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Oral health perception and clinical status: A cross sectional observational study

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Abstract:
Oral-health knowledge may not translate into consistent preventive practices among young adults. Therefore, it is of interest to assess the oral-health knowledge, practices, self-perception, DMFT and OHI-S among 350 participants aged 17-20 years. Although knowledge was favourable, only 41.1% brushed twice daily, while flossing (12.6%) and interdental-brush use (11.1%) remained low. The mean DMFT was 1.49 ± 1.19 and OHI-S was 1.11 ± 0.59, with self-perceived oral health significantly associated with OHI-S category ($\chi^2 = 8.18$, $p = 0.017$). Thus, data shows a persistent knowledge-practice gap, emphasizing behaviour-focused oral-health promotion for sustained preventive care.

Keywords: Oral health, oral-health knowledge, oral-hygiene practices, dental attendance, self-perceived oral health, decayed, missing and filled teeth (DMFT), simplified oral hygiene index (OHI-S), young adults, cross-sectional study

Background:
Oral health is an integral component of general health and well-being, yet oral diseases remain a major global public-health challenge affecting an estimated 3.5 billion people worldwide **[1]**. The distribution of oral disease is shaped by health-related behaviours, socioeconomic conditions, access to dental services and wider social determinants of health **[2]**. Regular tooth brushing with fluoride-containing toothpaste remains a fundamental evidence-based strategy for caries prevention **[3]**. Interdental cleaning provides additional plaque-control and gingival-health benefits, with interdental brushes offering greater adjunctive benefit than some other interdental methods **[4]**. Cumulative dental-caries experience is most widely quantified using the Decayed, Missing and Filled Teeth (DMFT) index **[5]**. Oral cleanliness is assessed using the Simplified Oral Hygiene Index (OHI-S) developed by Greene and Vermillion, which measures debris and calculus on representative tooth surfaces **[6]**. The continued use of standardized indices supports reliable epidemiological surveillance and population-level comparison of oral-health status **[7]**. Oral-health education can improve knowledge and selected behaviours, such as tooth brushing and fluoride-toothpaste use, although improvements in clinical outcomes are less consistent **[8]**. More behaviourally oriented approaches, including motivational interviewing, have shown potential benefits for selected oral-health behaviours and periodontal outcomes **[9]**. However, findings across randomized trials remain heterogeneous, emphasizing the need for context-specific and appropriately designed interventions **[10]**. Therefore, it is of interest to evaluate the oral-health knowledge, attitudes, oral-hygiene practices, dental attendance, self-perceived oral health and clinical oral-hygiene status and to determine the association between self-perceived oral health and clinical oral-hygiene status, among young individuals during the transition from adolescence to adulthood.

Materials and Methods:
A cross-sectional observational study was conducted among 350 participants at a private dental institution over a 12-month period, from June 2025 to May 2026. The study population comprised participants aged 17-20 years, categorized for analysis into two age groups: 17-18 years and 19-20 years, accounting for 40.3% and 59.7% of the study population, respectively. Participants who attended the institution during the study period, were willing to participate and provided written informed consent or assent, as applicable, were included. Participants were excluded if they were outside the specified age range, declined participation, were unable to cooperate with the questionnaire or clinical examination, had incomplete data, or had systemic conditions, recent major dental treatment or medication use that could influence the oral-health parameters under investigation. Data were collected using a structured, interviewer-administered questionnaire capturing socio-demographic characteristics, oral-health knowledge and attitudes, oral-hygiene practices, dental attendance patterns and self-perceived oral health. Knowledge items assessed recommended tooth brushing frequency, the role of fluoride, dental plaque and oral disease, the consequences of inadequate oral hygiene and the importance of regular dental visits. Practice-related variables included tooth brushing frequency, type of toothbrush and toothpaste, use of interdental cleaning aids, mouthwash use and pattern of dental attendance. To minimize interviewer-related variation, the questionnaire was

administered using a standardized procedure and responses were coded for analysis. A standardized clinical examination assessed dental-caries experience using the Decayed, Missing and Filled Teeth (DMFT) index and oral-hygiene status using the Simplified Oral Hygiene Index (OHI-S) developed by Greene and Vermillion, which incorporates debris and calculus scores on selected representative tooth surfaces. Based on the obtained OHI-S scores, participants were categorized according to the established interpretive criteria and clinical findings were recorded on standardized examination forms. Categorical variables were expressed as frequencies and percentages, whereas continuous variables, including DMFT and OHI-S scores, were summarized using mean ± standard deviation, median and range. Associations between OHI-S category and selected categorical variables were evaluated using the Pearson chi-square test. All statistical tests were two-sided and a p-value < 0.05 was considered statistically significant. The study was conducted in accordance with the ethical principles governing research involving human participants. Ethical approval was obtained from the Institutional Ethics Committee of the participating institution and written informed consent (with assent and/or parental or legally authorized consent where required) was obtained before enrolment. Participation was voluntary and confidentiality and anonymity were maintained throughout by restricting access to study records and using coded data for analysis and reporting.

Results:

A total of 350 participants were included. The study population was predominantly female (251; 71.7%), with 99 (28.3%) males. With respect to age, 141 (40.3%) participants were aged 17-18 years and 209 (59.7%) were aged 19-20 years, so the older age group constituted the larger proportion **(Table 1).** Participants demonstrated a generally favourable level of oral-health knowledge and attitudes. Twice-daily tooth brushing was correctly identified as ideal by 283 (80.9%) participants, awareness of the preventive role of fluoride was reported by 278 (79.4%) and 323 (92.3%) recognized plaque as a cause of oral disease. Furthermore, 331 (94.6%) acknowledged that poor oral hygiene could adversely affect health and 316 (90.3%) considered regular dental visits beneficial **(Table 2)**. Despite the favourable knowledge profile, a notable knowledge-practice discrepancy was observed. Although 283 (80.9%) recognized twice-daily brushing as ideal, only 144 (41.1%) reported brushing twice daily, whereas 206 (58.9%) brushed once daily. Fluoridated toothpaste use was reported by 312 (89.1%) and soft-toothbrush use by 241 (68.9%). Adoption of adjunctive interdental cleaning was limited, with only 44 (12.6%) using dental floss and 39 (11.1%) using interdental brushes. Regular mouthwash use was reported by 63 (18.0%), while 120 (34.3%) never used mouthwash **(Table 3)**. Dental attendance was predominantly symptom-driven: 158 (45.1%) participants visited a dentist only when experiencing pain, 110 (31.4%) reported annual visits and only 19 (5.4%) attended check-ups every six months. With respect to self-perceived oral health, 203 (58.0%) rated their oral health as good, 123 (35.1%) as fair and 24 (6.9%) as poor **(Table 4)**. The mean DMFT score was 1.49 ± 1.19 (median 1.00; range 0-5), indicating a measurable but relatively limited cumulative caries experience, while the mean OHI-S score was 1.11 ± 0.59 (median 1.13; range 0.00-2.58). Based on the OHI-S classification, 203 (58.5%) participants exhibited good oral hygiene and 147 (41.5%) fair oral hygiene and none was classified as having poor oral hygiene **(Table 5)**. A statistically significant association was observed between self-perceived oral health and clinically assessed OHI-S category (Pearson $\chi^2 = 8.18$, $p = 0.017$). Among participants who perceived their oral health as good, 70 (67.3%) demonstrated good OHI-S status and 34 (32.7%) fair status, whereas among those reporting fair self-perceived oral health, 27 (45.0%) had good OHI-S status and 33 (55.0%) fair status. Thus, good self-perception was more frequently accompanied by clinically good oral-hygiene status **(Table 6)**.

Table 1: Socio-demographic characteristics of the study population

Characteristic	n (%)
Sex	
Female	251 (71.7)
Male	99 (28.3)
Age group	
17-18 years	141 (40.3)
19-20 years	209 (59.7)
Total	350 (100)

Table 2: Oral-health knowledge and attitudes

Knowledge / attitude item	Favourable response, n (%)
Twice-daily tooth brushing identified as ideal	283 (80.9)
Aware of the preventive role of fluoride	278 (79.4)
Recognized plaque as a cause of oral disease	323 (92.3)
Acknowledged poor oral hygiene can affect health	331 (94.6)
Considered regular dental visits beneficial	316 (90.3)

Table 3: Oral-hygiene practices

Practice	n (%)
Tooth brushing twice daily	144 (41.1)
Tooth brushing once daily	206 (58.9)
Use of fluoridated toothpaste	312 (89.1)
Use of soft toothbrush	241 (68.9)
Use of dental floss	44 (12.6)
Use of interdental brushes	39 (11.1)
Regular mouthwash use	63 (18.0)
Never use mouthwash	120 (34.3)

Table 4: Dental attendance pattern and self-perceived oral health

Variable	n (%)
Dental attendance pattern	
Only when experiencing pain	158 (45.1)
Annual dental visit	110 (31.4)
Every six months	19 (5.4)
Self-perceived oral health	
Good	203 (58.0)
Fair	123 (35.1)
Poor	24 (6.9)

Table 5: Clinical oral-health indices (DMFT and OHI-S)

Index / category	Value
DMFT, mean ± SD	1.49 ± 1.19
DMFT, median (range)	1.00 (0-5)
OHI-S, mean ± SD	1.11 ± 0.59
OHI-S, median (range)	1.13 (0.00-2.58)

OHI-S good, n (%)	203 (58.5)
OHI-S fair, n (%)	147 (41.5)
OHI-S poor, n (%)	0 (0.0)

Table 6: Association between self-perceived oral health and OHI-S category

Self-perceived oral health	Good OHI-S, n (%)	Fair OHI-S, n (%)
Good	70 (67.3)	34 (32.7)
Fair	27 (45.0)	33 (55.0)

Pearson $\chi^2 = 8.18$; $p = 0.017$.

Discussion:

This cross-sectional study provided a multidimensional assessment of oral health among 350 young individuals by integrating oral-health knowledge and attitudes, self-care practices, dental attendance, self-perceived oral health and objective clinical indices. The principal finding was a clear discrepancy between the participants' relatively favourable oral-health knowledge and the extent to which this knowledge was translated into consistent preventive behaviour. Although most participants recognized the importance of twice-daily tooth brushing, fluoride, plaque control and regular dental attendance, substantially fewer reported practicing these behaviours consistently and dental attendance was predominantly symptom-driven. Although 80.9% of participants identified twice-daily brushing as ideal, only 41.1% reported brushing twice daily, indicating a substantial knowledge-practice gap. This observation is consistent with Firmino *et al.* **[11]**, who reported in a systematic review and meta-analysis that oral-health literacy was associated with several knowledge-related outcomes but showed an inconsistent relationship with specific behaviours, including tooth brushing and dental attendance. The findings therefore suggest that increasing knowledge alone may be insufficient to produce sustained behavioural change and that determinants such as motivation, self-efficacy, perceived barriers and habit formation should also be addressed. The relatively low prevalence of twice-daily brushing is also noteworthy in the context of caries risk. Kumar *et al.* **[12]**, in a systematic review and meta-analysis of 33 studies, reported that infrequent tooth brushing was associated with greater incidence and increment of dental caries compared with more frequent brushing. Although the cross-sectional design of the present study does not permit causal interpretation, the difference between recommended and reported brushing practices indicates an important behavioural vulnerability that should be considered alongside brushing technique, fluoride exposure and dietary habits. Interdental cleaning was limited, with only 12.6% using dental floss and 11.1% using interdental brushes, suggesting that oral-hygiene routines remained predominantly focused on tooth brushing. Worthington *et al.* **[13]**, in a Cochrane systematic review, reported that interdental cleaning in addition to tooth brushing may reduce gingivitis and plaque compared with tooth brushing alone, although the certainty of evidence for several outcomes was low or very low. The limited adoption of interdental cleaning therefore represents a potentially modifiable behavioural gap and recommendations should be individualized according to interdental anatomy, periodontal status and patient preference rather than promoting a single device universally. Self-perceived oral health provided an important subjective dimension that complemented clinical assessment and the significant association between self-perceived oral health and OHI-S category ($\chi^2 = 8.18$; $p = 0.017$) indicated a degree of concordance between subjective perception and objective oral-hygiene status. This is consistent with Gabardo *et al.* **[14]**, whose systematic review reported associations between poorer self-perceived oral health and unfavourable clinical, behavioural, psychosocial and socioeconomic characteristics. Nevertheless, self-perception remains subjective and may be influenced by symptoms, appearance and prior dental experiences, so self-reported measures should complement rather than replace standardized clinical examination. Taken together, the findings suggest that the major challenge in this population is not a lack of oral-health awareness but the incomplete translation of knowledge into sustained preventive behaviour. Xiang *et al.* **[15]**, in a systematic review and meta-analysis, reported that behavioural interventions could improve oral-health knowledge and behaviours and produce favourable effects on plaque and gingival outcomes at selected follow-up periods. These findings support a transition from purely information-based education toward behaviour-centred preventive strategies incorporating individualized instruction, goal setting, self-monitoring, reinforcement and motivational techniques, particularly during the transition from adolescence to young adulthood. The principal strength of this study lies in its multidimensional assessment, incorporating knowledge, attitudes, practices, dental attendance, self-perception, DMFT and OHI-S rather than relying exclusively on either subjective or clinical measures. Several limitations should nevertheless be acknowledged. The cross-sectional design prevents determination of temporal or causal relationships; several behavioural variables were self-reported and may be subject to recall and social-desirability bias; and the study was conducted at a single private dental institution with a predominance of female participants, which may limit generalizability. The clinical indices also provide a focused assessment of caries experience and oral hygiene but do not encompass the complete spectrum of periodontal and oral-health conditions.

Conclusion:

Good oral-health knowledge did not translate into preventive behaviour, as twice-daily brushing and interdental cleaning were limited and dental visits were mostly symptom-driven. Self-perceived oral health was significantly associated with OHI-S, supporting combined subjective and objective assessment. Sustained, behaviour-focused oral-health promotion is needed to turn knowledge into preventive practice among young adults.

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