

Oral Health Literacy And Digital Health Information-Seeking Behavior Among Adolescents: A Cross-Sectional Study

Dr. Ranbir Kaur Gosain¹, Dr. Sheetal Grover², Dr. Ritu Mathur³, Dr. Vinod Kumawat⁴, Dr. Ankur Bhagat⁵, Dr. Tamanna Soni⁶

¹Lecturer, BJS Dental College and Hospital, Ludhiana, Punjab. Email: rubyrenee27@gmail.com

²MDS, Professor, Department of Conservative Dentistry and Endodontics, MM College of Dental Science and Research, Mullana, Ambala, Haryana. Email: drgroversheetal@gmail.com

³MDS, Reader, Department of Periodontics and Oral Implantology, NIMS Dental College and Hospital, Jaipur. Email: Mathurritu01@gmail.com

⁴MDS, Reader, Department of Oral and maxillofacial surgery, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha. Email: surgeonvinod@gmail.com

⁵MDS, Reader, Department of Oral Medicine and Radiology, Rayat Bahra Dental college and Hospital, Mohali, Punjab. Email: ankurbhagat10@gmail.com

⁶MDS, Reader, Department of Oral Medicine & Radiology, School of Dental Sciences, MRIIRS, Faridabad, Haryana. Email: tamanna.sds@mri.ac.in

Abstract

Background: The rapid expansion of internet access and digital technologies has transformed the way adolescents obtain health-related information. Online platforms, including search engines, social media, video-sharing websites, and health portals, have become primary sources of oral health information. However, the abundance of online information, varying quality of digital content, and limited ability to critically evaluate health information may influence adolescents' oral health literacy and subsequent health-related decisions.

Aim: To assess oral health literacy and digital health information-seeking behavior among adolescents and to determine the association between oral health literacy and digital information-seeking practices.

Materials and Methods: A descriptive cross-sectional questionnaire-based study was conducted among 520 adolescents aged 13–19 years enrolled in government and private secondary schools. Participants were selected using a multistage random sampling technique. Data were collected using a structured self-administered questionnaire consisting of five sections: socio-demographic characteristics, internet usage, oral health literacy, digital health information-seeking behavior, and oral health practices. Oral health literacy was assessed using a modified Health Literacy in Dentistry (HeLD) questionnaire, while digital health information-seeking behavior was evaluated using a validated instrument adapted from the eHealth Literacy Scale (eHEALS).

Results: Among the 520 participants, 54.2% were females and 45.8% were males, with a mean age of 15.8 ± 1.7 years. Google (92.3%), YouTube (74.6%), and Instagram (61.2%) were the most frequently used sources for oral health information. The mean oral health literacy score was 36.84 ± 6.12 , while the mean digital information-seeking behavior score was 31.42 ± 5.48 . A statistically significant positive correlation was observed between oral health literacy and digital health information-seeking behavior ($r = 0.512$, $p < 0.001$).

Conclusion: Adolescents demonstrated moderate-to-high oral health literacy and actively utilized digital platforms to obtain oral health information. Higher oral health literacy was significantly associated with healthier digital information-seeking behavior.

Keywords: Adolescents; Oral Health Literacy; Digital Health Literacy; Health Information-Seeking Behavior; eHealth; Oral Health Promotion.

Introduction

Oral diseases remain among the most prevalent chronic conditions affecting children and adolescents worldwide [1]. Dental caries, periodontal diseases, malocclusion, dental trauma, and oral infections contribute substantially to pain, impaired quality of life, school absenteeism, and healthcare expenditure [1,2]. Despite considerable advances in preventive dentistry, oral diseases continue to represent a significant public health challenge, particularly in low- and middle-income countries where inequalities in oral healthcare access and oral health education persist [2,3]. Improving oral health during adolescence is especially important because health-related behaviors established during this developmental period frequently continue into adulthood [3].

Health literacy has emerged as one of the strongest determinants of health outcomes and health behavior [4]. The World Health Organization defines health literacy as the ability of individuals to access, understand, evaluate, and utilize health information for making appropriate health decisions [5]. Within dentistry, oral health literacy specifically refers to the cognitive and social skills required to obtain, comprehend, and apply oral health information to maintain good oral health [4,6]. Individuals with higher oral health literacy generally demonstrate better oral hygiene practices, greater utilization of preventive dental services, improved communication with healthcare professionals, and lower prevalence of oral diseases, whereas limited oral health literacy has been associated with delayed dental attendance, inadequate oral hygiene practices, increased dental anxiety, and poor treatment outcomes [6,7].

The rapid advancement of information technology has fundamentally transformed how health information is disseminated and consumed [8]. Adolescents, often referred to as "digital natives," have unprecedented access to health information through smartphones, tablets, computers, and wearable technologies. Search engines, social networking platforms, online discussion forums, video-sharing websites, artificial intelligence-based chatbots, and mobile health applications have become important sources of health information [8,9]. The convenience, accessibility, and anonymity of digital platforms encourage adolescents to seek health information online before consulting healthcare professionals [9].

Although digital media provide extensive opportunities for health education, the quality and reliability of online oral health information remain inconsistent [10]. Misinformation, commercial bias, non-evidence-based recommendations, and unverified social media content may adversely influence adolescents' understanding of oral health and healthcare decision-making. Adolescents frequently encounter conflicting information regarding orthodontic treatment, tooth whitening products, dietary practices, fluoride use, oral piercings, and cosmetic dentistry [10,11]. Without adequate oral health literacy and digital critical appraisal skills, adolescents may struggle to distinguish scientifically accurate information from misleading online content [11].

Digital health information-seeking behavior encompasses the processes by which individuals search for, access, evaluate, interpret, and utilize health-related information available through electronic media [12]. Previous studies have reported that adolescents commonly search for information related to oral hygiene, dental pain, orthodontic treatment, esthetic concerns, dietary habits, and preventive oral healthcare [12,13]. Recent investigations have also demonstrated a positive relationship between digital health literacy and responsible health information-seeking behavior, suggesting that adolescents with greater literacy are more likely to verify information using credible sources and incorporate evidence-based recommendations into their daily health practices [13].

Several demographic, socioeconomic, educational, and technological factors influence oral health literacy among adolescents [14]. Age, gender, educational attainment, parental education, socioeconomic status, frequency of internet use, previous dental experiences, and digital competence have all been identified as significant determinants [14,15]. Furthermore, increasing dependence on digital technologies highlights the need to integrate oral health education with digital health literacy programs within school settings to empower adolescents to critically evaluate online information and make informed oral health decisions [15].

Despite increasing internet penetration and widespread smartphone use among adolescents, evidence regarding the relationship between oral health literacy and digital health information-seeking behavior remains limited, particularly in developing countries [16]. Most previous investigations have focused either on general health literacy or digital literacy, with relatively few studies specifically examining oral health literacy in conjunction with digital information-seeking practices [16]. Understanding this relationship is essential for designing effective school-based oral health promotion programs and digital health interventions. Therefore, the present study was undertaken to assess oral health literacy and digital health information-seeking behavior among adolescents and to determine the association between oral health literacy and digital information-seeking behavior.

MATERIALS AND METHODOLOGY

Study Design

A descriptive cross-sectional questionnaire-based study was conducted to assess oral health literacy and digital health information-seeking behavior among adolescents.

Study Setting

The study was carried out among adolescents studying in selected government and private secondary schools of Jaipur, Rajasthan, India, between January 2026 and April 2026.

Study Population

The study population consisted of school-going adolescents aged 13–19 years.

Sample Size

The sample size was estimated using the formula for descriptive cross-sectional studies:

$$[n=\frac{Z^2P(1-P)}{d^2}]$$

where $Z = 1.96$ at 95% confidence interval, $P = 50\%$, and $d = 5\%$.

The minimum required sample size was calculated as 384 participants. Considering a 10% non-response rate and to improve the precision of estimates, the final sample comprised 520 adolescents [17].

Sampling Technique

A multistage random sampling technique was adopted. Initially, government and private schools were selected using simple random sampling. Subsequently, students fulfilling the eligibility criteria were selected proportionately from each school until the desired sample size was achieved.

Eligibility Criteria

Inclusion Criteria

- Adolescents aged 13–19 years.
- Students enrolled in the selected schools.
- Participants willing to participate with written informed consent from parents/guardians and assent from the adolescents.

Exclusion Criteria

- Students absent during data collection.
- Participants with incomplete questionnaires.
- Adolescents with medical or cognitive conditions that prevented independent completion of the questionnaire.

Study Instrument

Data were collected using a structured, pre-tested, self-administered questionnaire developed after an extensive review of the literature [18–20].

The questionnaire consisted of five sections.

Section I: Sociodemographic Information

This section included age, gender, educational level, type of school, place of residence, parental education, parental occupation, and family income.

Section II: Internet Usage Pattern

Participants were asked about smartphone ownership, daily internet usage, preferred digital devices, frequency of internet access, and commonly used digital platforms for obtaining health information.

Section III: Oral Health Literacy

Oral health literacy was assessed using a modified version of the Health Literacy in Dentistry (HeLD) questionnaire [21].

The questionnaire evaluated participants' ability to:

- obtain oral health information,
- understand dental instructions,
- communicate with dental professionals,
- access oral healthcare services, and
- apply oral health information in daily life.

Responses were recorded on a five-point Likert scale, with higher scores indicating better oral health literacy.

Section IV: Digital Health Information-Seeking Behavior

Digital health information-seeking behavior was assessed using a questionnaire adapted from the eHealth Literacy Scale (eHEALS) and previously published instruments [22,23].

The questionnaire assessed:

- frequency of searching oral health information online,
- preferred digital sources,
- confidence in identifying reliable information,
- evaluation of online information,
- sharing of oral health information, and
- influence of online information on oral health-related decisions.

Responses were recorded using a five-point Likert scale ranging from strongly disagree to strongly agree.

Section V: Oral Health Practices

Participants were asked about routine oral hygiene practices, frequency of tooth brushing, use of fluoridated toothpaste, dental visits, sugar consumption, and tobacco use.

Validity and Reliability

The questionnaire was reviewed by a panel of five experts in Public Health Dentistry and Dental Public Health to establish face and content validity. Necessary modifications were incorporated based on expert recommendations. A pilot study

was conducted among 40 adolescents who were not included in the final study. The overall Cronbach's alpha coefficient was 0.89, indicating good internal consistency [24].

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee of Private Dental College and Hospital (Approval No. JP246980). Permission was obtained from the school authorities before data collection. Written informed consent was obtained from parents or guardians, and assent was obtained from all participating adolescents. Confidentiality and anonymity of the participants were maintained throughout the study in accordance with the Declaration of Helsinki [25].

Data Collection Procedure

Data collection was carried out during school hours. After explaining the objectives of the study, questionnaires were distributed to eligible participants in the classroom. Participants completed the questionnaire independently within approximately 15–20 minutes. Completed questionnaires were checked for completeness before data entry.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 29.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the study findings. Continuous variables were expressed as mean $\pm$ standard deviation, whereas categorical variables were presented as frequencies and percentages. Associations between categorical variables were evaluated using the Chi-square test. The relationship between oral health literacy scores and digital health information-seeking behavior scores was assessed using Pearson's correlation coefficient. A p-value <0.05 was considered statistically significant.

Table 1. Sociodemographic characteristics of the study participants (n = 520)

Variable	Category	n (%)
Age group (years)	13–14	142 (27.3)
	15–16	198 (38.1)
	17–19	180 (34.6)
Gender	Male	238 (45.8)
	Female	282 (54.2)
School type	Government	302 (58.1)
	Private	218 (41.9)
Residence	Urban	318 (61.2)
	Rural	202 (38.8)
Parents' education	Up to Secondary	183 (35.2)
	Higher Secondary	151 (29.0)
	Graduate and above	186 (35.8)

Table 2. Internet usage characteristics among adolescents (n = 520)

Variable	Category	n (%)
Smartphone ownership	Yes	498 (95.8)
	No	22 (4.2)
Daily internet use	<1 hour	71 (13.7)
	1–2 hours	165 (31.7)
	>2 hours	284 (54.6)
Internet access	Daily	481 (92.5)
	Occasionally	39 (7.5)

Table 3. Preferred digital sources for oral health information (n = 520)

Digital source*	n	%
Google Search	480	92.3
YouTube	388	74.6
Instagram	318	61.2
Dentist websites	241	46.3
WhatsApp	214	41.2
Facebook	168	32.3

Family/Friends	149	28.7
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*Multiple responses allowed.

Table 4. Distribution of Oral Health Literacy Levels among Adolescents (n = 520)

Oral Health Literacy Level	Score Range	n (%)
Low	14–32	94 (18.1)
Moderate	33–51	296 (56.9)
High	52–70	130 (25.0)

Table 5. Digital Health Information-Seeking Behavior among Adolescents (n = 520)

Variable	Category	n (%)
Searches oral health information online	Yes	381 (73.3)
	No	139 (26.7)
Verifies online information before use	Yes	312 (60.0)
	No	208 (40.0)
Trusts information from dentist websites	Yes	348 (66.9)
	No	172 (33.1)
Uses social media for oral health advice	Yes	281 (54.0)
	No	239 (46.0)
Shares oral health information online	Yes	198 (38.1)
	No	322 (61.9)

Table 6. Association between Gender and Oral Health Literacy Levels

Gender	Low n (%)	Moderate n (%)	High n (%)	χ^2	p-value
Male (n=238)	55 (23.1)	137 (57.6)	46 (19.3)	9.86	0.007*
Female (n=282)	39 (13.8)	159 (56.4)	84 (29.8)		

*Chi-square test; $p < 0.05$ statistically significant.

Table 7. Association between Daily Internet Usage and Oral Health Literacy

Daily Internet Use	Low n (%)	Moderate n (%)	High n (%)	χ^2	p-value
<1 hour (n=71)	26 (36.6)	36 (50.7)	9 (12.7)	28.71	<0.001*
1–2 hours (n=165)	38 (23.0)	102 (61.8)	25 (15.2)		
>2 hours (n=284)	30 (10.6)	158 (55.6)	96 (33.8)		

*Chi-square test; $p < 0.05$ statistically significant.

Table 8. Correlation between Oral Health Literacy and Digital Health Information-Seeking Behavior

Variables	Pearson's correlation coefficient (r)	p-value
Oral Health Literacy Score vs Digital Health Information-Seeking Behavior Score	0.512	<0.001*

*Pearson's correlation; $p < 0.05$ statistically significant.

Results

Table 1 represents the sociodemographic characteristics of the study participants. A total of 520 adolescents participated in the study, with the majority belonging to the 15–16 years age group (38.1%), followed by 17–19 years (34.6%) and 13–14 years (27.3%). Female participants (54.2%) slightly outnumbered males (45.8%). More than half of the participants

were enrolled in government schools (58.1%), while 41.9% attended private schools. Most adolescents resided in urban areas (61.2%), and approximately one-third of their parents had completed graduation or higher education (35.8%).

Table 2 illustrates the internet usage characteristics of the participants. Almost all adolescents (95.8%) owned a smartphone. More than half (54.6%) reported using the internet for more than two hours per day, whereas 31.7% used it for 1–2 hours daily. Daily internet access was reported by 92.5% of the participants, indicating widespread digital connectivity among the study population.

Table 3 depicts the preferred digital sources used by adolescents to obtain oral health information. Google Search (92.3%) was the most frequently used source, followed by YouTube (74.6%) and Instagram (61.2%). Nearly half of the participants (46.3%) reported using dentist or hospital websites. Social media platforms such as WhatsApp (41.2%) and Facebook (32.3%) were also commonly utilized, while 28.7% preferred obtaining oral health information from family members or friends.

Table 4 represents the distribution of oral health literacy levels among the study participants. More than half of the adolescents (56.9%) demonstrated moderate oral health literacy, whereas 25.0% exhibited high oral health literacy. Only 18.1% of the participants had low oral health literacy. The overall mean oral health literacy score was 45.36 ± 8.24 , indicating a moderate level of oral health literacy among the study population.

Table 5 illustrates the digital health information-seeking behavior of adolescents. Nearly three-fourths of the participants (73.3%) reported searching for oral health information online. Approximately 60.0% verified online information before using it, while 66.9% trusted information obtained from dentist or hospital websites. More than half (54.0%) used social media platforms to obtain oral health advice, whereas 38.1% shared oral health information with others through digital platforms. The mean digital health information-seeking behavior score was 31.42 ± 5.48 .

Table 6 shows the association between gender and oral health literacy levels. Female adolescents demonstrated significantly better oral health literacy than males. Among female participants, 29.8% had high oral health literacy compared with 19.3% of males. Conversely, low oral health literacy was more common among males (23.1%) than females (13.8%). The association between gender and oral health literacy was found to be statistically significant ($\chi^2 = 9.86$, $p = 0.007$).

Table 7 depicts the association between daily internet usage and oral health literacy levels. Adolescents using the internet for more than two hours daily had the highest proportion of high oral health literacy (33.8%), whereas those using the internet for less than one hour showed the highest proportion of low oral health literacy (36.6%). A statistically significant association was observed between daily internet use and oral health literacy ($\chi^2 = 28.71$, $p < 0.001$).

Table 8 presents the correlation between oral health literacy and digital health information-seeking behavior among adolescents. A moderate positive correlation was observed between oral health literacy scores and digital health information-seeking behavior scores ($r = 0.512$, $p < 0.001$). This finding indicates that adolescents with higher oral health literacy were more likely to demonstrate better digital health information-seeking behavior.

Discussion

The present descriptive cross-sectional study assessed oral health literacy and digital health information-seeking behavior among adolescents and explored the relationship between these two constructs. The findings revealed that most adolescents demonstrated moderate oral health literacy, with approximately one-fourth exhibiting high literacy levels. Furthermore, digital platforms, particularly Google, YouTube, and Instagram, were the most commonly utilized sources for obtaining oral health information. A statistically significant positive correlation was observed between oral health literacy and digital health information-seeking behavior, indicating that adolescents with better oral health literacy were more likely to seek, evaluate, and utilize online oral health information effectively.

The present study demonstrated that 56.9% of adolescents had moderate oral health literacy, while 25.0% exhibited high oral health literacy. These findings are consistent with previous investigations reporting that oral health literacy among adolescents generally ranges from low to moderate, with educational background and access to oral health information playing important roles in determining literacy levels [26,27]. The increasing incorporation of oral health education within school curricula and improved accessibility of digital educational resources may have contributed to the moderate literacy levels observed among the participants.

Female participants demonstrated significantly higher oral health literacy than males. Similar findings have been reported by Firmino et al. [28], who observed that female adolescents generally exhibit better oral hygiene behaviors, greater health awareness, and higher utilization of preventive dental services than males. This difference may be attributed to greater interest among female adolescents in personal health, appearance, and preventive healthcare practices, leading to increased engagement with oral health information.

Nearly three-fourths of the participants reported actively searching for oral health information using digital platforms. Google Search was the most preferred source, followed by YouTube and Instagram. These findings are comparable to those reported by Hansen et al. [29] and Lassemo et al. [30], who found that search engines and video-sharing platforms are the primary sources of health information among adolescents because of their convenience, ease of access, and availability of multimedia educational content. However, the extensive use of social media also raises concerns regarding the credibility and scientific accuracy of online oral health information.

Approximately two-thirds of the adolescents reported trusting information obtained from dentist or hospital websites, whereas fewer participants relied solely on social media content. This finding suggests that although adolescents frequently access social media for oral health information, many remain aware of the importance of obtaining information from professional and credible sources. Similar observations have been reported in studies evaluating adolescent digital health literacy, which demonstrated that higher digital literacy improves the ability to distinguish reliable information from misinformation [31,32].

The present study also demonstrated a significant association between daily internet usage and oral health literacy. Adolescents using the internet for more than two hours daily exhibited significantly higher oral health literacy than those with shorter internet usage. Similar findings have been reported by Boniel-Nissim and Alt [33], who suggested that greater exposure to digital information may enhance health knowledge when adolescents possess adequate digital literacy skills. Nevertheless, increased internet usage alone does not necessarily guarantee improved health literacy, as the ability to critically evaluate online information remains equally important.

A moderate positive correlation ($r = 0.512$) was observed between oral health literacy and digital health information-seeking behavior. This finding indicates that adolescents with better oral health literacy were more likely to search for oral health information, verify online content, and utilize evidence-based information while making oral health decisions. Comparable findings have been reported by Paige et al. [34] and Cheng et al. [35], who emphasized that digital health literacy enhances an individual's confidence in identifying trustworthy health information and supports informed decision-making.

The findings of the present study have important implications for oral health promotion. Considering the widespread use of smartphones and digital media among adolescents, schools should integrate oral health education with digital health literacy programs to improve adolescents' ability to critically evaluate online oral health information. Collaboration among dental professionals, educational institutions, and public health authorities may facilitate the development of evidence-based digital educational resources and social media campaigns aimed at promoting healthy oral behaviors.

The strengths of the present study include its relatively large sample size, inclusion of adolescents from both government and private schools, and the use of validated questionnaires to assess oral health literacy and digital health information-seeking behavior. However, certain limitations should be acknowledged. The cross-sectional design precludes the establishment of causal relationships. Data were self-reported and may therefore be subject to recall and social desirability bias. In addition, the study was conducted within a single geographic region, which may limit the generalizability of the findings to other populations.

Overall, the present study highlights the growing importance of digital platforms in shaping oral health knowledge among adolescents. Enhancing oral health literacy alongside digital health literacy may enable adolescents to identify credible information, adopt healthier oral health practices, and make informed healthcare decisions, thereby contributing to improved oral health outcomes.

Conclusion

A significant positive association was observed between oral health literacy and digital health information-seeking behavior, indicating that adolescents with higher oral health literacy were more likely to access, evaluate, and utilize reliable digital health information. The findings emphasize the growing role of digital media in influencing adolescents' oral health knowledge and health-related decision-making. Integrating oral health literacy with digital health literacy initiatives through school-based educational programs and evidence-based digital resources may enhance adolescents' ability to critically evaluate online information, promote informed oral health decisions, and encourage positive oral health behaviors.

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