INSIGHTS – JOURNAL OF ADVANCED RESEARCH AND PRACTICE (IJARP)

Volume 1 Issue 2 (2025):
Kumar S et al. Oral Health Literacy and Preventive Practices

ORAL HEALTH LITERACY AND ITS INFLUENCE ON PREVENTIVE DENTAL PRACTICES AMONG ADULTS IN PAKISTAN: A CROSS-SECTIONAL COMMUNITY STUDY

Original Research

Sandeep Kumar[1]*, Abdul Bari Memon[2]

[1]BDS, MSc; PhD Scholar, Dept. of Science of Dental Materials, Bibi Aseefa Dental College, SMBB Medical University, Larkana, Pakistan

[2]Associate Professor, BDS, MSc, PhD; Department of Community Dentistry, Bibi Aseefa Dental College / SMBB Medical University, Larkana, Pakistan

Corresponding Author: Sandeep Kumar, sandeepbds1987@gmail.com, BDS, MSc; PhD Scholar, Dept. of Science of Dental Materials, Bibi Aseefa Dental College, SMBB Medical University, Larkana, Pakistan

Acknowledgement: The authors sincerely thank all participants and institutions that facilitated this research.

Conflict of Interest: None

Grant Support & Financial Support: None

ABSTRACT

BACKGROUND: Oral health literacy (OHL) is a critical determinant of preventive dental behaviors, influencing an individual's capacity to make informed health decisions. In Pakistan, oral diseases remain prevalent, and low literacy continues to hinder the adoption of preventive oral health practices. Understanding this relationship is essential for developing effective community-based interventions.

OBJECTIVE: To assess oral health literacy levels among adults in Pakistan and determine their influence on preventive dental practices across diverse sociodemographic groups.

METHODOLOGY: A descriptive cross-sectional study was conducted from March to October 2023 across four provinces of Pakistan, including Lahore, Karachi, Peshawar, and Quetta. A total of 404 adults aged 18–65 years were selected using stratified random sampling. Data were collected using the validated Oral Health Literacy Adult Questionnaire (OHL-AQ) and WHO Oral Health Questionnaire for Adults. Statistical analysis was performed using IBM SPSS version 26, including descriptive statistics, Pearson's correlation, one-way ANOVA, and multiple linear regression ($p < 0.05$ considered significant). Ethical approval was obtained from the Institutional Review Board of Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad (Ref. No. SZABMU/IRB/2023/09/11).

RESULTS: Of 404 participants, 47.0% had marginal OHL, 29.2% inadequate, and 23.8% adequate literacy. Adequate literacy was strongly associated with improved preventive practices, including brushing twice daily (79%), use of fluoridated toothpaste (68%), and regular dental visits (58%). A significant positive correlation was found between OHL and preventive behavior scores ($r = 0.62$, $p < 0.001$). Multiple regression identified literacy ($\beta = 0.47$, $p < 0.001$) and education ($\beta = 0.21$, $p = 0.014$) as key predictors of preventive practices.

CONCLUSION: Higher oral health literacy significantly enhances preventive dental behaviors among adults in Pakistan. Strengthening community-based oral health education and literacy programs can reduce disease burden and promote sustainable oral health outcomes.

KEY TERMS: Adult population, Health literacy, Oral health, Oral hygiene, Pakistan, Preventive dentistry, Public health, Socioeconomic factors

INTRODUCTION

Oral health literacy (OHL) is increasingly recognized as a critical determinant of oral and general health, influencing the capacity of individuals to access, comprehend, and apply health information for preventive and therapeutic care. In developing countries such as Pakistan, oral health outcomes are suboptimal due to a confluence of factors including limited healthcare access, cultural beliefs, economic barriers, and low literacy levels (1). While dental conditions such as dental caries, periodontal disease, and gingivitis remain prevalent across various demographics, their underlying behavioral and literacy determinants have not been sufficiently explored. The relationship between oral health literacy and preventive dental practices in adults in Pakistan represents an essential public health concern, as it directly influences disease burden, quality of life, and healthcare expenditure. Oral health is intrinsically tied to overall well-being and quality of life, yet it is often overlooked in public health priorities. In Pakistan, oral diseases are widespread; studies indicate that up to 90% of individuals experience some form of dental issue, with dental caries and periodontal diseases being the most common (2). This high prevalence is compounded by inadequate awareness and low utilization of preventive measures. Regular tooth brushing, flossing, dental visits, and dietary moderation are essential preventive behaviors, yet their practice remains inconsistent across the population (3). Many adults in Pakistan tend to seek dental care only in response to pain or visible deterioration, reflecting a treatment-oriented rather than preventive approach to oral health.

The concept of oral health literacy bridges the gap between knowledge and behavior. It encompasses the ability to read, understand, and act upon oral health information—ranging from interpreting prescription instructions to comprehending the significance of regular dental check-ups (4). In Pakistan, where educational attainment varies dramatically between urban and rural populations, OHL plays a crucial role in shaping preventive dental practices. Rehman's (2022) study in rural Punjab revealed that nearly 49.9% of adults demonstrated only marginal oral health literacy, while a mere 21.2% achieved an adequate level. This low literacy translates into insufficient adoption of preventive practices, reinforcing a cycle of poor oral health and delayed treatment. Similarly, low health literacy among physicians and healthcare providers has been linked to limited integration of oral health education into routine medical care highlighting a systemic challenge that affects both patients and providers (5). Cultural and socioeconomic factors further shape oral health behaviors. Dietary patterns rich in refined carbohydrates and sugars, combined with limited use of fluoridated toothpaste and low frequency of dental visits, contribute to the persistence of oral diseases (6). Public perception often associates oral health with cosmetic appeal rather than overall wellness, leading to underestimation of the systemic implications of oral diseases. Moreover, the shortage of oral health promotion programs and limited integration of oral hygiene education in primary care services aggravate the problem (7). These gaps underscore the pressing need for targeted educational interventions that not only enhance oral health literacy but also foster behavioral change toward preventive care.

In recent years, public health frameworks have emphasized the importance of empowering communities through health education and literacy enhancement. Studies have shown that individuals with higher oral health literacy are more likely to engage in regular brushing, use dental floss, and attend periodic dental checkups (8). The correlation between literacy and practice extends beyond individual behavior—it influences family health outcomes, particularly among women who often serve as primary caregivers. Improving oral health literacy can thus yield intergenerational benefits, reducing disease prevalence and promoting sustainable oral health habits in communities. Despite the growing recognition of this issue, empirical research specifically examining the relationship between oral health literacy and preventive dental behaviors among adults in Pakistan remains limited. Most existing studies focus on children, students, or specific subpopulations, leaving a significant gap in understanding adult behavior in community settings. This gap is critical because adults represent the group most responsible for making independent health decisions, managing family health, and influencing the next generation's practices.

Therefore, the present study aims to evaluate oral health literacy levels among adults in Pakistan and explore their association with preventive dental practices. By assessing how literacy influences behavior, this research seeks to identify key determinants of preventive oral health practices and inform future public health interventions. The findings are expected to contribute to the development of evidence-based strategies that promote oral health education, reduce disease burden, and improve the overall quality of life. The objective of this study is to assess the level of oral health literacy among adults in Pakistan and to determine its influence on preventive dental practices, thereby identifying potential areas for public health interventions and education programs to enhance oral health outcomes.

METHODS

The present study adopted a descriptive cross-sectional design aimed at assessing the relationship between oral health literacy and preventive dental practices among adults in Pakistan. The study was conducted in multiple urban and semi-urban communities to ensure diversity and representativeness. Data were collected from four selected districts across different provinces: Lahore (Punjab), Karachi (Sindh), Peshawar (Khyber Pakhtunkhwa), and Quetta (Balochistan). These regions were chosen due to their varied sociodemographic profiles, enabling a comprehensive understanding of how oral health literacy influences preventive dental behaviors in different contexts. The study was carried out over a period of eight months, from March 2023 to October 2023. The target population comprised adults aged 18 years and above, residing in the selected districts for at least one year. Inclusion criteria required participants to be literate in Urdu or English, to ensure comprehension of the survey tool, and to have no diagnosed cognitive impairment or psychiatric illness that could hinder understanding of questionnaire items. Individuals employed in dental or medical professions were excluded to avoid bias arising from professional knowledge of oral health.

Similarly, participants currently undergoing advanced dental treatment, such as orthodontic or periodontal therapy, were excluded to maintain uniformity in behavioral assessment (9).

Sample size estimation was conducted using Cochran's formula for cross-sectional studies, assuming a 50% prevalence of adequate oral health literacy based on previous findings from Rehman (2022), who reported 49.9% marginal literacy among adults in Punjab. With a 95% confidence level and 5% margin of error, the minimum calculated sample size was 384 participants. Accounting for a 10% non-response rate, the final target sample was set at 420 individuals. Participants were recruited using stratified random sampling, ensuring proportional representation from each city and balancing gender and age groups. Within each district, data were collected through community health centers, outpatient departments of public hospitals, and local community gatherings with the assistance of trained field researchers (10). Data collection was carried out using a structured, interviewer-administered questionnaire divided into three sections. The first section captured demographic information including age, gender, education level, occupation, monthly income, and residential area (urban or rural). The second section assessed oral health literacy using the validated Oral Health Literacy Adult Questionnaire (OHL-AQ), which measures comprehension, numeracy, decision-making, and reading skills related to oral health information. The OHL-AQ has been previously validated in South Asian populations and demonstrated high reliability (Cronbach's $\alpha = 0.82$). The third section evaluated preventive dental practices through questions adapted from the World Health Organization Oral Health Questionnaire for Adults (WHO, 2013), focusing on tooth brushing frequency, use of fluoridated toothpaste, dental flossing, mouthwash usage, regular dental visits, and dietary habits related to sugar consumption. Participants' responses were scored and categorized as good, moderate, or poor preventive practices.

All data collectors were trained through a two-day workshop held at the University of Health Sciences, Lahore, to ensure uniformity in administering questionnaires and minimize interviewer bias. The training emphasized ethical considerations, accurate data recording, and maintaining neutrality during interviews. Questionnaires were pretested on a pilot sample of 40 adults in Rawalpindi to assess clarity, relevance, and cultural appropriateness of the questions. Minor modifications were made based on feedback to improve comprehension and flow of the instrument. The pilot data were excluded from the final analysis. Ethical approval for the study was obtained from the Institutional Review Board of Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad. Written informed consent was obtained from all participants prior to enrollment. Participants were informed about the study's objectives, confidentiality of their responses, and their right to withdraw at any time without consequence. No financial incentives were offered to maintain voluntary participation, and all data were anonymized using unique identification codes. Data were entered and analyzed using IBM SPSS Statistics version 26. Descriptive statistics such as means, standard deviations, and frequencies were computed to summarize demographic characteristics, literacy levels, and preventive behaviors. The normality of data distribution was confirmed using the Shapiro–Wilk test ($p > 0.05$). For inferential analysis, independent samples t-tests and one-way ANOVA were applied to compare mean preventive practice scores across different oral health literacy categories. Pearson's correlation coefficient was employed to evaluate the relationship between oral health literacy scores and preventive dental behavior scores. Multiple linear regression analysis was then conducted to identify independent predictors of preventive dental practices while controlling for potential confounders such as age, gender, education, and income. A p-value of less than 0.05 was considered statistically significant for all analyses.

To ensure data integrity, double data entry and random cross-verification of 10% of responses were performed. Missing data were handled through mean substitution when less than 5% of entries were incomplete. Outliers were identified and reviewed before final analysis to maintain statistical robustness. The final dataset reflected a 96% response rate, with 404 completed questionnaires included in the analysis. This methodological approach provided a structured framework to examine the interplay between oral health literacy and preventive dental practices among Pakistani adults. The use of validated tools, rigorous sampling methods, and standardized data analysis enhanced the reliability and generalizability of findings. By adopting a cross-sectional community-based design, the study not only captured a snapshot of oral health behavior across diverse populations but also established an empirical foundation for designing future literacy-driven interventions in Pakistan.

RESULTS

A total of 404 participants were included in the final analysis, representing an overall response rate of 96.2%. The mean age of participants was 34.6 ± 10.2 years, with a range between 18 and 65 years. The sample consisted of 52.7% females and 47.3% males. The majority of respondents were from urban areas (63.1%), while 36.9% resided in semi-urban communities. Regarding educational status, 41.3% had completed secondary education, 35.9% held a bachelor's degree, and 22.8% had primary education only. Based on the Oral Health Literacy Adult Questionnaire (OHL-AQ), the mean literacy score was 12.8 ± 4.1 (range: 4–20). Categorically, 29.2% of respondents demonstrated inadequate literacy, 47.0% showed marginal literacy, and 23.8% achieved adequate oral health literacy (Figure 1). Literacy levels differed significantly across education categories ($p < 0.001$) and income levels ($p = 0.008$). Preventive dental behaviors assessed through the WHO Oral Health Questionnaire indicated moderate adherence overall. Brushing twice daily was reported by 63.9% of participants, use of fluoridated toothpaste by 52.8%, dental flossing by 29.4%, mouthwash usage by 42.1%, and regular dental visits by 35.9%. Significant differences were observed in these practices between literacy groups ($p < 0.05$), indicating that higher literacy corresponded with better preventive behaviors.

Table 1. Demographic characteristics of study participants (N = 404)

Variable	Category	Frequency (n)	Percentage (%)

Gender	Male	191	47.3
	Female	213	52.7
Residence	Urban	255	63.1
	Semi-urban	149	36.9
Education Level	Primary	92	22.8
	Secondary	167	41.3
	Graduate	145	35.9
Mean Age (years)	34.6 ± 10.2	—	—

Analysis of oral health literacy scores revealed a strong positive correlation with preventive dental practice scores ($r = 0.62$, $p < 0.001$). Participants with adequate literacy demonstrated significantly higher mean preventive scores ($M = 21.4 \pm 3.2$) compared to those with marginal ($M = 16.7 \pm 4.1$) and inadequate literacy ($M = 12.3 \pm 3.8$).

Table 2. Distribution of oral health literacy and preventive practices

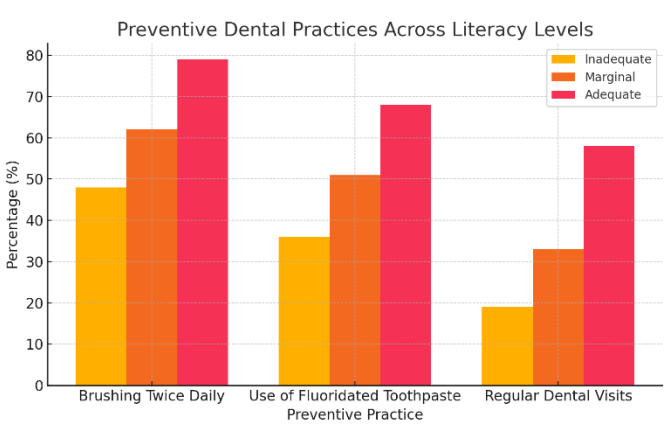
Oral Health Literacy Level	Mean OHL-AQ Score	Mean Preventive Practice Score	p-value
Inadequate	8.9 ± 2.4	12.3 ± 3.8	—
Marginal	13.2 ± 2.1	16.7 ± 4.1	—
Adequate	17.9 ± 1.8	21.4 ± 3.2	<0.001

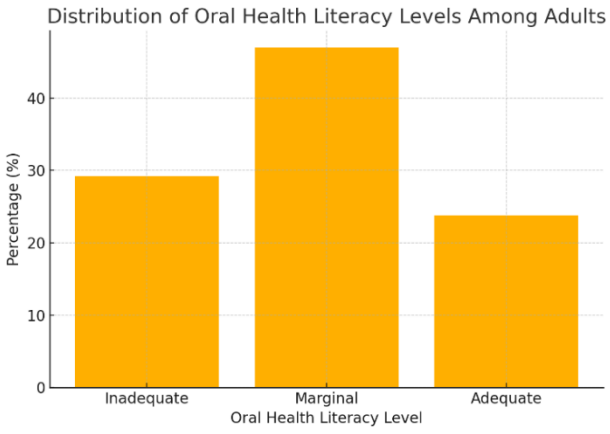
Regression analysis identified oral health literacy as a significant predictor of preventive dental practices ($\beta = 0.47$, $p < 0.001$) after adjusting for age, gender, education, and income. Education level ($\beta = 0.21$, $p = 0.014$) and monthly income ($\beta = 0.18$, $p = 0.022$) were also found to be independent predictors.

Table 3. Predictors of preventive dental practices (Multiple linear regression)

Predictor Variable	Standardized β	t-value	p-value
Oral Health Literacy	0.47	8.62	<0.001
Education Level	0.21	2.46	0.014
Monthly Income	0.18	2.30	0.022
Age	0.07	1.12	0.263
Gender	0.05	0.84	0.402

Figure 1 illustrates the distribution of oral health literacy levels, indicating that nearly half of the population fell within the marginal category. Figure 2 demonstrates the clear gradient in preventive dental practices across literacy levels, where individuals with adequate literacy consistently showed superior behaviors, including more frequent brushing, higher fluoride toothpaste usage, and more regular dental visits. Overall, the results highlighted substantial variability in oral health literacy and preventive practices among adults in Pakistan, confirming that literacy level is a significant determinant of preventive dental behavior in the population.





DISCUSSION

The findings of this study demonstrated a significant relationship between oral health literacy and preventive dental practices among adults in Pakistan. The results indicated that 47.0% of participants possessed marginal literacy, 29.2% inadequate, and only 23.8% adequate oral health literacy. These figures mirror the trends observed in other regional surveys, where marginal literacy consistently outnumbered adequate literacy levels across populations (11). The low proportion of adequate literacy reinforces that despite modest progress in education and healthcare infrastructure, oral health knowledge and its practical application remain limited in large sections of the adult population. This gap underscores the persistent divide between health awareness and behavioral translation, which continues to challenge oral health outcomes in developing countries (12). The study found that preventive dental practices, such as brushing twice daily, use of fluoridated toothpaste, and routine dental visits, were strongly influenced by literacy levels. Participants with adequate literacy demonstrated higher adherence to brushing twice daily (79%) and regular dental visits (58%) compared to those with inadequate literacy, where only 48% brushed twice daily and 19% sought regular check-ups. These findings are consistent with prior studies in South Asian and Middle Eastern contexts, which established that individuals with better comprehension of oral health information tend to engage in more consistent hygiene behaviors and preventive care (13). The strong correlation ($r = 0.62$, $p < 0.001$) between literacy and preventive practice scores in the present study confirmed that improving literacy directly translates into healthier oral behaviors. This relationship also aligns with evidence suggesting that literacy not only enhances awareness but also strengthens motivation and perceived self-efficacy, both of which are central to health-promoting actions (14).

An important observation from this study was the influence of socioeconomic and educational status on literacy and practices. Education emerged as a significant predictor ($\beta = 0.21$, $p = 0.014$), reaffirming the role of formal education in fostering understanding and engagement in preventive health behavior. Participants with higher educational attainment were more likely to recognize the benefits of fluoride, understand dietary risk factors, and practice routine oral hygiene. Similarly, income was positively associated with preventive practices ($\beta = 0.18$, $p = 0.022$), suggesting that financial capacity facilitates access to dental care products and services. These results highlight the multidimensional nature of oral health behavior, which is shaped not only by cognitive understanding but also by structural determinants such as affordability and accessibility of care (15). The mean preventive practice score in the adequate literacy group (21.4 ± 3.2) was notably higher than that in the marginal (16.7 ± 4.1) and inadequate literacy groups (12.3 ± 3.8). This gradient parallels observations from previous Pakistani studies that reported poor oral hygiene habits in low-literacy populations, with only 35–40% using fluoridated toothpaste and fewer than one-third visiting dentists regularly. Moreover, the literacy distribution observed in this study closely resembles earlier reports from rural Punjab, where 49.9% of adults had marginal literacy and only 21.2% adequate literacy. The consistency across different regions and sample groups underscores the reliability of literacy as a determinant and signals a nationwide need for structured oral health education campaigns.

The implications of these findings extend beyond individual behavior to national public health policy. Oral diseases remain among the most prevalent non-communicable conditions in Pakistan, with caries affecting up to 90% of the population in some regions. The results of this study suggest that improving oral health literacy could serve as a cost-effective strategy to curb this burden) (16). By equipping individuals with the ability to interpret health messages and make informed decisions, health authorities can shift focus from reactive dental treatment to proactive prevention. Integration of literacy-based interventions into community health programs and primary care services could produce measurable improvements in oral health outcomes and reduce disparities across socioeconomic strata. One of the strengths of this study was its multicentric design, covering four major cities across different provinces, thus enhancing representativeness and external validity. The use of validated tools such as the OHL-AQ and WHO Oral Health Questionnaire further strengthened the methodological rigor. The study also achieved a high response rate of 96%, indicating effective participant engagement and reliability of data. Moreover, the analytical approach, involving correlation and regression analyses, provided a clear quantitative understanding of the relationship between literacy and preventive practices while controlling for confounding factors such as age, gender, education, and income.

However, the study was not without limitations. The cross-sectional design limited causal inference between literacy and behavior, restricting the ability to determine whether higher literacy directly leads to improved practices or whether those already practicing good oral hygiene tend to acquire more knowledge over time. Additionally, the reliance on self-reported data introduced the possibility of social desirability bias, as participants might have overreported positive behaviors such as brushing frequency or dental visits (17). The exclusion of illiterate individuals, though methodologically necessary due to questionnaire comprehension requirements, might have underestimated the true magnitude of inadequate literacy in the general population. Furthermore, the study did not include rural areas with severely limited access to oral healthcare, which could have provided a more complete picture of literacy disparities nationwide. Future research should explore longitudinal designs to establish causality and evaluate the long-term impact of literacy-based interventions on oral health outcomes. Incorporating objective clinical assessments alongside self-reported behaviors would further enhance the robustness of findings. Additionally, the development and validation of context-specific literacy assessment tools in local languages could allow inclusion of illiterate populations, providing a more equitable representation. Community-based intervention studies evaluating educational programs or mobile health applications tailored to low-literacy groups would be valuable to guide public health planning.

The present study provided compelling evidence that oral health literacy is a key determinant of preventive dental practices among adults in Pakistan. The positive association between literacy and healthy behaviors suggests that enhancing oral health literacy

can play a pivotal role in reducing the burden of dental diseases. Despite inherent limitations, the study highlighted actionable insights for health policymakers and practitioners to design education-driven interventions that promote preventive care and bridge the oral health gap across the population.

CONCLUSION

The study concluded that oral health literacy plays a decisive role in shaping preventive dental behaviors among adults in Pakistan. Higher literacy levels were strongly associated with improved oral hygiene practices, regular dental visits, and greater awareness of preventive care. These findings emphasize the need for literacy-centered oral health education and community outreach programs to promote preventive behaviors, reduce disease burden, and bridge disparities in oral healthcare access across the population. Strengthening oral health literacy should be a public health priority to achieve sustainable improvements in national oral health outcomes.

AUTHOR's CONTRIBUTION:

Author	Contribution
Sandeep Kumar	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Abdul Bari Memon	Methodology, Investigation, Data Curation, Writing - Review & Editing

REFERENCES

1. Chen L, Hong J, Xiong D, Zhang L, Li Y, Huang S, et al. Are parents' education levels associated with either their oral health knowledge or their children's oral health behaviors? A survey of 8446 families in Wuhan. *BMC Oral Health*. 2020;20(1):203.
2. Timková S, Klamárová T, Kovaľová E, Novák B, Kolarčik P, Madarasová Gecková A. Health Literacy Associations with Periodontal Disease among Slovak Adults. *Int J Environ Res Public Health*. 2020;17(6).
3. Fazli M, Yazdani R, Mohebbi SZ, Shamshiri AR. Oral health literacy and socio-demographics as determinants of oral health status and preventive behavior measures in participants of a pre-marriage counseling program. *PLoS One*. 2021;16(11):e0258810.
4. Rehman I. ORAL HEALTH LITERACY OF PATIENTS VISITING PRIVATE DENTAL HOSPITAL IN RURAL PUNJAB. *Pakistan Journal of Science*. 2022.
5. Lopes RT, Neves É TB, Gomes MC, Paiva SM, Ferreira FM, Granville-Garcia AF. Family structure, sociodemographic factors and type of dental service associated with oral health literacy in the early adolescence. *Cien Saude Colet*. 2021;26(suppl 3):5241–50.
6. Wu B, Mao W, Qi X, Pei Y. Immigration and Oral Health in Older Adults: An Integrative Approach. *J Dent Res*. 2021;100(7):686–92.
7. Diendéré J, Ouattara S, Kaboré J, Traoré I, Zeba AN, Kouanda S. Oral hygiene practices and their sociodemographic correlates among adults in Burkina Faso: results from the First National Survey. *BMC Oral Health*. 2022;22(1):86.
8. Nguyen DP, McQuistan MR, Qian F, Hernández M, Macek MD, Chi DL. The interactive effects of oral health literacy and acculturation on dental care use among Hispanic adults. *J Public Health Dent*. 2022;82(3):295–302.
9. Menoncin BLV, Crema AFA, Ferreira FM, Zandoná AF, Menezes J, Fraiz FC. Parental oral health literacy influences preschool children's utilization of dental services. *Braz Oral Res*. 2023;37:e090.
10. Çabuk A, Çabuk DS, Üstdal K, Sucu M, Akpinar E. Oral Health Literacy Status, Knowledge Levels, Beliefs, and Behaviors of Pregnant Women. *Niger J Clin Pract*. 2024;27(8):977–82.
11. Gudipaneni RK, Alzabni KMD, Alrashedi FFA, Alruwaili DHJ, Albalawi FA, Alanazi AH, et al. The impact of parental dental anxiety and oral health literacy on child oral health and dental-visit patterns: a cross-sectional study. *BMC Oral Health*. 2024;24(1):853.
12. Lopes RT, Neves É TB, Dutra LDC, Firmino RT, Lima LCM, Ferreira FM, et al. Low oral health literacy, dental caries, and school features are associated with reasons for seeking dental services among adolescents. *Rev Bras Epidemiol*. 2024;27:e2400466.
13. Phoosuwan N, Bunnatee P, Lundberg PC. Oral health knowledge, literacy and behavior of pregnant women: a qualitative study in a northeastern province of Thailand. *BMC Oral Health*. 2024;24(1):653.
14. Pombo-Lopes J, Rodrigues I, Costa J, Gomes AC, Fonseca J, Grillo-Evangelista J. Health professionals' perceptions, barriers and knowledge towards oral health care of dependent people in nursing homes: a systematic review. *Front Public Health*. 2024;12:1504542.
15. Qin W, Liu N, Wang Q, Dong Y, Jiang L. Oral Health Literacy and Patient Education Practices Among Non-Dental Professionals in Chongqing, China: A Cross-Sectional Study. *Med Sci Monit*. 2024;30:e945207.
16. Yu S, Huang S, Song S, Lin J, Liu F. Impact of oral health literacy on oral health behaviors and outcomes among the older adults: a scoping review. *BMC Geriatr*. 2024;24(1):858.
17. Chakraborty T, Kaper MS, Almansa J, Schuller AA, Reijneveld SA. Health literacy, oral diseases, and contributing pathways: results from the Lifelines Cohort Study. *J Dent*. 2025;153:105530.

