participants

who reported that they exercised less than one day per week had lower eHEALS scores when compared to those who exercised more than one day in a week. This underscores the interconnectedness of physical and digital health. In similar studies conducted among Japanese university students (15), Taiwanese students (12), Greek students (13), and American students (14), regular exercise was positively associated with higher eHealth literacy scores. There may be opportunities to promote digital health literacy through health promotion initiatives that encourage healthy lifestyle behaviours among young adults.

Research and clinical implications of the study

Findings from this study suggest that individuals with higher eHealth literacy tend to engage in healthier lifestyle behaviours such as regular exercise, having a regular breakfast, and avoiding excessive alcohol consumption. These findings also underscore the importance of integrating health literacy components into educational curricula, particularly for students enrolled in non-health-related courses. The role of positive lifestyle behaviours, such as regular exercise and sufficient sleep, in promoting higher eHealth literacy scores suggests that interventions aimed at promoting healthy lifestyle behaviours may indirectly contribute to improving eHealth literacy levels.

Study Limitations and Strengths: This is one of the first studies evaluating eHealth literacy among undergraduate students in Nigeria and its association with lifestyle behaviour. However, some of the limitations need discussion. First, this study was conducted at only one public university. UNN is one of the first-generation universities in

Nigeria, with students from different sociocultural backgrounds. Future studies should be designed to include students from both public and private universities. Second, this study employed a cross-sectional design. Constraints on time and finances did not allow us to use an interventional study design. However, this study represents the first attempt at defining eHealth literacy among university students in Nigeria against a backdrop of even less literature on eHealth literacy evaluations in Africa. Notwithstanding, future nationwide studies on the impact of eHealth literacy education are needed to prove causation and develop an intervention.

Conclusion

The eHealth literacy level of students at the University of Nigeria Nsukka, was good. The most prevalent unhealthy lifestyle behaviours reported among the students were poor physical activity and insufficient sleep patterns. The course of study, level of study, regular exercise, and adequate sleep were linked to a higher level of eHealth literacy.

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Availability of data and materials: The datasets generated and/or analysed during this study are not publicly available to protect confidentiality, but aggregated data is available from the corresponding author upon reasonable request.

Conflicts of interests: The authors declare that they have no competing interests.

Consent for publication: Not applicable

Ethical approval and consent to participate:

The study obtained full ethical approval from the Faculty of Pharmaceutical Science ethical review board. Ref No: FPSRE/UNN/21/0011 (Aug 15, 2021). No identifier information was requested from the respondents. All information obtained from the respondents was treated with the utmost confidentiality. Before each participant signed the written informed consent, we made sure they read it, understood its contents, and decided they wanted to take part in the study. We confirm that all procedures followed the guidance outlined in the Declaration of Helsinki.

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Author contributions: NUI, OJU and BOU-K devised the study and developed/refined the main conceptual ideas. NUI and BOU-K led the study protocol development, ethical application and gaining approvals. All authors undertook recruitment and data collection. OJU undertook the main analysis with critical input from NUI and BOU-K. OJU and BOU-K drafted the manuscript. All authors helped refine the manuscript and approved the final version.

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