

Research Article

Digital Health Literacy Among Odontology Students in Senegal: Exploratory Survey

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Abstract

Background: The development of digital technologies has made scientific resources at university increasingly accessible to students. However, students need specific skills to locate, assess, and use this information effectively in their training and research. Digital health literacy (DHL) refers to the ability to use the Internet and other digital platforms to find, understand, and evaluate health-related information. This study aimed to assess the level of digital health literacy among dental students in Senegal. **Method:** A cross-sectional study was conducted involving 196 dental students at Cheikh Anta Diop University in Dakar with proportional stratified sampling. The Digital Health Literacy Instrument (DHLI) was used to assess students' DHL levels. The distribution of DHL scores according to gender, academic level, and type of information sought was analysed using Fisher's exact test. **Results:** Students were more likely to seek general information (42%) than information related to their dental training (35%). The level of online health information search was estimated as average for 48.9% and low for 41.3% of participants. Regarding the ability to verify the reliability of online information, 48.2% demonstrated low competence. More than half of the students (55.2%) showed average skills in communicating via digital media. Only the distribution of Internet search skills by academic level and communication skills by gender were statistically significant ($p < 0.01$). **Conclusion:** This study revealed an overall average level of digital health literacy among dental students in Senegal, with particularly low performance in verifying information reliability. These findings underscore the need for targeted educational interventions and greater integration of digital health literacy into dental curricula.

Keywords

Digital Health Literacy, Student, Odontology, Senegal

1. Introduction

Digital technological advances in recent decades have revolutionized the world of communication and information. Virtual exchanges are transcontinental while access to information is democratized. Applications that deal with all areas of life thanks to the rapid progress of the digital world have become essential to life [1]. At the same time, the con-

siderable growth of information poses a challenge to users regarding the reliability of this information and its sources, with a proliferation of inaccurate, contradictory or converging information [2]. The health sector is not outside this reality. The period of the Covid-19 pandemic illustrated the power of information and its ability to influence user behavior. The

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overabundance of information had led to confusion and uncertainty regarding public health measures [3] and at the same time, information was of great help in the response. In the context of health education, digital technologies, when used properly, can be of considerable support to students [4]. In addition to traditional methods of searching for information or documentation, digital technology has changed the information ecosystem, making it more complex for students. Thus, faced with this situation, users need specific skills to cope and an adequate level of digital health literacy (DHL) is essential. DHL is defined as the process of searching, understanding and evaluating health-related information from electronic platforms according to technological advances and processing and solving health problems using this information [5, 6]. It is known that a sufficient level of DHL is directly associated with skills for better use of online health information, and conversely, difficulties in exploiting digital technologies may be linked to an inadequate level of DHL. Evidence-based online information contributes to strengthening DHL by providing access to credible, reliable and useful information [7, 8]. The search for health-related information of this nature by the student is closely linked to university studies. With the arrival of digital technology, the student completes his courses, checks diagnostic elements and care protocols or consolidates therapeutic options through online research. More recent studies have shown that DHL among university students is well developed, but there is still a significant proportion of students facing difficulties with certain dimensions of digital literacy [9, 10], in particular, on the identification of good sources of information and the verification of the credibility and reliability of the information received or found. A literature review reported gaps in digital literacy among students in sub-Saharan African countries, which it associates, among other things, with low exposure to digital technology in universities and the lack of digital policy, particularly in pedagogy [11]. No studies on digital health literacy among students were found in sub-Saharan Africa or West Africa. In Senegal, little research has been done on oral health literacy, and none targets dental students. Yet, like students around the world, they face data needs related to their fields of study and are also users of digital technologies. An understanding of students' diverse digital literacy skills in general, and digital health literacy in particular, as well as the factors influencing them, will help inform decisions aimed at their improvement. Thus, the objective of this study is to describe digital health literacy among dental students in Senegal.

2. Method

The data for this study were drawn from a mixed-method research project on DHL. The study is cross-sectional and targets students enrolled at the Institute of Odontology and Stomatology (IOS) of the Faculty of Medicine, Pharmacy and Odontostomatology of the Cheikh Anta Diop University of Dakar, the only public

dental training school in Senegal. The participants were students in dental surgery training enrolled in 2024 and who agreed to complete the survey form.

To determine the number of subjects required, the Schwartz formula was used ($n = z^2 \cdot p(1-p) / e^2$); with n =sample size, z =confidence level set at 95%, p = theoretical frequency in the population set at 0.5; e = degree of precision set at 7%. By integrating the values, the sample size is 196 students. A stratified sample was drawn according to the level of study, with proportional allocation based on the number of students at each level. Accordingly, of the 196 participants to be surveyed, 22% were to be third-year undergraduate students, and 24%, 20%, 19%, and 15% were to be first-year Master's students, second-year Master's students, 6th-year students, and specialised students, respectively. Digital health literacy of students was assessed by digital health literacy instrument (DHLI) which is a measuring tool in the form of a Likert scale with 21 items and five levels (impossible, difficult, not easy, easy and very easy) [12]. The French translation of the DHLI has not been formally validated. However, it was carried out by a linguist with a strong command of both academic and medical English. After the survey, the items were grouped into six themes. These are the use of the computer and the web, consisting of items 1, 2 and 3; the search for health-related information on the internet, formed by items 5, 9, 13, 14 and 15; the reliability of the health information found, with items 4, 6, 7, 8 and 10; the application of information in our lives, formed by items 11 and 12; communication in digital media, consisting of items 1, 17, 18 and 19; and privacy protection, with items 20 and 21. The scales were also grouped to estimate three levels of digital health literacy which are, low, medium and high. Sociodemographic characteristics were also studied. They consisted of age in years; sex, expressed as male or female; level of study, assessed in third-year undergraduate (L3), first-year Master (M1), second-year Master (M2), 6th-year, and DSS (Diploma of Specialized Studies); and the type of information sought, which can be various information, general health or dental.

The data was collected online using a Google Forms. The form link was shared with students and follow-ups were sent regularly. Data were extracted into Excel and analyzed by STATA-17. Quantitative data were expressed as means and medians with their dispersion parameters, and qualitative variables as frequencies. Distributions of DHL according to sociodemographic characteristics were tested using the Fisher exact test.

3. Results

Of the 196 students in the sample size, 143 responded, representing a rate of 73%. The mean age of the study population was 27.6 ± 6.1 years; the median age was 26 years with an interquartile range of 5 years, and men were more nu-

merous (60.1%). DSS and 6th-year students were the most represented with 32.1 and 27.7% respectively, while third - year students represented only 4.2% of the population. More than a third (35%) of students were looking for information on

dentistry related to their training, while 42% of them were looking for miscellaneous information not related to health (Table 1).

Table 1. Sample characteristics.

Variables	Effective	Frequency
Age	$m = 27.6 \pm 6.1$	
Sex		
Women	57	39.9%
Man	86	60.1%
Year of study		
L3	9	6.7%
M1	21	15.3%
M2	25	18.2%
6th year	38	27.7%
DSS	44	32.1%
Internet use		
Less than 5 years old	6	4.2%
From 6 - 10 years old	31	21.7%
More than 10 years	106	74.1%
Information sought		
In Dentistry	50	35%
In General health	32	22.4%
Various information	61	42.6%

More than half (55.9%) of the students had a high level of computer and internet use; the level of health information search on the internet was estimated as average and low for 48.9% and 41.3% of students respectively. As for skills in verifying the reliability of information found online, the low level (48.2%) was the most represented while the high level

concerned only 14% of students. More than half of the students had average levels in applying information found and in communicating in digital media with 51.7% and 55.2% respectively. More than two-thirds (67.8%) of the students had a high level of privacy protection on the net (Table 2).

Table 2. Sample distribution according to the DHL level for each item.

Items	Weak	Average	High
Use of the computer and the web	13(9.1%)	50(35%)	80(55.9%)
Searching for health information on the web	59(41.3%)	70(48.9%)	14(9.8%)

Items	Weak	Average	High
Reliability of the health information	69(48.2%)	54(37.8%)	20(14%)
Application of the information for our daily life	40(28%)	74(51.7%)	29(20.3%)
Communication on the web	40(28%)	79(55.2%)	24(16.8%)
Protection of privacy on the web	17(11.9%)	29(20.3%)	97(67.8%)

Male students (11.6% vs. 7%), specialization students (18.2% vs. 3.4%), or dentistry information seekers (12% vs. 8.2%) were more likely to have high internet search skills. Skills in verifying the reliability of information were low among the majority of male students (49.1% vs. 47.7%), specialization students (43.2% vs. 55.2%), or dentistry information seekers (53% vs. 44%). A high level of internet communication skills

was found among more male students (23.3% vs. 7%) or specialization students (22.7% vs. 13.8%). Only the distributions of internet search skills by level of study and internet communication skills by gender were significant ($p < 0.01$). More specifically, students at higher levels of study demonstrated better internet use skills than those at lower levels. Female students also exhibited stronger online communication skills compared to their male counterparts (Table 3).

Table 3. Distribution of digital health literacy level according to sample characteristics.

Items		Sex		Level of study			Information sought		
		Women	Man	L3 or M1	M2 or 6 th grade	DSS	In dentistry	In General health	Various information
Computer use	Weak	06(10.5%)	07 (08.1%)	06(20.7%)	05(07.9%)	02(04.5%)	07(14.0%)	02(06.2%)	04(06.5%)
	Average	18(31.6%)	32(37.2%)	13(44.8%)	19(30.2%)	14(31.8%)	22(44.0%)	11(34.4%)	17(27.9%)
	High	33(57.9%)	47(54.6%)	10(34.5%)	39(61.9%)	28(63.6%)	21(42.0%)	19(59.4%)	40(65.6%)
Internet search	Weak	27(47.4%)	32(37.2%)	14(48.3%)	22(34.9%)	18(40.9%)	23(46.0%)	13(40.6%)	23(37.7%)
	Average	26(45.6%)	44(51.2%)	14(48.3%)	36(57.2%)	18(40.9%)	21(42.0%)	16(50.0%)	33(54.1%)
	High	04(07.0%)	10(11.6%)	01(03.4%)	05(07.9%)	08(18.2%) *	06(12.0%)	03(09.4%)	05(08.2%)
Information reliability	Weak	28(49.1%)	41(47.7%)	16(55.2%)	29(46.0%)	19(43.2%)	22(44.0%)	17(53.1%)	30(49.2%)
	Average	25(43.9%)	29(33.7%)	11(33.9%)	24(38.1%)	18(40.9%)	21(42.0%)	12(37.5%)	21(34.4%)
	High	04(07.0%)	16(18.6%)	02(06.9%)	10(15.9%)	07(15.9%)	07(14.0%)	03(09.4%)	10(16.4%)
Application in information	Weak	17(29.8%)	23(26.7%)	11(37.9%)	14(22.2%)	13(29.6%)	10(20.0%)	14(43.7%)	16(26.2%)
	Average	28(49.1%)	46.53.6%)	16(55.2%)	32(50.8%)	21(47.7%)	29(58.0%)	12(37.5%)	33(54.1%)
	High	12(21.1%)	17(19.8%)	02(06.9%)	17(27.0%)	10(22.7%)	11(22.0%)	06(18.8%)	12(19.7%)
Clear communication on internet	Weak	19(33.3%)	21(24.4%)	08(27.6%)	22(34.9%)	08(18.2%)	10(20.0%)	09(28.1%)	21(34.4%)
	Average	34(59.7%)	45(52.3%)	17(58.6%)	31(49.2%)	26(59.1%)	31(62.0%)	18(56.3%)	30(49.2%)
	High	04(07.0%)	20(23.3%)*	04(13.8%)	10(15.9%)	10(22.7%)	09(18.0%)	05(15.6%)	10(16.4%)
Life pro-	Weak	03(05.3%)	14(16.3%)	02(06.9%)	09(14.3%)	06(13.6%)	04(08.0%)	09(28.1%)	04(06.5%)

Items		Sex		Level of study			Information sought		
		Women	Man	L3 or M1	M2 or 6 th grade	DSS	In dentistry	In General health	Various information
Information on internet	Average	12(21.0%)	17(19.8%)	07(24.1%)	14(22.2%)	07(15.9%)	11(22.0%)	05(15.6%)	13(21.3%)
	High	42(73.7%)	55(63.9%)	20(69.0%)	40(63.5%)	31(70.5%)	35(70.0%)	18(56.2%)	44(72.1%)

* = $p < 0.01$

4. Discussion

Digital health literacy is essential in the context of dentistry, so that students and future professionals can not only access reliable information to strengthen their academic training, but also effectively care for their patients in the digital age [13]. The results of the study showed a generally average level of digital health literacy among students, particularly in terms of searching for health information on the internet, applying the information found and communicating in digital media. A low level of digital health literacy was observed in terms of verifying the reliability of information found online. Previous literature data had already concluded in this sense in other contexts. Indeed, a study in Malaysia indicated that dental students had a moderate level of digital health literacy skills (mean score of 31.13 ± 4.95) [14] while another study in Nepal showed that medical and dental interns had limited DHL skills, particularly in assessing the reliability of online information [15]. Studies confirm the difficulties in judging the reliability of online information among students. In a study in Germany, 42.3% of students had difficulty assessing the reliability of online health information [9]. The ability of students to find the right information and integrate it into their training is limited [16]. Despite the development of digital technology, optimal use of the internet and the search for reliable information is an almost universal difficulty among dental students. One of the explanatory hypotheses could be linked to the quantity of information circulating online. A large and ever-growing volume of data is encountered online, with the infodemic phenomenon taking on significant proportions. This state of fact makes it difficult for students to verify the reliability of information and sort through relevant information. In Senegal specifically, this low level of digital skills among students, in addition to the factors previously mentioned, may also be attributed to cultural and infrastructural challenges. Senegalese universities lack a coherent policy for digital development, both in teaching and in supporting students' personal use, and internet connection speeds remain slow. Furthermore, the technical nature of digital communication contrasts with the country's predominantly oral cultural context. This mode of communication has not yet fully

adapted to the influence of digital practices among students, which remains a key determinant of digital literacy.

Furthermore, paradoxically, the majority of students in the sample (41%) are looking for general information. Whereas, it was legitimately supposed to seek mainly information on their training, in particular, oral health, dental treatments, technological innovations and clinical protocols. This result is in line with previous studies, notably that of Shiferaw et al on nursing students at the University of Gondar in Ethiopia which reports that only 22.7% of students are looking for information on their health training [17]. Some authors raise as one of the elements explaining this finding, the emotional adaptation to the demands and pressure of medical studies. Social networks offer fun and entertaining content necessary for the mental well-being of students [18].

Digital health literacy can be influenced by education level, learning style, or gender [13, 19]. Indeed, the level of university education can contribute to strengthening digital health skills. Students with advanced university education seek specific information and consult specific sources for their research needs. In doing so, they develop their critical and analytical thinking, as well as a better level of DHL. Students who seek information about their dental training or health in general have better DHL skills compared to those who seek general information [20]. Regarding the gender factor, contradictory results are found in the literature. For some studies, women tend to have better digital health literacy than men [19]; for others, on the other hand, male students had higher DHL scores than their female counterparts [21]. These discrepancies can be attributed to cultural, social and educational factors specific to each region.

These results have implications for the training prospects of dental students in Senegal. Indeed, they highlight the need for integrating DHL into the curriculum of dental students. It will help to promote informed decision-making among students and support the learning of evidence-based practices [9]. In line with Senegal's new digital policy, known as the New Deal Technology, Senegalese universities must integrate digital technologies into teaching, develop digital infrastructure, and incorporate digital modules into student training. The Ministry of Health must also keep pace by preparing future health professionals for the use of digital technologies in healthcare

services.

The limitations of this study are primarily the declarative nature of the data and the self-administered survey. Declarative data are likely to be affected by social desirability bias due to the tendency to present a better self-image. The self-administered survey does not offer the possibility of explaining the question or rephrasing it in case of misunderstanding by the participant. One of the strengths is the use of a validated tool for assessing digital health literacy. Another is a rigorous and consistent methodological process according to the objectives of the study.

5. Conclusion

The results of this study show average digital health literacy skills among dental students in Senegal, with low skills in verifying the reliability of information. Digital health literacy is an essential skill for students, directly influencing the quality of training. It has implications for the dental practice of future oral healthcare professionals. Thus, these results highlight the need for targeted educational interventions and increased integration of digital health literacy into dental training programs. By investing in the development of these skills, academic institutions can effectively prepare future oral health professionals for the demands of an increasingly digital healthcare environment. More robust and powerful scientific studies are also needed to further explore digital health literacy in Senegal.

Abbreviations

DHL	Digital Health Literacy
DSS	Diploma of Specialized Studies
IOS	Institute of Odontology and Stomatology

Conflicts of Interest

The authors declare no conflicts of interest.

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