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Comparative evaluation of dental caries and periodontal conditions and oral health-related quality of life of dental and medical students: a cross-sectional study

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Abstract

Background The aim of this study is to comparatively examine the dental caries and periodontal health status of dental (DS) and medical students (MS) and to evaluate their quality of life related to oral health using the Oral Health Impact Profile–14 (OHIP-14) scale.

Materials and methods The cross-sectional study included a total of 400 systemically healthy volunteers from 1st–5th year DS ($n = 200$) and MS ($n = 200$) students of Recep Tayyip Erdoğan University. Participants' body mass index was recorded; clinical dental (decayed, missing, and filled teeth (DMFT)) and periodontal parameters (plaque index (PI), gingival index (GI), bleeding on probing index (BOP), and probing pocket depth (PPD)) were measured. Oral Health–Related Quality of Life (OHRQoL) was assessed using the OHIP-14 questionnaire. Statistical analyses were performed to compare the two faculties across all academic years (1st–5th year) and evaluate the associations between variables. Additionally, adjusted multiple linear regression analyses were conducted to determine the independent effect of academic year on oral health parameters while controlling for gender and body mass index. The significance level was set at $p < 0.05$.

Results In DS, the PI, GI, BOP, and PPD parameters were found to be significantly lower than in MS ($p < 0.05$). In intra-faculty comparisons, DS generally showed a positive trend in dental, periodontal, and OHRQoL as their class level increased, while the opposite was observed in MS. In inter-faculty comparisons at each class level, significant differences were obtained at all parameters in all classes except the first year ($p < 0.05$). Class level was determined to be an associated factor for all oral health parameters in students of both faculties.

Conclusion This cross-sectional study showed that, unlike DS, lower levels were observed in dental and periodontal health status and OHRQoL were observed in MS as their class level increased. In this context, including topics related to oral health awareness and daily care habits in MS curricula could be beneficial.

Trial registration This study was retrospectively registered at ClinicalTrials.gov (Identifier: NCT07425860) on February 10, 2026.

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Keywords Oral health, OHIP-14, Periodontal health, DMFT, University

Introduction

The health of teeth and surrounding tissues affects individuals' overall physical, social, and psychological well-being, which in turn is related to their quality of life [1, 2]. The bidirectional relationship between oral health and general health, linking it to systemic diseases, has been emphasized by the World Health Organization [3].

Periodontal diseases, most commonly gingivitis and periodontitis, are chronic inflammatory conditions driven by host immune responses and may lead to progressive destruction of the tooth-supporting tissues [4]. Although periodontal diseases are multifactorial in nature, inadequate oral hygiene practices, unhealthy dietary habits, stress, and lifestyle changes play a significant role in their development in young adults, especially university students [5, 6]. Dental caries is characterized by the localized destruction of the hard tissues of the tooth due to acidic byproducts of bacterial fermentation [7]. The DMFT index, which represents the number of decayed, missing, and filled teeth, is a tool that provides an objective and practical way to determine the prevalence and severity of caries [8]. This quantitative data regarding treated and/or untreated dental caries is important because it affects quality of life [9].

Many questionnaire-based scales have been developed to assess quality of life [10, 11]. One of the most commonly used concepts associated with oral health is Oral Health-Related Quality of Life (OHRQoL), which consists of individuals' self-assessments and shows the impact of oral health on quality of life [12]. Various assessment tools have been developed to measure OHRQoL [13]. The most comprehensive and widely used of these is the Oral Health Impact Profile (OHIP) scale, which is based on a behavioral-outcome model [14]. This scale, proposed by Slade, has been simplified to OHIP-14 to include four sub-dimensions (Oral Function, Orofacial Pain, Orofacial Appearance, and Psychosocial Impact) [15, 16]. OHIP-14 has become a tool that enables the practical measurement of OHRQoL in both clinical and community-based studies [1, 17, 18]. Furthermore, OHIP-14 has been included in many current studies in relation to caries and periodontal conditions in university students [19–21].

Current data show that oral diseases affect an average of 3.69 billion people worldwide, and untreated caries and periodontal disease are the most common oral health problems [22]. Moreover, numerous studies have proven that poor oral health, such as that caused by cavities and periodontal diseases, can negatively impact the quality of life for individuals [1, 23, 24]. Individuals who teach or study in the health sciences are expected to have

a higher level of knowledge and awareness regarding oral health. However, a very recent systematic review revealed that dental students (DS) had a good level of knowledge regarding oral health, although their attitudes and behaviors were relatively less positive [25]. When compared with students in other faculties, DS had a better level of knowledge and awareness [26, 27]. In another study, it was found that medical students (MS), in particular, showed lower attitudes and behaviors [28]. When comparing oral manifestations of systemic diseases, it was noted that MS did not have a sufficient level of knowledge [29]. Studies have recommended the inclusion of oral health-related courses in medical school curricula [26, 28, 29].

In this context, the aim of this study is to comparatively evaluate the dental and periodontal status OHRQoL of DS and MS studying in Turkey at the class level, and reveal the differences in clinical status regarding oral health between the two groups.

Materials and methods

Study groups

This study includes students from the DS and MS at Recep Tayyip Erdoğan University. Ethical approval was granted by the Recep Tayyip Erdoğan University Non-Interventional Clinical Research Ethics Committee on October 9th, 2025 (Decision number: 2025/400). The study was conducted in accordance with the STROBE checklist. The inclusion criteria were being enrolled in undergraduate education (years 1–5), being systemically healthy, and completing the questionnaire within the specified time. The exclusion criteria included having used antibiotics, antioxidants, or psychotropic drugs in the last 6 months, and smoking. To maintain equal group sizes and ensure direct comparison of results, final-year students from the Faculty of Medicine were not included in the study.

Study protocol

The study was conducted using a single-center, descriptive, and cross-sectional survey model. G*Power (ver.3.1.9.7) analysis, using a one-way ANOVA experimental design with a test power of 0.95, effect size of 0.25, and Type-1 error of 0.05, revealed that at least 39 participants were needed for each class. A total of 400 students participated, comprising DS (90 female, 110 male) and MS (85 female, 115 male). Sampling and data collection were performed simultaneously between October 16th, 2025 and January 5th, 2026. Participating students were grouped according to faculty and class level. Clinical and radiographic evaluations were performed on those with

systemic health, based on the anamnesis obtained from the participants.

Examiner calibration

Calibration was performed on 16 patients (8 DS, 8 MS) not included in the study. A single examining specialist (G.H.) was trained and calibrated to measure clinical periodontal parameters (probing pocket depth (PPD)) and dental caries (DMFT total score) at two different time points (baseline and day 5). Each participant had a minimum of 28 teeth. PPD measurements were recorded at four sites per tooth, resulting in a total of 112 sites per participant. In addition, the DMFT index was calculated as a total score based on the evaluation of 28 teeth for each participant. Intraclass correlation was assessed as 0.98 and 0.97, respectively.

Clinical periodontal parameters

Plaque index (PI) was used to assess the clinical periodontal status of participants in all natural teeth (excluding third molars) [30], gingival index (GI) [31], bleeding on probing (BOP) [32], PPD [33] and measurements were made. For PPD, measurements were recorded on all four surfaces (mesiobuccal, buccal, distobuccal, lingual/palatal) of each tooth using a Williams periodontal probe (Hu-Friedy, Chicago, USA). The probe was advanced by an experienced periodontist (G.H.) until slight resistance was felt at the base of the pocket, and the results were recorded in millimeters. Plaque accumulation was assessed using the PI according to Silness and Löe [30]. Gingivitis was assessed using the GI as defined by Löe and Silness [31]. BOP was recorded as the presence or absence of bleeding after a mild examination within 10 s at the same four points for each tooth [32]. All measurements were performed under standardized clinical conditions using four sites per tooth of all present teeth. Results for PI and GI were expressed as scores, and BOP was expressed as percentage.

Decayed Missing Filled Tooth (DMFT) Index

The number of D (decayed teeth), M (teeth lost due to decay), and F (filled teeth) values were determined for each individual, and these values were summed. A high DMFT score indicates that the individual has more tooth decay and a worsening oral health status [8].

Oral Health Impact Profile-14 (OHIP-14)

A 14-question subjective online survey was used to assess the OHRQoL of participating students. The questionnaire was administered anonymously via the Google Forms platform at the examination chair immediately following the clinical examinations.

The OHIP-14 scale was developed to assess the physical, psychological, and social impacts of individuals' oral

health status on daily life. The validity and reliability of OHIP-14 scale has been proven in Turkish [15, 34]. The 14 items in the scale encompass four sub-dimensions: Oral Function, Orofacial Pain, Orofacial Appearance, and Psychosocial Impact. Participants rated the frequency of their experience with each item using a 5-point Likert scale (0 = never, 1 = rarely, 2 = sometimes, 3 = frequently, 4 = always). An increase in the total OHIP-14 score indicates a negative impact on quality of life related to oral health [15].

Systemic parameter

Body weight and height were measured using a calibrated digital scale (Tess®, Turkey, sensitivity: 0.05 kg for weight and 0.1 cm for height). Participants were measured wearing light clothing and no shoes. Body mass index (BMI) was calculated as weight in kilograms divided by the square of height in meters (kg/m^2). Participants were categorized according to the World Health Organization classification as underweight ($< 18.5 \text{ kg/m}^2$), normal weight ($18.5\text{--}24.9 \text{ kg/m}^2$), overweight ($25.0\text{--}29.9 \text{ kg/m}^2$), and obese ($\geq 30.0 \text{ kg/m}^2$) [35].

Statistical analysis

There was no missing data in the dataset; all measurements were completed for all participants. Data analysis was performed using the IBM SPSS Statistics 26 package program. Normality of continuous variables was assessed using skewness–kurtosis values, visual inspection (histograms and normal probability plots), and the Shapiro–Wilk test. Skewness and kurtosis values within ± 1.5 were considered acceptable for approximate normality (Tabachnick & Fidell). In the Shapiro–Wilk test, $p > 0.05$ indicated that the normality assumption was not violated. Based on these evaluations, parametric tests were applied. Independent samples t-test and one-way ANOVA were used for intergroup comparisons; the Games–Howell test was applied when variances were unequal, and Tukey test when variances were equal. Relationships between variables were examined using Pearson correlation analyses; correlation coefficients of 0.00–0.30 were interpreted as low, 0.30–0.70 as medium, and 0.70–1.00 as high. Adjusted multiple linear regression analysis was applied to determine the effect of class level on oral health parameters in DS and MS. The significance level was accepted as $p < 0.05$ in all analyses.

Results

Demographic data

The study included 400 individuals, 175 women and 225 men. There were no significant differences between the groups in terms of gender, and BMI ($p > 0.05$) (Table 1).

Table 1 Demographic data

Variable	Category	Dental Students		Medical Students		χ^2	<i>p</i>
		<i>N</i>	%	<i>N</i>	%		
Class	1st	40	50	40	50	0.000	0.999
	2nd	40	50	40	50		
	3rd	40	50	40	50		
	4th	40	50	40	50		
	5th	40	50	40	50		
Gender	Female	90	45	85	42.5	0.254	0.614
	Male	110	55	115	57.5		
BMI (kg/m ²)	Normal (18.5–24.9)	146	73	142	71	0.198	0.656
	Overweight/Obese (> 25)	54	27	58	29		

N Number, % Percentage, χ^2 Chi-square analysis, *BMI* Body mass index, *kg* Kilogram, *m*² Square meter. *p* < 0.05 statistically significant

Table 2 Comparison of oral health parameters between dental and medical students

Parameter	Dental Students				Medical Students				<i>t</i>	<i>p</i>
	Mean	S.D.	min.	max.	Mean	S.D.	min.	max.		
PI	1.39	0.37	0.56	2.34	2.19	0.38	1.33	3	-21.338	< 0.001**
GI	1.24	0.37	0.5	1.98	2.03	0.37	1.14	3	-21.318	< 0.001**
BOP (%)	16.4	4.3	6.3	28.2	24.2	4.2	14.1	35.9	-18.621	< 0.001**
PPD (mm)	2.42	0.41	1.33	3.56	3.18	0.4	1.92	4.22	-18.56	< 0.001**
DMFT	1.8	0.4	0.5	3.1	2.2	0.4	1.1	3.2	-10.385	< 0.001**
OHIP-14	9.6	2.5	1.4	15.3	14.3	2.6	7.9	20.4	-18.675	< 0.001**

PI Plaque Index, *GI* Gingival Index, *BOP* Bleeding on Probing Index, *PPD* Probing Pocket Depth, *DMFT* Decayed Missing Filled Tooth, *OHIP-14* Oral Health Impact Profile, *S.D.* Standard Deviation, *max* Maximum, *min.* Minimum, %: Percentage, *mm* Millimeters, *t* Independent samples t-test. **: *p* < 0.001 statistically significant

Table 3 Comparison of oral health parameters of dental students according to their classes

Class	PI	GI	BOP (%)	PPD (mm)	DMFT	OHIP-14
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
1st	1.78 ± 0.22 ^e	1.62 ± 0.2 ^e	21 ± 3.2 ^d	2.88 ± 0.33 ^e	2 ± 0.5 ^c	11.7 ± 1.6 ^d
2nd	1.59 ± 0.28 ^d	1.45 ± 0.24 ^d	18.3 ± 2.8 ^c	2.63 ± 0.26 ^d	1.9 ± 0.5 ^c	10.8 ± 2.1 ^c
3rd	1.43 ± 0.23 ^c	1.28 ± 0.23 ^c	15.7 ± 3 ^b	2.4 ± 0.3 ^c	1.8 ± 0.4 ^{b, c}	9.5 ± 1.7 ^b
4th	1.19 ± 0.24 ^b	1.05 ± 0.28 ^b	14.3 ± 3.7 ^b	2.19 ± 0.24 ^b	1.58 ± 0.4 ^a	8.3 ± 2.1 ^a
5th	0.98 ± 0.23 ^a	0.81 ± 0.23 ^a	12.5 ± 2.7 ^a	2.03 ± 0.28 ^a	1.64 ± 0.4 ^{a, b}	7.6 ± 2.3 ^a
<i>F</i>	68.669	72.843	45.856	57.059	5.592	29.423
<i>p</i>	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**

PI Plaque Index, *GI* Gingival Index, *BOP* Bleeding on Probing Index, *PPD* Probing Pocket Depth, *DMFT* Decayed Missing Filled Tooth, *OHIP-14* Oral Health Impact Profile, % Percentage, *mm* Millimeters, *S.D.* Standard Deviation, *F* One-way ANOVA

**: *p* < 0.001 statistically significant, a, b, c, d, e: different letters indicate statistically significant difference, Tukey's test was used for homogeneous variances, and Games–Howell test for non-homogeneous variances

Comparison of oral health parameters of DS and MS

All clinical periodontal parameters, DMFT, and OHIP-14 were observed to be significantly higher in MS compared with DS (*p* < 0.001) (Table 2).

Comparison of oral health parameters within faculties according to classes

Comparison of DS by Class

As the grade level increased, a statistically significant decrease was detected in some clinical periodontal parameters, DMFT and OHIP-14 scores (*p* < 0.05). However, the DMFT score was found to be higher in 5th-year students compared with 4th-year students (*p* > 0.05). No statistically significant difference was observed in BOP scores in 3rd and 4th-year students,

DMFT scores in 1st and 2nd-year students, and OHIP-14 scores in 4th and 5th-year students (*p* > 0.05) (Table 3).

Comparison of MS by Class

It was determined that some clinical periodontal parameters, DMFT and OHIP-14 scores increased as the class level increased (*p* < 0.05). There was no significant difference between classes 3 and 4 in terms of PI, BOP and DMFT scores (*p* > 0.05). No significant difference was found between classes 1 and 2 in PI, and between classes 2 and 3 in PPD results (*p* > 0.05) (Table 4).

Table 4 Comparison of oral health parameters of medical students according to their classes

Class	PI	GI	BOP (%)	PPD (mm)	DMFT	OHIP-14
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
1st	1.86 ± 0.3 ^a	1.64 ± 0.2 ^a	20.58 ± 3.3 ^a	2.74 ± 0.3 ^a	2 ± 0.4 ^a	11.88 ± 2 ^a
2nd	1.93 ± 0.2 ^a	1.82 ± 0.2 ^b	22.1 ± 2.9 ^b	3.05 ± 0.3 ^b	2.19 ± 0.4 ^b	13.24 ± 2 ^b
3rd	2.22 ± 0.2 ^b	2.05 ± 0.3 ^c	24.43 ± 2.7 ^c	3.15 ± 0.2 ^b	2.23 ± 0.4 ^{b,c}	14.18 ± 2.3 ^c
4th	2.29 ± 0.2 ^b	2.23 ± 0.2 ^d	24.97 ± 2.9 ^c	3.42 ± 0.3 ^c	2.26 ± 0.4 ^{b,c}	15.39 ± 1.9 ^d
5th	2.64 ± 0.3 ^c	2.41 ± 0.3 ^e	28.87 ± 3.5 ^d	3.56 ± 0.3 ^d	2.38 ± 0.3 ^c	16.96 ± 1.5 ^e
F	59.15	65.322	42.509	51.717	5.103	40.268
p	< 0.001**	< 0.001**	< 0.001**	< 0.001**	0.001**	< 0.001**

PI Plaque Index, GI Gingival Index, BOP Bleeding on Probing Index, PPD Probing Pocket Depth, DMFT Decayed Missing Filled Tooth, OHIP-14 Oral Health Impact Profile, % Percentage, mm Millimeters, S.D. Standard Deviation, F one-way ANOVA

** $p < 0.001$ statistically significant, a, b, c, d, e: different letters indicate statistically significant difference, Tukey's test was used for homogeneous variances, and Games–Howell test for non-homogeneous variances

Table 5 Comparison of oral health parameters among the same classes

Students-Class	PI	GI	BOP (%)	PPD (mm)	DMFT	OHIP-14
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
DS-1	1.78 ± 0.2	1.62 ± 0.2	20.95 ± 3.2	2.88 ± 0.3	1.98 ± 0.5	11.71 ± 1.6
MS-1	1.86 ± 0.3	1.64 ± 0.2	20.58 ± 3.3	2.74 ± 0.3	2 ± 0.4	11.88 ± 2
t	-1.368	-0.393	0.52	2.035	-0.261	-0.423
p	0.175	0.695	0.605	0.045*	0.795	0.674
DS-2	1.59 ± 0.3	1.45 ± 0.2	18.26 ± 2.8	2.63 ± 0.3	1.86 ± 0.5	10.78 ± 2.1
MS-2	1.93 ± 0.2	1.82 ± 0.2	22.1 ± 2.9	3.05 ± 0.3	2.19 ± 0.4	13.24 ± 2
t	-5.884	-6.955	-6.051	-6.903	-3.319	-5.363
p	< 0.001**	< 0.001**	< 0.001**	< 0.001**	0.001**	< 0.001**
DS-3	1.43 ± 0.2	1.28 ± 0.2	15.66 ± 3	2.4 ± 0.3	1.79 ± 0.4	9.54 ± 1.7
MS-3	2.22 ± 0.2	2.05 ± 0.3	24.43 ± 2.7	3.15 ± 0.2	2.23 ± 0.4	14.18 ± 2.3
t	-15.812	-14.175	-13.812	-12.236	-5.09	-10.251
p	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**
DS-4	1.19 ± 0.2	1.05 ± 0.3	14.35 ± 3.7	2.19 ± 0.2	1.59 ± 0.4	8.34 ± 2.1
MS-4	2.29 ± 0.2	2.23 ± 0.2	24.97 ± 2.9	3.42 ± 0.3	2.26 ± 0.4	15.39 ± 1.9
t	-20.696	-21.588	-14.105	-20.342	-7.085	-15.877
p	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**
DS-5	0.98 ± 0.2	0.81 ± 0.2	12.54 ± 2.7	2.03 ± 0.3	1.64 ± 0.4	7.61 ± 2.3
MS-5	2.64 ± 0.3	2.41 ± 0.3	28.87 ± 3.5	3.56 ± 0.3	2.38 ± 0.3	16.96 ± 1.5
t	-30.299	-28.54	-23.663	-24.507	-9.423	-21.897
p	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**	< 0.001**

PI Plaque Index, GI Gingival Index, BOP Bleeding on Probing Index, PPD Probing Pocket Depth, DMFT Decayed Missing Filled Tooth, OHIP-14 Oral Health Impact Profile, DS Dental Students, MS Medical Students, % Percentage, mm Millimeters, S.D. Standard Deviation, t Independent sample t-test. *: $p < 0.05$, **: $p < 0.001$ statistically significant

Comparison of oral health parameters of DS and MS among the same classes

At the first-year, there was no statistically significant difference between the two faculty students in terms of PI, GI, BOP, DMFT, and OHIP-14 scores ($p > 0.05$). However, PPD scores were higher in DS compared with MS ($p = 0.045$). In the second year, MS were found to have significantly higher values than DS in all parameters. This trend continued as the class level increased, with the highest values observed in the fifth year ($p < 0.001$) (Table 5).

Adjusted multiple linear regression analysis regarding the effect of class levels on oral health parameters

Adjusted multiple linear regression analyses demonstrated that class level was a statistically significant associated with all oral health parameters in both faculties, even after controlling for gender and BMI ($p < 0.001$). In dental students, class level was negatively associated with all outcomes, indicating an improvement in oral health parameters and OHRQoL as academic level increased. However, no significant difference was observed between 1st and 2nd-year DS for DMFT ($p = 0.209$). In contrast, in MS, class level showed a significant positive association with all parameters, reflecting a deterioration in oral health status with increasing academic level. However,

no significant difference was observed between 1st and 2nd-year MS for PI ($p = 0.138$) and DMFT ($p = 0.051$). The strength of the associations was high for PI, GI, and PPD, moderate for BOP and OHIP-14, and low for DMFT in both groups. Gender was not significantly associated with any outcome in either faculty. BMI showed a limited effect, being significantly associated only with DMFT in medical students ($p = 0.018$) (Table 6) (Table 7).

Discussion

To our knowledge, this study is among the first to comprehensively compare the periodontal status, caries severity, and OHRQoL of DS and MS studying in Turkey,

according to their class level. The main results indicate that while both faculties start out with comparable oral health profiles in their first year, these profiles diverge sharply as students' progress through their education. Significant and stable improvements in periodontal parameters were observed in DS over the years, whereas deterioration in these parameters was detected in MS. Furthermore, OHRQoL showed a similar trend in accordance with these clinical changes. This contrasting pattern is noteworthy for the present study and in terms of student behaviors reported in literature [27, 36, 37]. Importantly, adjusted regression analyses confirmed that class level remained independent associated with all oral

Table 6 Adjusted multiple linear regression analysis of factors associated with oral health parameters in dental students

Dependent variable	Predictor	B	S.E.	β	95% CI	p	Adjusted R^2
PI	Class=2nd year	-0.184	0.054	-0.200	-0.291 to -0.078	0.001*	0.573
	Class=3rd year	-0.338	0.055	-0.367	-0.447 to -0.229	<0.001**	
	Class=4th year	-0.586	0.054	-0.636	-0.693 to -0.478	<0.001**	
	Class=5th year	-0.785	0.055	-0.853	-0.894 to -0.676	<0.001**	
	Gender (Male)	0.024	0.037	0.032	-0.050 to 0.098	0.521	
	BMI (kg/m ²)	-0.004	0.011	-0.019	-0.025 to 0.017	0.708	
GI	Class=2nd year	-0.167	0.053	-0.181	-0.273 to -0.062	0.002*	0.588
	Class=3rd year	-0.337	0.055	-0.364	-0.444 to -0.229	<0.001**	
	Class=4th year	-0.569	0.054	-0.614	-0.675 to -0.462	<0.001**	
	Class=5th year	-0.813	0.055	-0.878	-0.921 to -0.706	<0.001**	
	Gender (Male)	0.005	0.037	0.007	-0.067 to 0.078	0.883	
	BMI (kg/m ²)	0.006	0.011	0.027	-0.015 to 0.026	0.594	
BOP (%)	Class=2nd year	-2.718	0.694	-0.256	-4.087 to -1.348	<0.001**	0.472
	Class=3rd year	-5.420	0.708	-0.510	-6.818 to -4.023	<0.001**	
	Class=4th year	-6.677	0.699	-0.628	-8.056 to -5.298	<0.001**	
	Class=5th year	-8.536	0.709	-0.803	-9.935 to -7.137	<0.001**	
	Gender (Male)	-0.485	0.480	-0.057	-1.430 to 0.461	0.314	
	BMI (kg/m ²)	0.067	0.137	0.028	-0.203 to 0.338	0.624	
PPD (mm)	Class=2nd year	-0.254	0.063	-0.246	-0.379 to -0.129	<0.001**	0.532
	Class=3rd year	-0.490	0.065	-0.475	-0.618 to -0.363	<0.001**	
	Class=4th year	-0.694	0.064	-0.672	-0.820 to -0.568	<0.001**	
	Class=5th year	-0.851	0.065	-0.824	-0.978 to -0.723	<0.001**	
	Gender (Male)	-0.056	0.044	-0.068	-0.143 to 0.030	0.200	
	BMI (kg/m ²)	-0.007	0.013	-0.030	-0.032 to 0.018	0.577	
DMFT	Class=2nd year	-0.120	0.095	-0.108	-0.308 to 0.068	0.209	0.089
	Class=3rd year	-0.202	0.097	-0.182	-0.394 to -0.010	0.039*	
	Class=4th year	-0.401	0.096	-0.361	-0.591 to -0.212	<0.001**	
	Class=5th year	-0.353	0.097	-0.318	-0.546 to -0.161	<0.001**	
	Gender (Male)	0.029	0.066	0.033	-0.101 to 0.159	0.656	
	BMI (kg/m ²)	0.026	0.019	0.101	-0.011 to 0.063	0.172	
OHIP-14	Class=2nd year	-0.918	0.443	-0.149	-1.791 to -0.045	0.039*	0.360
	Class=3rd year	-2.161	0.451	-0.351	-3.051 to -1.270	<0.001**	
	Class=4th year	-3.360	0.446	-0.546	-4.238 to -2.481	<0.001**	
	Class=5th year	-4.077	0.452	-0.662	-4.969 to -3.186	<0.001**	
	Gender (Male)	-0.134	0.306	-0.027	-0.737 to 0.469	0.661	
	BMI (kg/m ²)	-0.049	0.088	-0.035	-0.221 to 0.124	0.578	

PI Plaque Index, GI Gingival Index, BOP Bleeding on Probing Index, PPD Probing Pocket Depth, DMFT Decayed Missing Filled Tooth, OHIP-14 Oral Health Impact Profile, BMI Body Mass Index, R^2 This value indicates the level of explanation of each model, S.E. Standard Error, β Standardized Regression Coefficients, CI Confidence Interval, % Percentage, mm Millimeters. *: $p < 0.05$, **: $p < 0.001$ statistically significant, Ref. categories: 1st year for class, Female for gender. BMI (kg/m²) was entered as a continuous variable in the regression models

Table 7 Adjusted multiple linear regression analysis of factors associated with oral health parameters in medical students

Dependent variable	Predictor	B	S.E.	β	95% CI	p	Adjusted R ²
PI	Class=2nd year	0.086	0.057	0.091	-0.028 to 0.199	0.138	0.539
	Class=3rd year	0.364	0.058	0.388	0.249 to 0.478	< 0.001**	
	Class=4th year	0.428	0.059	0.457	0.312 to 0.544	< 0.001**	
	Class=5th year	0.779	0.058	0.831	0.664 to 0.893	< 0.001**	
	Gender (Male)	0.040	0.039	0.053	-0.036 to 0.116	0.298	
	BMI (kg/m ²)	0.005	0.011	0.026	-0.016 to 0.026	0.623	
GI	Class=2nd year	0.183	0.055	0.200	0.075 to 0.291	0.001*	0.560
	Class=3rd year	0.408	0.055	0.446	0.299 to 0.518	< 0.001**	
	Class=4th year	0.587	0.056	0.641	0.476 to 0.697	< 0.001**	
	Class=5th year	0.774	0.055	0.846	0.665 to 0.883	< 0.001**	
	Gender (Male)	-0.021	0.037	-0.028	-0.093 to 0.051	0.568	
	BMI (kg/m ²)	0.001	0.010	0.004	-0.019 to 0.021	0.935	
BOP (%)	Class=2nd year	1.395	0.686	0.135	0.041 to 2.749	0.044*	0.460
	Class=3rd year	4.059	0.694	0.392	2.690 to 5.428	< 0.001**	
	Class=4th year	4.678	0.703	0.452	3.293 to 6.064	< 0.001**	
	Class=5th year	8.472	0.693	0.818	7.106 to 9.838	< 0.001**	
	Gender (Male)	-0.010	0.461	-0.001	-0.918 to 0.899	0.984	
	BMI (kg/m ²)	-0.241	0.128	-0.109	-0.494 to 0.012	0.061	
PPD (mm)	Class=2nd year	0.309	0.064	0.308	0.183 to 0.435	< 0.001**	0.503
	Class=3rd year	0.401	0.064	0.400	0.274 to 0.528	< 0.001**	
	Class=4th year	0.669	0.065	0.667	0.540 to 0.798	< 0.001**	
	Class=5th year	0.809	0.064	0.806	0.682 to 0.936	< 0.001**	
	Gender (Male)	-0.046	0.043	-0.056	-0.130 to 0.039	0.287	
	BMI (kg/m ²)	0.009	0.012	0.042	-0.015 to 0.032	0.454	
DMFT	Class=2nd year	0.169	0.086	0.169	-0.001 to 0.339	0.051	0.094
	Class=3rd year	0.269	0.087	0.268	0.097 to 0.440	0.002*	
	Class=4th year	0.304	0.088	0.303	0.130 to 0.478	0.001*	
	Class=5th year	0.412	0.087	0.411	0.241 to 0.584	< 0.001**	
	Gender (Male)	0.035	0.058	0.043	-0.079 to 0.149	0.542	
	BMI (kg/m ²)	-0.038	0.016	-0.180	-0.070 to -0.007	0.018*	
OHIP-14	Class=2nd year	1.327	0.438	0.205	0.463 to 2.192	0.003*	0.438
	Class=3rd year	2.376	0.443	0.366	1.502 to 3.250	< 0.001**	
	Class=4th year	3.613	0.449	0.557	2.728 to 4.498	< 0.001**	
	Class=5th year	5.141	0.442	0.793	4.268 to 6.013	< 0.001**	
	Gender (Male)	0.076	0.294	0.014	-0.504 to 0.656	0.797	
	BMI (kg/m ²)	-0.081	0.082	-0.059	-0.242 to 0.080	0.324	

PI Plaque Index, GI Gingival Index, BOP Bleeding on Probing Index, PPD Probing Pocket Depth, DMFT Decayed Missing Filled Tooth, OHIP-14: Oral Health Impact Profile, BMI Body Mass Index, R² This value indicates the level of explanation of each model, S.E. Standard Error, β Standardized Regression Coefficients, CI Confidence Interval, % Percentage, mm Millimeters. *: $p < 0.05$, **: $p < 0.001$ statistically significant, Ref. categories: 1st year for class, Female for gender. BMI (kg/m²) was entered as a continuous variable in the regression models

health parameters after controlling for gender and BMI, reinforcing the robustness of these findings.

The positive changes in DS may reflect the integration of periodontal education with clinical practice, professional awareness, being a role model for patients, and the reinforcement of self-care behaviors throughout their training. Previous studies have reported that as DS' class level increases, their attitudes and behaviors towards oral hygiene become more positive, and clinical experience strengthens self-care [36, 38]. Our findings have strongly supported this trend. Indicators for DS are closely associated with the educational curriculum. Specifically, the PI score (0.98), GI score (0.81), and BOP positivity rate

(12.5%) observed among 5th-year DS demonstrate a notable trend toward lower values in both clinical and behavioral assessments. This reveals that DS education, while supporting professional skills, also strengthens students' awareness and motivation to maintain their own oral hygiene. In MS, however, the sharp increases observed in PI, GI, and BOP parameters, especially in later years, suggest that self-care is relegated to the background during periods of intense clinical training. Many studies in literature have highlighted the need to improve the level of oral health education and awareness among MS [26–29, 37, 39].

A study evaluating the periodontal health of students from various faculties found that DS students had notably lower bleeding scores yet showed higher levels of plaque buildup. Interestingly, as DS students progressed from their first to final years, their plaque accumulation steadily went down, while MS students experienced a significant increase in plaque over time [36]. These results are consistent with the findings of our own study. A current study [6] linked the significantly higher clinical attachment loss and GI scores of MS compared with DS and other faculty students to increased stress levels.

The common results of studies comparing DS and MS in terms of periodontal status and DMFT parameters support our findings [27, 36, 37, 40]. Studies have generally shown that MS have more gingival bleeding, plaque, and deeper pockets [40]. However, studies have not shown a generally significant difference between the two faculties in terms of DMFT scores [41, 42]. In this study, the fact that DMFT scores did not significantly change according to grade level is entirely consistent with the literature showing that DMFT has low sensitivity to short-term behavioral changes [43, 44]. The fact that the DMFT results in our study were more stable compared with other parameters indicates that periodontal findings change more rapidly with behavior and education. Nevertheless, the DMFT score in our study findings, just like the periodontal parameters, points to significant differences in all class level comparisons (except for the 1st year) between the two faculties. In a study conducted in Northwest Russia [45], it was reported that MS had a higher mean score than DS, although this was not statistically significant ($p = 0.149$). The influence of sociodemographic data and the difference in the distribution of participants between groups (MS: 442, DS: 309) may have affected the results. However, a comparison of DMFT scores between DS and MS at the University of Barcelona reported contrasting results to our findings [42]. However, the results of the same study indicate that DS have a higher number of treated teeth, and that their oral health habits and knowledge levels are superior. Considering the sample size of the study [42], (MS: 45, DS: 47), it should be considered that the results might vary.

The OHIP-14 results have once again demonstrated the strong relationship between periodontal health and individual life perception [1, 46]. The decrease in OHIP-14 scores as the class level increases in DS are consistent with the improvement in clinical parameters. In MS, however, the increasing OHIP-14 scores indicate that periodontal inflammation and poor hygiene directly affect quality of life. It has been suggested that high DMFT scores are associated with oral health quality of life in Japanese university students [19, 20]. In Russian university students, it was reported that DMFT and oral hygiene were related to OHIP scores and that MS

had significantly lower OHRQoL compared with DS ($p < 0.001$) [21]. The correlation between OHIP-14 perception and clinical parameters in Japanese and Russian student populations is consistent with the Turkish student population, as presented in our study findings. However, to our knowledge, there is no study that examines the relationship between OHIP-14 scores and caries and periodontal disease risk parameters in DS and MS at the class level in any population.

This study's strengths include a large sample size, balanced representation of 1st-5th year students from two faculties, and analysis of oral health alongside quality of life using current clinical data. Furthermore, the use of adjusted multiple linear regression models, which test the predictive power of class level, provides comprehensive methodologic depth by statistically modeling how oral health behaviors change in student groups [47]. However, this study has some limitations. First, it focuses on the OHIP-14 total score only, inclusion of the subscales would add value to the study. Secondly, while a significant confounding factor such as high BMI was considered, other sociodemographic data such as smoking, socioeconomic status, and family education level were not included. Thirdly, although DMFT is a common indicator of cumulative caries experience, other parameters affecting oral health were not examined. Fourthly, although clinical attachment level is an important parameter for assessing periodontal destruction and disease classification, it was not included in this study because the study population consisted predominantly of young individuals and the primary focus was on periodontal inflammation rather than attachment loss. This can be considered a limitation in interpreting the periodontal status of the participants. Finally, replicating this study at different universities, with larger sample groups and longitudinal designs, could contribute to a more comprehensive understanding of the effects of additional variables such as stress, sleep patterns, lifestyle, geography, and nutrition on oral health and quality of life.

This cross-sectional study shows that medical students are at risk in terms of oral health and that current educational programs do not adequately support this area. Integrating structured modules on oral health and periodontal diseases—such as oral hygiene education, basic oral examinations, and the connection between oral and systemic health—into the medical curriculum is crucial. This approach benefits students' own oral health and contributes significantly to public health. In support of this, providing regular practical oral hygiene training and motivational programs, especially for medical students, is crucial for improving the observed low level of awareness. Creating interdisciplinary training sessions where DS and MS participate together will foster a shared understanding of the relationship between oral health

and systemic diseases, contributing to a holistic approach in healthcare. Finally, developing community-based educational projects and awareness campaigns aimed at strengthening oral health literacy among health sciences students will help make oral health more visible and sustainable as a public health element.

Conclusion

This study showed that, unlike DS across the academic years (1st–5th year), MS exhibited poorer dental and periodontal health and OHRQoL. In this context, reinforcing the MS education curriculum with aspects related to oral health and its systemic effects could provide significant benefits.

Abbreviations

BMI	Body Mass Index
BOP	Bleeding on Probing Index
DS	Dental Students
DMFT	Decayed, Missing, and Filled Teeth
GI	Gingival Index
MS	Medical Students
OHIP	Oral Health Impact Profile
OHRQoL	Oral Health–Related Quality of Life
PI	Plaque Index
PPD	Probing Pocket Depth

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Authors' contributions

The study was conceptualized and designed by O.K. and G.H. Clinical measurements were performed by G.H. The manuscript was written by G.H. and N.Y. It was critically revised and edited by O.K., N.Y., G.N.A. and D.A.C. All authors have read and approved the final manuscript.

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Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Non-Interventional Clinical Research Ethics Committee of Recep Tayyip Erdoğan University (9 October 2025–Decision No: 2025/400) and conducted in accordance with the principles of the Declaration of Helsinki (2013 revision- <https://www.wma.net/policies-post/wma-declaration-of-helsinki/>). Written informed consent was obtained from all participants prior to their inclusion in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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