

Evaluation of Oral Health Attitudes and Behaviors Among Dental Students

İdil Özden¹, Mustafa Enes Özden², Merve Gökyar¹, Hesna Sazak-Öveçoğlu¹

¹Department of Endodontics, Marmara University Faculty of Dentistry, İstanbul, Türkiye

²Department of Public Health, University of Health Sciences İzmir Faculty of Medicine, İzmir, Türkiye

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Abstract

Background: Given the multifactorial nature of oral diseases, oral hygiene habits, diet, tobacco use, stress management, and professional dental care play a crucial role in disease prevention. This study aimed to assess dental students' self-reported oral health attitudes and behaviors using the validated Oral Health Attitude Scale (OHA-S) and to examine differences based on gender and academic year.

Methods: This cross-sectional study was conducted among dental students at Marmara University using a validated 41-item OHA-S (total possible score range: 41–205). The scale consists of 6 subscales: sensitivity (12 items), importance (6 items), awareness (6 items), social influence (4 items), avoidance of harmful factors (7 items), and product/activity engagement (6 items). Data were collected through an online self-administered survey distributed via institutional email to all preclinical and clinical dental students. Students aged 18–25 years who voluntarily participated were included, while those who declined participation were excluded. The scale assessed both attitudinal and behavioral aspects of oral health (e.g., tobacco use, sugar intake, brushing, flossing). Statistical analyses were performed using IBM SPSS v29, applying independent samples *t*-tests and one-way ANOVA to compare OHA-S total and subscale scores across gender and academic levels.

Results: A total of 285 students (age range: 18–25 years; mean age: 22.1 ± 1.9; 71.1% female) participated. The mean total OHA-S score was 166.8 ± 15.2. Female students exhibited significantly higher scores in all subscales except for the "importance" domain (*P* < .001). Higher academic year students demonstrated more positive oral health attitudes compared to first-year students, particularly in sensitivity, awareness, and product/activity engagement subscales (*P* < .05). Additionally, behavior-related subscales reflected daily practices (e.g., avoiding tobacco or sugar, using floss or mouthwash), in which female and senior students showed greater adherence (*P* < .05).

Conclusion: This study demonstrated that dental education positively influences students' oral health attitudes and behaviors over time, fulfilling the study objective of identifying differences across gender and academic year. Female students showed more favorable attitudes and behaviors, while senior students exhibited greater awareness and engagement compared to first-year students. These findings highlight the need for targeted strategies to enhance male students' awareness and to reinforce preventive behaviors during the early years of dental education.

Keywords: Dental students, oral health attitudes, oral hygiene behaviors

What is already known on this topic?

- Dental students generally demonstrate better oral health knowledge and more positive attitudes than non-dental students. Previous research suggests that oral health attitudes and behaviours may differ by gender and educational level; however, findings regarding changes across academic years are inconsistent, partly due to variations in assessment tools.

What this study adds on this topic?

- Using a validated multidimensional scale, this study shows that oral health attitudes and self-reported behaviours improve with advancing academic year in dental education. Senior students exhibited greater awareness and preventive behaviours, while female students consistently demonstrated more favourable oral health-related behaviours, highlighting the need for early and targeted educational strategies.

INTRODUCTION

Oral diseases, which are considered a major category of non-communicable diseases, affect millions of individuals worldwide, irrespective of gender, age,

Corresponding author: İdil Özden
e-mail: idil.akman94@gmail.com



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race, or socioeconomic status. Indeed, it has been reported that 1 in every 2 adults globally has untreated dental caries.¹ In consideration of the pivotal role that modifiable risk factors play in the etiology of non-communicable diseases, public health programs primarily aim to control these factors.²⁻⁴ Given the multifactorial nature of oral diseases, interventions targeting modifiable risk factors such as oral hygiene habits, nutrition, tobacco use, stress management strategies, and professional dental care are believed to be effective.⁵⁻⁷

Oral hygiene is closely associated with an individual's level of knowledge and their behaviors regarding this matter. Awareness of one's own oral health status contributes to the development of adequate oral hygiene practices; however, merely possessing knowledge is insufficient for maintaining oral hygiene.⁸ In cases where knowledge is not supported by appropriate attitudes and behaviors, sustaining oral hygiene may not be possible.⁹ Therefore, providing individuals with appropriate education is considered a fundamental necessity for the preservation of oral health.

A notable body of research has identified a correlation between a lack of interest in the subject and negative attitudes, particularly among university students, and the prevalence of oral health problems.⁹ Furthermore, studies have indicated that a paucity of concern regarding oral health among students may contribute to the development of negative attitudes toward oral hygiene.⁸ Furthermore, while many students believe that basic oral health knowledge is sufficient for maintaining good oral hygiene, it has been emphasized that knowledge alone is inadequate in the implementation phase.¹⁰

Maintaining oral hygiene is of particular significance for dental students, who are regarded as role models in society following graduation and therefore have a responsibility to encourage others to maintain oral hygiene.¹¹ Students must possess appropriate oral care habits and demonstrate accurate oral hygiene knowledge, behaviors, and a positive attitude, in order to serve as examples within their family environment and the broader community.¹² Consequently, personal oral care is recognized as an essential component of dental education and a cost-effective public health intervention. It is therefore expected that dental students will acquire appropriate oral health attitudes and behaviors throughout their education. This process is anticipated to have a decisive impact on the professional roles and social responsibilities they will assume after graduation.^{11,12}

Despite the existence of various scales developed to assess university students' attitudes toward oral and dental health over time, the number of valid and reliable scales based on multiple theoretical approaches remains limited in the literature. In this context, Fidan et al¹³ (2023) developed the Oral Health Attitude Scale (OHA-S) to psychometrically evaluate university students' attitudes toward oral and dental health.

The present study aimed to evaluate dental students' self-reported oral health attitudes and behaviors using the OHA-S, and to examine potential differences in these outcomes based on academic year and gender. The study hypothesizes that senior dental students will exhibit more positive oral health attitudes and behaviors and that their awareness and implementation of oral hygiene practices will increase as they progress in their education.

MATERIALS AND METHODS

This cross-sectional survey-based study was conducted with the participation of dental students at Marmara University Faculty of Dentistry, in accordance with the ethical standards of the 2024 Helsinki Declaration. The Non-Interventional Research Ethics Committee of the Faculty of Health Sciences, Marmara University (Approval No: 05; Date of approval: January 29, 2025) approved the study.

Inclusion criteria were students aged 18-25 years who were actively enrolled in the Faculty of Dentistry at Marmara University during the 2024-2025 academic year and voluntarily agreed to participate. Exclusion criteria were students outside this age range or those unwilling to participate.

The study population consists of students enrolled in the Faculty of Dentistry at Marmara University during the 2024-2025 academic year who voluntarily participated in the survey. At Marmara University, dental students receive preclinical education during the first 2 years, which includes theoretical instruction and laboratory-based skill training. Clinical training begins in the third year, during which students actively engage in patient care under supervision. This structure provides a basis for comparing students' attitudes and behaviors at different stages of their education. A power analysis was conducted with a 95% power and a 1% margin of error, based on the total of 589 students enrolled in this academic year. As a result, the required minimum sample size was determined to be 144 participants. The study data were collected online using the Google Forms survey platform. Participants were contacted via their registered faculty email addresses, and prior to participation, informed consent was obtained from all respondents, after which they were asked to complete the survey in its entirety. The final analysis included data from 285 completed surveys. The first section of the survey collected demographic information, including the participants' academic year and gender. In the original version of the OHA-S, the attitude-related items begin from question 1. However, in the present study, demographic questions regarding participants' academic year and gender were included at the beginning of the questionnaire. As a result, the first question of the OHA-S corresponded to question 3 in the current version. Accordingly, all question numbers related to the subdimensions have been shifted by 2 in the current questionnaire (For example, question 5 of the original OHA-S corresponds

to question 7 in the current version). Questions 3 to 43 utilized a five-point Likert scale, requiring respondents to rate their responses on a scale from 1 to 5. The assessment scale, adapted from the study by Fidan et al,¹³ was designed to evaluate both oral health attitudes and behaviors. The original Turkish version of the OHA-S, developed and psychometrically validated, was used in this study with the authors' permission. No modifications were made to the scale's content or structure. In this context, certain subdimensions—such as avoidance of harmful factors (e.g., avoiding tobacco use, controlling sugar intake), inclination toward products and practices (e.g., use of dental care products like mouthwash or dental floss), and awareness (e.g., self-monitoring of oral hygiene routines)—primarily reflect behavioral components. Other subdimensions such as sensitivity, importance, and social influence were designed to assess attitudinal components, including personal awareness of oral health, perceived importance of maintaining a healthy mouth, and the influence of social perception or feedback on oral care. The distribution of items across the 6 subdimensions is as follows:

Sensitivity (Questions: 3, 7, 11, 15, 17, 19, 23, 27, 31, 35, 39, 42)

Importance (Questions: 5, 9, 18, 22, 33, 37)

Avoidance of harmful factors (Questions: 4, 13, 20, 25, 29, 36, 41)

Tendency toward products and activities: (Questions: 8, 21, 26, 30, 34, 43)

Awareness (Questions: 6, 16, 24, 32, 38, 40)

Social influence (Questions: 10, 12, 14, 28)

Among its subdimensions, "avoidance of harmful factors" and "inclination toward products and practices" are considered to reflect actual oral health behaviors, such as avoiding tobacco use and regularly using oral hygiene products. The remaining subdimensions primarily assess attitudes, awareness, and social influence.

Statistical Analysis

The study data were analyzed using IBM SPSS v29 software (IBM Corp., Armonk, NY, USA), with the normality of data distribution being assessed through the application of statistical and graphical methods. Descriptive statistics were presented as frequencies and percentages for categorical variables, while continuous variables were reported as means and SDs. The independent samples *t*-test was used to compare scale scores between genders, while a one-way ANOVA test was applied for comparisons across academic years. A type 1 error rate of 5% was considered statistically significant for all analyses.

RESULTS

Within the scope of the study, out of 589 dental students enrolled during the 2024-2025 academic year, a total of

285 students completed the questionnaire, corresponding to a response rate of approximately 48.4%. One response was excluded due to missing data. Although no formal analysis of non-response bias was conducted, the questionnaire was distributed to all students via their registered faculty email addresses, accompanied by explanatory information and reminder messages to encourage participation. No additional strategies or incentives were implemented to increase the response rate.

Among the participants, 71.1% were female, and the distribution by academic year was as follows: 13.7% were first-year students, 19.7% were second-year students, 12.7% were third-year students, 33.1% were fourth-year students, and 20.8% were fifth-year students (Table 1).

The mean total score obtained from the OHA-S was 166.8 ± 15.2 . The mean scores for the subdimensions of the scale were calculated (sensitivity: 54.3 ± 4.4 ; importance: 27.2 ± 2.4 ; avoidance of harmful factors: 23.3 ± 4.4 ; tendency toward products and activities: 22.3 ± 3.9 ; awareness: 25.1 ± 3.1 ; social influence: 13.9 ± 2.7) (Table 2).

Gender-based comparisons indicated that female students had significantly higher scores across all subdimensions except "importance." Independent samples *t*-test results showed statistical significance for the total score ($P < .001$), sensitivity ($P = .002$), avoidance of harmful factors ($P = .001$), tendency toward products and activities ($P = .002$), awareness ($P = .003$), and social influence ($P < .001$), while the importance subdimension did not differ significantly ($P = .078$) (Table 2).

The analysis of scale scores by academic year revealed that first-year students had lower mean scores compared to students in higher academic years (Table 3, Figure 1) (Results of 1-way ANOVA test for total score: $P < .001$; sensitivity: $P = .036$; importance: $P = .239$; avoidance of harmful factors: $P = .078$; tendency toward products and activities: $P < .001$; awareness: $P < .001$; social influence: $P = .448$).

In addition to the year-based comparisons, students were also grouped into preclinical (first and second years) and

Table 1. Gender and Class Distributions of Students

Gender	Number (%)
Female	202 (71.1)
Male	82 (28.9)
Class	Number (%)
First year	39 (13.7)
Second year	56 (19.7)
Third year	36 (12.7)
Fourth year	94 (33.1)
Fifth year	59 (20.8)

Table 2. Distribution of Students' Oral Health Attitude Scale Scores

	Female (n=202) Mean ± SD	Male (n=82) Mean ± SD	Mean ± SD	P*
Total (maximum 205)	168.5 ± 14.4	160.3 ± 15.9	166.8 ± 15.2	<.001
Sensitivity (maximum 60)	54.8 ± 4.0	53.0 ± 5.0	54.4 ± 4.4	.002
Importance (maximum 30)	27.3 ± 2.4	26.8 ± 2.4	27.2 ± 2.4	.078
Avoidance of harmful factors (maximum 35)	23.9 ± 4.3	22.0 ± 4.4	23.3 ± 4.4	.001
Tendency toward products and activities (maximum 30)	22.7 ± 3.8	21.2 ± 4.0	22.3 ± 3.9	.002
Awareness (maximum 30)	25.5 ± 3.1	24.3 ± 3.0	25.1 ± 3.1	.003
Social influence (maximum 20)	14.3 ± 2.5	13.0 ± 2.9	13.9 ± 2.7	<.001

*Independent samples t-test.

Table 3. Scale Score Distribution by Class

Class	Mean ± SD						
	Total	Sensitivity	Importance	Avoidance of Harmful Factors	Tendency Toward Products and Activities	Awareness	Social Influence
First year	156.2 ± 13.9 ^a	52.6 ± 4.5 ^a	26.5 ± 2.3	21.5 ± 4.1	19.3 ± 3.7 ^a	23.0 ± 2.9 ^a	13.3 ± 3.0
Second year	166.1 ± 15.3 ^b	54.1 ± 4.1 ^{a,b}	27.1 ± 2.5	23.8 ± 5.2	22.7 ± 3.2 ^b	24.4 ± 2.9 ^{a,b}	14.0 ± 2.6
Third year	170.4 ± 12.9 ^b	55.6 ± 4.2 ^b	27.7 ± 2.4	23.8 ± 4.6	22.9 ± 4.1 ^b	26.1 ± 2.6 ^b	14.4 ± 2.7
Fourth year	167.1 ± 15.6 ^b	54.2 ± 4.4 ^{a,b}	27.1 ± 2.4	23.7 ± 4.4	22.4 ± 3.7 ^b	25.7 ± 3.1 ^b	13.9 ± 2.8
Fifth year	168.4 ± 14.5 ^b	54.8 ± 4.3 ^{a,b}	27.4 ± 2.4	23.2 ± 3.4	23.2 ± 4.0 ^b	25.8 ± 2.9 ^b	13.9 ± 2.4
P	<.001	.036	.239	.078	<.001	<.001	.448

*One-way ANOVA test: No statistically significant difference was found between classes indicated by the same letters (^{a,b}).

clinical (third, fourth, and fifth years) categories to explore potential differences based on clinical exposure. Although clinical students had higher mean scores across all OHA-S

subdimensions and the total score, independent samples t-tests revealed that none of these differences were statistically significant ($P > .05$).

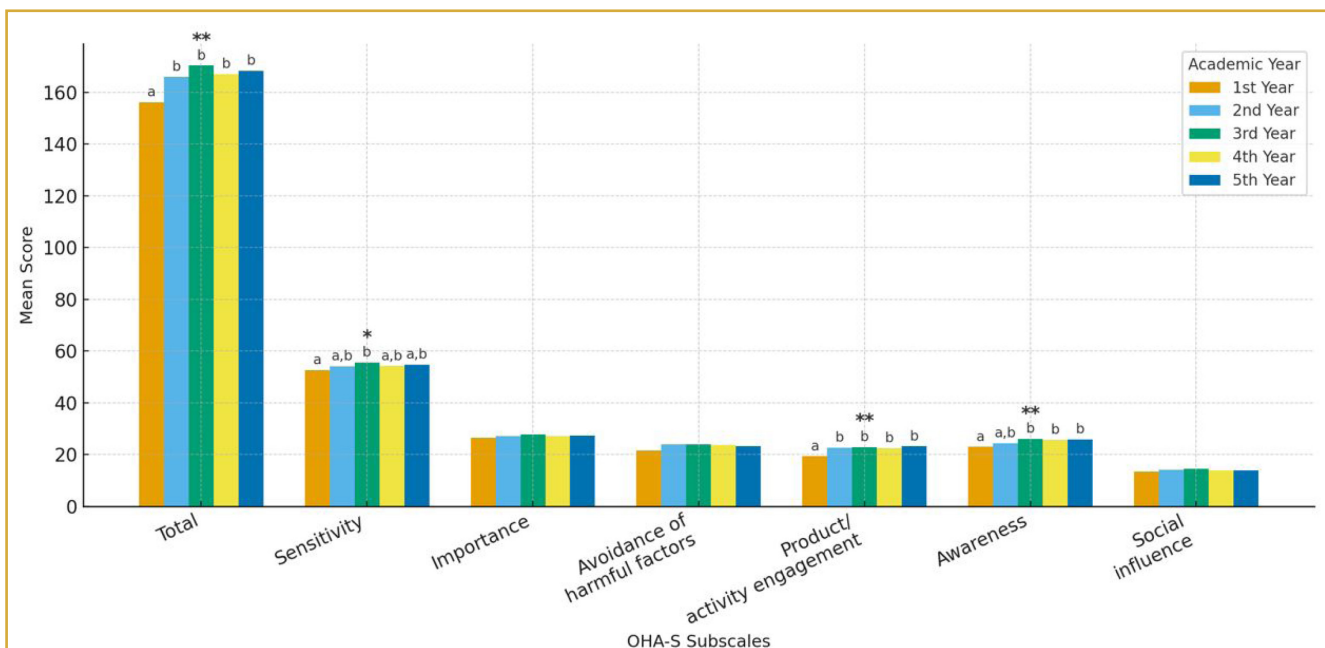


Figure 1. Mean total and subscale Oral Health Attitude Scale scores across academic years. Bars depict mean values. Overall differences between class years (1-way ANOVA) are indicated by stars above each subscale group (* $P < .05$, ** $P < .01$, *** $P < .001$). Pairwise groupings from post-hoc comparisons are shown as letters above the bars; bars sharing the same letter do not differ significantly.

DISCUSSION

In this study, the attitudes of dental students toward oral health and care were assessed using the most recent Turkish-validated scale. The findings indicate that students who have commenced clinical training exhibit more positive attitudes toward oral health compared to those who have not yet started clinical education. In this context, the study hypothesis has been confirmed.

At XX University Faculty of Dentistry, the dental education program consists of a 5-year integrated curriculum. The first and second years are designated as the preclinical phase, during which students primarily receive theoretical instruction and participate in laboratory-based training to develop basic skills. Starting from the third year, students transition into the clinical phase, which continues through the fifth year. During this period, students begin to engage in patient care under faculty supervision as part of their clinical training. This structured progression allows for a gradual development of both professional competence and clinical decision-making. A comparison of the scale scores based on students' academic levels revealed that first-year students had the lowest total scale score in comparison to students in other class levels. This difference was found to be statistically significant. Furthermore, a comprehensive analysis revealed significant variations among class levels in the sensitivity subdimension, the inclination toward products and practices subdimension, and the awareness subdimension. These findings imply that as students progress through their educational journey, their awareness of oral health is enhanced, consequently fostering more conscious health behaviors. However, no significant difference was found in the social influence subdimension. The observation that students had similar scores in this dimension regardless of their academic level suggests that social influences on oral health are independent of class level and instead stem from their social environment. Additionally, it was observed that as class level increased, students exhibited a more conscious approach toward avoiding harmful habits and interest in oral health products. This finding suggests that as students progress through their education, their health behaviors improve as they gain more knowledge and experience. This included more frequent use of dental floss and mouthwash, as well as reduced consumption of sugary foods and tobacco products. This finding is consistent with previous studies that have argued for a positive relationship between higher education levels and greater awareness and knowledge of oral health.^{14,15} Research has also demonstrated that as dental students' knowledge levels increase, their preventive health behaviors improve.^{14,15} However, some researchers argue that oral health attitudes are not significantly influenced by educational level. For instance, Mekhemar et al¹⁶ reported that dental education did not have a meaningful effect on oral health attitudes. Similarly, studies conducted in Yemen and India found no significant association between dental

students' education levels and their oral health attitudes and behaviors.^{17,18}

The majority of students who participated in the survey demonstrated high awareness and adherence to oral health practices. This finding is consistent with similar studies assessing oral health attitudes and awareness among dental students, indicating that dental education contributes to the development of positive health behaviors.¹⁹⁻²¹ Nevertheless, the study conducted by Peker et al²² reported that Turkish dental students exhibited relatively poor oral health behaviors. The researchers evaluated the oral health attitudes and behaviors of dental students in Istanbul in 2010 and used the Hiroshima University-Dental Behavioral Inventory scale for this purpose. In the present study, the higher scores obtained, in contrast to the previous study, may be attributed to differences in the assessment scales used, changes in curricula over time, or the inclusion of only a single center in the evaluation.

A significant number of studies have been conducted on the subject of oral health knowledge, attitudes, and practices among university students not receiving dental education. These studies have generally reported lower levels of awareness and adherence to oral health practices among non-dental students. For example, a study conducted in Nigeria compared oral health knowledge, attitudes, and behaviors among students in medicine, pharmacy, and nursing programs. The study concluded that students' oral health knowledge was inadequate and needed improvement.²³ The discrepancy in findings between studies conducted with dental students and those involving other university students may be attributed to the formal education received by dental students, which equips them with accurate knowledge of proper oral health practices.

The study results also revealed a significant difference in oral health knowledge and attitudes between male and female participants, with the gender variable creating significant differences in specific dimensions of oral health attitudes. Female students had a significantly higher total score on the OHA-S compared to male students. Of particular note is the finding that female students exhibited higher scores in sensitivity, avoidance of harmful factors, inclination toward products and practices, awareness, and social influence subdimensions when compared to their male counterparts. However, no statistically significant difference was observed in the importance subdimension. The extant literature also supports the notion that women ascribe greater importance to oral health and demonstrate more frequent preventive behaviors than men.^{17,24} This discrepancy may be attributable to women's generally higher health awareness and greater aesthetic concerns. The higher frequency with which women visit dentists and their greater propensity to seek treatment results in their being more exposed to oral health-related information.²⁵ The higher scores of female students in the avoidance of harmful habits and interest in oral health-related products and

activities suggest that they possess a more developed health consciousness, and these findings highlight the need for educational programs aimed at increasing male students' awareness of oral health.

It is important to note that the present study did not evaluate students' factual knowledge regarding oral health, but rather focused on their self-reported attitudes and behaviors. The OHA-S used in the study consists of 41 items addressing a wide range of topics, including awareness, emotional sensitivity, avoidance of harmful factors, social influence, and behavioral tendencies such as frequency of brushing, use of dental floss, and engagement with oral hygiene products. Therefore, the findings should be interpreted in the context of perceived attitudes and behavioral inclinations, rather than objective knowledge levels. This study provides important data for understanding the demographic factors influencing oral health attitudes; however, it has several limitations. Firstly, since the study has a cross-sectional design, the obtained data reflect only a specific period and do not allow for establishing causal relationships. Secondly, as the data were collected through self-reporting, participants may have tended to provide socially acceptable responses rather than accurately reflecting their actual oral health attitudes. Furthermore, the study was conducted within a single faculty, which precludes the possibility of comparisons with dental students from different universities. Finally, as the scale was applied only to dental students, the opportunity to compare the findings with those from general university students is limited.

CONCLUSION

Under the limitation of this study, the findings suggest that dental students in higher academic years demonstrate greater awareness of oral health issues compared to those in earlier years. Female students exhibited stronger tendencies to avoid harmful factors and to engage in oral health-related behaviors, reflecting a more proactive approach to oral hygiene. These results imply that awareness programs should be reinforced during the early years of dental education, and educational strategies tailored to male students may further promote preventive oral health behaviors.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of University of Health Sciences, Marmara University. (Approval No.: 05; Date: January 29, 2025).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: ..

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