

ORIGINAL RESEARCH ARTICLE

Oral Hygiene Habits and Knowledge Among Dentistry Students and Patients: A Questionnaire Study

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Abstract

Purpose: This study aimed to compare oral hygiene habits, awareness, and knowledge among dental students and patients.**Materials and Methods:** This study was conducted at Bolu Abant İzzet Baysal University, Faculty of Dentistry. The study included 266 participants divided into groups of dental students (n=133) and patients (n=133). A structured questionnaire with 63 multiple-choice questions covering demographic information, oral hygiene habits, awareness, and knowledge about dental care was used. All the statistical analyses, including chi-square tests and independent sample t-tests, were performed using IBM SPSS Statistics (version 26.0). Statistical significance was defined as $p < 0.05$.**Results:** There were significant differences in tooth brushing frequency, brushing time, toothpaste type, tooth brushing technique, product used for dentures, and frequency of toothbrush replacement between dental students and patients ($p < 0.05$). There was a significant difference between the groups in terms of when the first visit to the dentist occurred, how frequently the dentist was visited, and under what circumstances the dentist was visited ($p < 0.05$). There were significant differences in knowledge regarding the initiating factors and important symptoms of periodontal disease, methods used to prevent periodontal disease, effects of smoking, systemic conditions, and the sufficiency of tooth brushing alone ($p < 0.05$).**Conclusions:** Dental students did not have the same level of oral hygiene habits as shown by the high proportion of correct answers to questions about periodontal diseases and oral hygiene habits. Dentists should increase patients' knowledge about oral hygiene and periodontal disease.**Key words:** oral hygiene; periodontal health; questionnaire

Introduction

Gingival inflammation is induced by dental plaque, a microbial biofilm. Oral and systemic variables might affect the severity and characteristics of inflammation.¹ Oral hygiene is the cornerstone of maintaining gingival and dental health.² Effective plaque removal is essential for gingival health.³ Oral hygiene habits such as tooth brushing and toothpaste usage remove microbial dental plaque.^{4,5} Previous studies showed that oral health providers' behavior and attitudes toward oral health reflected their understanding of the importance and significance of preventive dental procedures and improved their patients' oral health.^{6,7} A positive association has been shown between knowledge, attitudes, and practices associated with oral health.⁸

Education leads to fundamental changes in students' knowledge, attitudes, and practices related to their oral health.⁹ Oral health education improves oral hygiene, knowledge, attitudes, practices, plaque control, and gingival health. Dental students' oral hygiene knowledge may increase, and oral hygiene habits may improve with

advancing years of their education.⁸ Dentists' oral hygiene habits and periodontal status were found to be good.¹⁰ Dental students are highly motivated to maintain their dental health, and their dental education experiences influence this behavior.¹¹ Yemeni dental and medical students have been shown to have markedly poor oral health attitudes and behaviors. Despite this result, dental education significantly impacts oral health and behavior improvement.¹² In another study, non-medical, para-medical, and medical students had a low level of knowledge, and preventive behavior among the students could be improved. The results indicated that knowledge did not influence oral health behavior, but behavior showed a linear relationship with student attitudes.¹³ To improve the understanding of periodontal disease among patients and experts, it is crucial to reduce the gap between the existence of periodontitis and its recognition as an oral health issue.¹⁴ The periodontal status of dental students improves with increasing education.⁸

Many studies evaluated the habits of dental students^{11,15} and others evaluated adults;^{16,17} however they did not compare the two groups. Evaluating dental students' knowledge and awareness of

periodontal diseases is essential.

Dentistry students are thought to be more knowledgeable and conscious about health problems. The null hypothesis of this study was that dental students would not have better knowledge due to the knowledge they learned during the education process. It is important to assess the oral health knowledge, attitudes, and awareness of dentistry because they are future professionals who will be responsible for managing and preventing oral health diseases. The objective of this study was to evaluate and compare the oral hygiene practices, degree of awareness, and knowledge of dental students and patients.

Material and Methods

Study Design

The study was approved by the Ethical Committee of Bolu Abant İzzet Baysal University (2022/176). Between July 2022 and April 2023, 266 individuals, consisting of 5th-grade students and patients who applied to Bolu Abant İzzet Baysal University for treatment, were included in the study. At the beginning of the study, all participants were informed about the study purpose and the questionnaire, and written informed consent was obtained in accordance with the Helsinki Declaration.

Study Population Calculation

According to the results of the power analysis of the G Power program (G * Power 3.1 software, Düsseldorf, Germany), which was carried out within the scope of the study, for the chi-square analysis, at least 127 participants were required for each group, with a margin of error (α) of 0.05 at 2 degrees of freedom and a minimum of 254 participants at the 0.20 effect (w) and 0.95 power ($1-\beta$) level.

Participants

Two hundred sixty-six people were included. Participants consisted of 2 groups: Bolu Abant İzzet Baysal University Faculty of Dentistry 5th-year students ($n=133$) and patients ($n=133$) who visited the clinic. The medical history of patients and 5th-year dental students was recorded, and their overall health was assessed.

Eligibility Criteria

Inclusion Criteria

- 5th year dental student or patient between the ages of 18-27
- Individuals with systemically healthy or controlled systemic disease

Exclusion Criteria

- Patients with mental disorders that make it difficult to complete the questionnaire
- Pregnant women
- Participants who did not answer all of the survey questions used in the research or who did not answer the survey questions following the specified instructions

Questionnaire

The data were collected by using self-administered structured questionnaires, which were adapted from related literature.^{18,19} A questionnaire was used to gain insight into knowledge, attitudes, and behavior related to dental care habits among dentistry students and

patients in Türkiye. Dentistry students studying at the faculty of dentistry and patients visiting the faculty hospital were asked to answer a total of 63 multiple-choice questions, including 11 that collected general and demographic information (such as age and sex), 34 related to oral hygiene habits (attitudes toward toothbrush care, etc.), and 18 that awareness/knowledge of toothbrush care and maintenance. The answer options for the questions ranged from two to eighteen. There was also a "don't know" option for questions containing information. In the first section, data on demographic characteristics were collected, and age, sex, marital status, educational status of the family, whether the individuals were health workers, and with whom they lived were assessed. In the second section, oral habits were examined, and many questions were asked, including where the participant learned to brush, systemic disease, smoking, tooth brushing frequency, duration, products, brushing technique, and dentist appointments.

In the last section, where the participants' knowledge was measured, questions regarding the factors that initiate periodontal diseases, symptoms, and the effect of systemic diseases, and how many minutes, how often, and how to brush their teeth, etc., were asked. A clinician (T.Ş.) administered the survey to the patients. All the questionnaires were provided in printed formats, and the primary language was Turkish.

Statistics

Within the scope of the study, IBM SPSS Statistics (version 26.0. Armonk, NY, USA) was used for statistical analysis. Categorical data were expressed as numbers and percentages. The chi-square test was used to compare the evaluations of the participants who were and were not dentistry students regarding the questions in the questionnaire. $P<0.05$ was considered to indicate statistical significance in this study.

Results

Sociodemographic Characteristics

There was no significant difference in sex or age distribution between the groups. There was a statistically significant difference between the education levels of the mothers and fathers of the participants who were dentistry students and those who were not ($p<0.05$). A total of 32.3% of the dentistry students had fathers who were educated at a university; this percentage was 8.3% for the participants who were not dentistry students.

State of Health

There was a statistically significant difference according to the status of the participants who were previously informed about tooth brushing, interdental cleaning, or general oral care by a dentistry student ($p<0.05$) (Table 1). Tooth brushing, interdental cleaning, and general oral care were greater in dental students than in patients.

Oral hygiene habits

There was a statistically significant difference in tooth brushing frequency, time and toothpaste type, tooth brushing technique, and frequency of toothbrush replacement between the dentistry students and patients ($p<0.05$).

There was no statistically significant difference between the dental students and patients regarding the products used for tooth brushing ($p>0.05$). For this question, where multiple answers could be given, the majority of the participants in both groups reported

Table 1. Ways for participants to acquire oral hygiene behaviors

			Population		Total	p
			Dentistry Students	Patients		
Have you been informed about tooth brushing, interdental cleaning, and general oral care from the dentist before?	Yes	n %	118 88.7%	99 74.4%	217 81.6%	0.003*
	No	n %	15 11.3%	34 25.6%	49 18.4%	
Other than the dentist, where did you receive information or training about brushing, interdental cleaning and general oral care? (More than one answer may be given.)	Family	n %	58 43.9%	64 48.1%	122 45.9%	0.561
	School	n %	86 65.2%	64 48.1%	150 56.4%	
	Relative	n %	4 3.0%	1 0.8%	5 1.9%	
	Friend	n %	8 6.1%	5 3.8%	13 4.9%	
	Social media	n %	32 24.2%	38 28.6%	70 26.3%	
Have you been shown how to brush your teeth by the dentist on a dental model or your teeth?	Yes	n %	104 78.2%	89 67.4%	193 72.8%	0.087
	No	n %	29 21.8%	43 32.6%	72 27.2%	
Has the tooth plaque disclosing tablet been applied to you by your dentist?	Yes	n %	5 3.8%	8 6.1%	13 4.9%	0.416
	No	n %	128 96.2%	124 93.9%	252 95.1%	
Have you taken indices to determine your periodontal disease/oral hygiene habits before?	Yes	n %	30 22.7%	22 16.5%	52 19.6%	0.271
	No	n %	102 77.2%	111 83.5%	213 80.4%	

that they used toothbrushes and toothpastes.

There was no significant difference between dental students and patients with implants in terms of the products they used ($p > 0.05$) (Table 2).

Knowledge Regarding Oral Hygiene

There was a significant difference between dental students and patients regarding all answers. A high percentage of dentistry students could determine what factors initiated periodontal disease. Patients had a limited amount of knowledge on this subject. A total of 79.7% of the dentistry students and 39.1% of the patients reported that gingival bleeding was an important symptom. A total of 96.9% of the dentistry students and 72.9% of the patients answered that using a toothbrush, flossing, and having regular dentist visits were effective methods.

A total of 92.5% of the dentistry students and 64.6% of the patients answered that teeth should be brushed 2–3 times per day. A total of 79.9% of the dentistry students and 43.6% of the patients answered that teeth should be brushed for 2 minutes or more. A total of 92.5% of the dentistry students and 68.4% of the patients answered that brushing alone is not sufficient for oral health.

A total of 93.2% of the dentistry students and 69.9% of the patients answered that smoking affects the healing of periodontal diseases. A total of 97.7% of the dentistry students and 66.9% of the patients answered that systemic condition is a risk factor for periodontal diseases. Approximately 90.2% of dental students and 69.2% of patients answered that routine check-ups should be performed every six months (Table 4).

Discussion

This study aimed to determine whether dentistry students have better oral hygiene practices, awareness, and habits than patients. The null hypothesis of this study was that dental students would not possess superior knowledge as a result of the education process they

underwent. In this study, the greatest difference between the two groups was observed in terms of knowledge, with no significant difference in all oral hygiene behaviors or awareness.

Tobacco consumption, even at early ages, affects periodontal health.²⁰ While 64% of the preclinical students smoked half a pack of cigarettes, 85% of 4th and 5th-year dental students reported smoking half a pack of cigarettes.²¹ The prevalence of smoking among Italian dental students ranged from 28% to 42% depending on their academic year.²² A total of 18.33% of Moroccan dental students reported smoking.²³ While 5.3% of the dentistry students stated that they smoked more than one pack a day, this rate was 3.8% among the patients in this study.

Toothbrushes serve as the principal dental hygiene tools utilized for cleaning teeth.²⁴ In a study comparing the oral hygiene habits of dental students, fourth- and fifth-year dental students gave better feedback on tooth brushing (76%), flossing (31%), and cleaning their teeth with toothpaste (57%).²¹ The oral hygiene behavior of the medicine and dentistry students was further evaluated based on the recommended components of oral hygiene behavior: brushing teeth at least twice a day, tongue cleaning, and flossing at least once a day.⁹ Jensen et al. (2011) reported that twice-daily brushing in Scandinavians was standard for all age groups, with most participants brushing two or more times daily.²⁵ In the study in which the oral hygiene habits of medicine and dentistry students were measured, more than two-thirds of dentistry students brushed their teeth twice or more daily.²⁶ A study conducted on postgraduate, undergraduate, and faculty staff in four universities in India found that most dental students used toothbrushes and toothpaste twice daily before meals.²⁷ In this study, 75.9% of the patients and 52.6% of the dental students reported that they brushed their teeth 2 or more than twice daily.

Jensen et al. (2012) reported that more than 5% of individuals in different age groups in Sweden brushed their teeth for less than 2 minutes.²⁵ One hundred and eighty-nine periodontitis patients participated in the study in which oral hygiene habits were analyzed. 51% brushed their teeth for 2 minutes, and 31% brushed their teeth for 3 minutes or longer.²⁸ Saxer et al. (1998) found that the mean

Table 2. Participants' oral hygiene habits

		Population		Total	p
		Dentistry students	Patients		
What is your tooth brushing frequency?	I never brush	n 0 % 0.0%	3 2.3%	3 1.1%	0.003*
	Once a month	n 2 % 1.5%	7 5.2%	9 3.4%	
	2-3 times a month	n 7 % 5.3%	9 6.8%	16 6.1%	
	Once a week	n 0 % 0.0%	3 2.3%	3 1.1%	
	Twice a week	n 2 % 1.5%	5 3.7%	7 2.6%	
	1 time per day	n 21 % 15.8%	36 27.1%	57 21.4%	
	2 or more per day	n 101 % 75.9%	70 52.6%	171 64.3%	
	What is your tooth brushing time?	Less than 1 minute	n 5 % 3.9%	32 24.6%	
Between 1-2 minutes	n 77 % 59.2%	69 53.1%	146 56.2%		
More than 2 minutes	n 48 % 36.9%	29 22.3%	77 29.6%		
Which products do you use? (More than one answer can be given)	Toothbrush	n 122 % 91.7%	124 93.2%	146 54.9%	0.143
	Electric toothbrush	n 18 % 13.5%	13 9.8%	31 11.7%	
	Toothpaste	n 109 % 82.9%	109 82.2%	218 82.2%	
	Dental floss	n 77 % 57.9%	31 23.3%	108 40.6%	
	Interdental brush	n 13 % 9.8%	9 6.8%	22 8.3%	
	Mouthwash	n 40 % 30.1%	31 23.3%	71 26.7%	
	Toothpick	n 14 % 3.6%	30 22.6%	44 16.5%	
How do you brush your teeth?	Horizontal direction (Forward-Backward)	n 6 % 4.5%	36 27.3%	42 15.8%	0.001*
	From the gingival junction to the tooth	n 108 % 81.2%	63 47.7%	171 64.5%	
	Brushing zig-zags between teeth	n 12 % 9.9%	18 13.6%	30 11.3%	
	Random	n 7 % 5.3%	15 11.4%	22 8.4%	
What type of toothpaste is it?	Whitening	n 30 % 22.6%	57 43.2%	87 32.8%	0.001*
	Anti-caries	n 76 % 57.1%	35 26.5%	111 41.9%	
	Gum protection	n 11 % 8.3%	22 16.6%	33 12.4%	
	Sensitive	n 14 % 10.4%	15 11.4%	29 10.9%	
	Content other than fluoride (Charcoal, probiotic, etc.)	n 1 % 0.8%	0 0.0%	1 0.4%	
	Natural ingredients (Aloe vera, clove, propolis, etc.)	n 1 % 0.8%	3 2.3%	4 1.6%	
How often do you change your toothbrush?	1-3 months	n 29 % 21.8%	39 30.0%	68 25.9%	0.035*
	Once in 3 months	n 64 % 48.1%	41 31.5%	105 39.9%	
	3 months-1 year	n 36 % 27.1%	38 29.3%	74 28.1%	
	More than a year	n 4 % 3%	12 9.2%	16 6.1%	
	If you have a dental prosthesis and a total removable prosthesis, which of the following products do you use? (More than one answer can be given)	Superfloss	n 2 % 1.5%	3 2.3%	
Denture cleaning tablet	n 4 % 3%	5 3.8%	9 3.4%		
None	n 12 % 9%	48 36.4%	60 22.6%		
I don't have a denture	n 115 % 86.5%	76 57.5%	189 71.1%		
If you have an implant, which of the following products do you use?	Oral irrigator	n 1 % 0.8%	2 1.5%	3 1.1%	0.185
	Interdental brush	n 3 % 2.3%	6 4.5%	9 3.4%	
	Superfloss	n 1 % 0.8%	4 3%	5 1.9%	
	None	n 128 % 96.1%	121 91%	249 93.6%	
When was the last time you went to the dentist?	0-3 months	n 70 % 53.9%	70 53%	140 53.4%	0.001*
	3-12 months	n 41 % 31.5%	19 14.4%	60 22.9%	
	More than a year	n 19 % 14.6%	43 32.6%	62 23.7%	

Table 3. Participants' awareness levels and habits

		Population		Total	p	
		Dentistry students	Patients			
How do you rate your current health?	Bad	n %	9 6.8%	35 26.5%	44 16.6%	0.001*
	Moderate	n %	38 28.6%	63 47.7%	101 38.0%	
	Good	n %	67 50.4%	29 22.0%	96 36.3%	
	Excellent	n %	19 14.3%	5 3.8%	24 9.1%	
Can you recognize yourself if you have periodontal disease?	Yes	n %	119 92.2%	78 60.0%	197 76.1%	0.001*
	No	n %	10 7.8%	52 40.0%	62 23.9%	
I think I have done everything I need to do about my oral health	Yes	n %	62 46.6%	69 51.9%	131 49.2%	0.391
	No	n %	71 53.4%	64 48.1%	135 50.8%	
When you start treatment for gum disease, do you keep your appointments with your dentist until the treatment is finished?	Yes	n %	123 92.5%	114 87.7%	237 90.1%	0.193
	No	n %	10 7.5%	16 12.3%	26 9.9%	
Do you follow the dentist's recommendations?	Totally	n %	91 70.0%	82 68.9%	173 69.5%	0.140
	Partially	n %	37 28.5%	31 26.1%	68 27.3%	
	Nothing	n %	2 1.5%	6 5.0%	8 3.2%	
What is your reason for not taking care of your mouth?	I think oral care is not important	n %	11 8.3%	14 10.9%	25 9.6%	0.071
	Individual inadequacies	n %	5 3.8%	12 9.4%	17 6.5%	
	It's hard to do it regularly	n %	33 25.0%	21 16.4%	54 20.8%	
	I forget	n %	46 34.8%	37 28.9%	83 31.9%	
	I will definitely do it	n %	37 28.4%	44 34.4%	81 31.2%	
		n %	7 5.3%	10 7.9%	17 6.5%	
What was your first dentist visit age?	0-2 years	n %	43 32.3%	24 18.9%	67 25.8%	0.001*
	3-6 years	n %	70 52.6%	60 47.2%	130 50.0%	
	7-18 years	n %	13 9.8%	33 26.0%	46 17.7%	
	Above 18 years	n %	70 52.6%	42 31.8%	112 42.3%	
How often do you go to the dentist?	1 in 6 months	n %	30 22.6%	31 23.5%	61 23.0%	0.005*
	1 in 1 year	n %	18 13.5%	30 22.7%	48 18.1%	
	1 in 2 year	n %	11 8.3%	17 12.9%	28 10.6%	
	1 in 6 year	n %	4 3.0%	12 9.1%	16 6.0%	
	More than 6 year	n %	44 33.1%	75 56.4%	119 44.7%	
For what conditions do you go to the dentist?	Toothache	n %	0 0%	11 8.2%	11 4.1%	0.001*
	Dental prostheses made/renovate	n %	24 18.0%	11 8.2%	35 13.2%	
	Scaling and root planing	n %	58 43.6%	30 22.6%	88 33.1%	
	Routine dental visit	n %	7 5.3%	6 4.6%	13 4.9%	
	I don't go	n %	79 59.4%	65 48.9%	144 54.1%	
What is your main purpose in brushing your teeth?	Prevention of gingiva disease and caries	n %	26 19.4%	24 17.9%	50 18.8%	0.128
	Making my teeth look cleaner by removing food waste from tooth surfaces	n %	10 7.5%	11 8.2%	21 7.9%	
	To prevent bad breath and have a fresher breath	n %	10 7.5%	12 9.0%	22 8.2%	
	Making your teeth look better	n %	7 5.2%	20 15.0%	27 10.2%	
	Not to lose your teeth	n %	7 5.2%	20 15.0%	27 10.2%	

Table 4. Participants' knowledge of oral hygiene and periodontal diseases

	Population			P		
	Dentistry Student (n(%))	Patient (n(%))	Total (n(%))			
What is the factor that initiates periodontal disease?	Bacterial dental plaque	112 (84.2%)	43 (32.3%)	155 (58.3%)	0.001*	
	Calculus	13 (9.7%)	40 (30.1%)	53 (19.9%)		
	Malnutrition	1 (0.8%)	12 (9.0%)	13 (4.9%)		
	Hereditary	3 (2.3%)	13 (9.8%)	16 (6.0%)		
	Diabetes	4 (3.0%)	11 (8.3%)	15 (5.6%)		
	I don't know	0 (0.0%)	14 (10.5%)	14 (5.3%)		
What is the most apparent symptom of periodontal disease?	Gingival bleeding	106 (79.7%)	52 (39.1%)	158 (59.4%)	0.001*	
	Gingival enlargement	11 (8.3%)	41 (30.8%)	52 (19.6%)		
	Gingival erythema	14 (10.5%)	10 (7.5%)	24 (9.0%)		
	Halitosis	2 (1.5%)	13 (9.7%)	15 (5.6%)		
	I don't know	0 (0.0%)	17 (12.9%)	17 (6.4%)		
	Once	1 (3.8%)	17 (12.8%)	22 (8.3%)		
How many times a day should you brush your teeth?	2-3 times	123 (92.5%)	86 (64.6%)	209 (78.6%)	0.001*	
	3-5 times	2 (1.5%)	15 (11.3%)	17 (6.4%)		
	I don't know	3 (2.2%)	15 (11.3%)	18 (6.7%)		
	Less than 1 minute	7 (5.2%)	32 (24.1%)	39 (14.7%)		
	1-2 minutes	19 (14.3%)	41 (30.8%)	60 (22.6%)		
	2 minutes	43 (32.3%)	31 (23.3%)	74 (27.8%)		
How many minutes should you brush your teeth?	2-3 minutes	48 (36.1%)	23 (17.3%)	71 (26.7%)	0.001*	
	More than 3 minutes	15 (11.3%)	4 (3.0%)	19 (7.1%)		
	I don't know	1 (0.8%)	2 (1.5%)	3 (1.1%)		
	Yes	125 (93.9%)	110 (82.7%)	235 (88.3%)		0.019*
	No	5 (3.8%)	10 (7.5%)	15 (5.7%)		
	I don't know	3 (2.3%)	13 (9.8%)	16 (6.0%)		
What is the effective measure to prevent periodontal disease?	Toothbrush, flossing and regular visits to the dentist	129 (96.9%)	97 (72.9%)	226 (85.0%)	0.001*	
	Good nutrition	3 (2.3%)	15 (11.3%)	18 (6.7%)		
	Dentist treatment only	1 (0.8%)	14 (10.5%)	15 (5.6%)		
	I don't know	0 (0.0%)	7 (5.3%)	7 (2.7%)		
	Yes	117 (87.9%)	92 (69.2%)	209 (78.6%)		0.001*
	No	15 (11.3%)	30 (22.5%)	45 (16.9%)		
I don't know	1 (0.8%)	11 (8.3%)	12 (4.5%)			
Does smoking affect the healing of gingival diseases?	Yes	124 (93.2%)	93 (69.9%)	217 (81.6%)	0.001*	
	No	9 (6.8%)	33 (24.8%)	42 (15.8%)		
	I don't know	0 (0.0%)	7 (5.3%)	7 (2.6%)		
	Yes	130 (97.7%)	102 (76.7%)	232 (87.2%)		0.001*
	No	3 (2.3%)	23 (17.3%)	26 (9.8%)		
	I don't know	0 (0.0%)	8 (6.0%)	8 (3.0%)		
Do you know that systemic conditions that can affect general body health, such as diabetes, heart disease, and pregnancy complications, can be a risk factor for periodontal diseases?	Yes	130 (97.7%)	89 (66.9%)	219 (82.3%)	0.001*	
	No	3 (2.3%)	37 (27.8%)	40 (15.1%)		
	I don't know	0 (0.0%)	7 (5.3%)	7 (2.6%)		
	Yes	126 (94.7%)	89 (66.9%)	215 (80.8%)		0.001*
	No	7 (5.3%)	34 (25.5%)	41 (15.4%)		
	I don't know	0 (0.0%)	10 (7.6%)	20 (7.6%)		
Can bacteria in the mouth be removed by brushing teeth?	Yes	106 (79.7%)	97 (72.9%)	203 (76.3%)	0.001*	
	No	27 (20.3%)	29 (21.8%)	56 (21.1%)		
	I don't know	0 (0.0%)	7 (5.3%)	7 (2.6%)		
	Yes	10 (7.5%)	32 (24.1%)	42 (15.8%)		0.001*
	No	123 (92.5%)	91 (68.4%)	214 (80.4%)		
	I don't know	0 (0.0%)	10 (7.5%)	10 (3.8%)		
Does pregnancy affect gingival disease?	Yes	132 (99.2%)	71 (53.4%)	203 (76.3%)	0.001*	
	No	1 (0.8%)	36 (27.1%)	37 (13.9%)		
	I don't know	0 (0.0%)	26 (19.5%)	26 (9.7%)		
	Yes	124 (93.2%)	38 (28.6%)	162 (60.9%)		0.001*
	No	9 (6.8%)	47 (35.3%)	56 (21.1%)		
	I don't know	0 (0.0%)	48 (36.1%)	48 (18.0%)		
Are all mouthwashes used for a long time?	Yes	3 (2.3%)	13 (9.8%)	16 (6.0%)	0.001*	
	No	129 (96.9%)	95 (71.4%)	224 (84.2%)		
	I don't know	1 (0.8%)	25 (18.8%)	26 (9.8%)		
	Roll technique	30 (22.6%)	25 (18.8%)	55 (20.7%)		0.001*
	Modified stilmann technique	54 (40.6%)	11 (8.3%)	65 (24.4%)		
	Charters technique	0 (0.0%)	7 (5.3%)	7 (2.6%)		
Bass technique	45 (33.8%)	8 (6.0%)	53 (19.9%)			
Leonard technique	0 (0.0%)	5 (3.9%)	5 (1.9%)			
I don't know	4 (3.0%)	77 (57.9%)	81 (30.5%)			
How often should routine check-ups be performed at the dentist?	1 month	6 (4.5%)	2 (1.5%)	8 (3.0%)	0.001*	
	3 months	4 (3.0%)	11 (8.3%)	15 (5.6%)		
	6 months	120 (90.2%)	92 (69.2%)	212 (79.7%)		
	12 months	3 (2.3%)	16 (12.0%)	19 (7.2%)		
	18 months	0 (0.0%)	8 (6.0%)	8 (3.0%)		
	I don't know	0 (0.0%)	4 (3.0%)	4 (1.5%)		

tooth brushing time of one hundred and fifty-four patients who applied to the clinic was 56.6 seconds.²⁹ In the present study, 36.9% of the dental students and 22.3% of the patients reported that they brushed for more than two minutes.

Among the 189 consecutive periodontitis patients treated for moderate to severe periodontitis, 41.3% used dental floss, 72.5% used toothpicks, and 60.3% used interdental brushes. In addition, 82% of the participants used toothpaste containing fluoride, and more than 4% of the participants used wood sticks and/or interdental brushes at least once a day.²⁸ In this study, 91.7% of the dental students and 93.2% of the patients used toothbrushes. Toothpaste was used by 82% of the students and 82% of the patients.

Elkerbout et al. (2023) followed periodontitis patients for one year, and 33.8% said they used the Bass technique.²⁸ In another study examining the oral health behavior, awareness, and status of 1st and 3rd year medical and dental students, it was reported that 66.3% of dental students brushed their teeth using either vertical brushing or the Bass technique.²⁶ Naseem et al. (2017) reported that 31.1% of medical students brushed their teeth with circular movements. Medical students were found to have a faulty teeth cleaning technique.³⁰ While 81.2% of the dental students brushed from the tooth-gingiva junction upward or downward according to the jaw, 47.7% of the patients did so.

Mechanical brushing is the most common method used for cleaning dentures in all oral hygiene practices.³¹ Evren et al. (2011) reported that 4% of two hundred sixty-nine patients cleaned their dentures only with a toothbrush.³² In the study in which oral hygiene and periodontal status of five hundred and fifty patients with dentures were evaluated, 26.34% brushed once a day, while 36.9% of those who brushed three times a day had good denture cleanliness.³³ In another study, 4% of the oral participants among the fifty denture patients brushed only with water and a toothbrush.³⁴ According to the data, patients and dental students with dentures mostly did not use anything for cleaning their dentures. In the Australian study, 88.7% of patients brushed their implant prostheses, 78.1% used an interdental brush, and 80.9% employed dental floss.³⁵ In the study by Cheung et al. (2021), 74.4% of the patients used dental floss, and 44.9% used interdental brushes.³⁶ Ninety-one percent of the patients with implants in this study did not use oral hygiene products.

Messer et al. (2012) reported that 8% of first-year students used fluoride toothpaste.³⁷ In a study by Macharia et al. (2023), it was determined that the use of fluoridated toothpaste was common, but individuals who were aware of the fluoride in toothpaste were few.³⁸ A total of 7.4% of Chinese adolescents used fluoridated toothpaste.³⁹ While dentistry students mostly used the most anti-caries toothpaste, patients used whitening toothpaste in this study.

Approximately 45% of the students followed a consistent toothbrush replacement routine and changed their toothbrush every three months.⁴⁰ Jensen et al. (2011) reported that 48.3% of patients changed their toothbrushes in less than three months.²⁵ Dentistry students changed their toothbrushes more frequently. In this study, 48.1% of the dentistry students changed their toothbrushes every three months, while only 31.5% of the patients did so.

It appears that different professions have varying recommendations regarding the age of the first dental appointment.⁴¹ In the study conducted in Poland, patients made their first dental visit at the age of four years.⁴² The majority of children in Lebanon visit a dentist.⁴³ In this study, the first dental visits were generally made between the ages of 7 and 18 years. Regarding oral health behavior, 42.7% of dental students reported visiting a dentist regularly (at least once every 2 years), and 58.6% visited a dentist within the last year.⁴⁴ A total of 12.8% of adults went to the dentist for routine control.⁸ 33.3% of the clinical students visited the dentist for toothaches. Most dental students visited the dentist every six months (29.5%).⁹ Messer et al. (2012) reported that 23% of participants consulted a dentist when they felt uncomfortable with their teeth.³⁷ In another study, 47% of dentistry students visited a

dentist only when they had a toothache.⁶ In the Turkey Oral and Dental Health Profile Research Report (2018), 9 out of 10 individuals in all age groups answered "when they had a complaint" to the question about the "frequency of visiting the dentist".⁴⁵ Therefore, the most common reason for the last visit to the dentist was "pain or problem related to teeth, gums or mouth". This study revealed that 43.6% of the dentistry students went for routine check-ups, while 22.6

An emphasis on dental health care and education should be developed and maintained during early school education to improve oral health knowledge in adulthood.¹⁸ The majority of adults incorrectly define the meaning of dental plaque and do not understand its role in the etiology of gingival disease. A total of 26.8% of the participants reported that plaque would cause periodontal disease.¹⁷ Dentistry students suggested that plaque was the initiating factor of periodontal disease at a greater rate.¹⁸ A high percentage of dentists identified the factors that initiate periodontal disease in this study.

In the study by Yuen et al. (2007), 77.9% of the participants reported that gingival bleeding was an early sign of periodontal disease.⁴⁴ In Jordan, the majority of adult participants (60.8%) were aware that gingival bleeding upon brushing indicated the presence of periodontal disease, which can be prevented by brushing and flossing (63.4%).¹⁷ According to Shitu et al. (2023), sixty-six percent of individuals thought bleeding gums were signal of inflammation.⁴⁰ In another study, 7% of the participants who considered gingival bleeding as a symptom of periodontal disease were in their first year of dental school, and 9% were in their last year.¹⁸ In this study, 79.7% of the dental students and 39.1% of the patients said that bleeding was the most important symptom of periodontal disease.

In the study by Taani et al. (2002), adults stated that, besides toothbrushes, interdental brushes and dental floss should be used to prevent periodontal disease. 63.4% of adults thought tooth brushing and flossing were sufficient for preventing periodontal disease.¹⁷ In another study, 72% of first-year dentistry students believed that the most effective way to prevent periodontal disease was tooth brushing and flossing, while 9% of fifth-year dentistry students answered similarly.¹⁸ In this study, 96.9% of the dental students considered tooth brushing, flossing, and routine visits to the dentist to be effective at preventing periodontal disease, while 72.9% of the patients thought so.

Dentistry students had better knowledge of the relationship between periodontal disease and smoking, heart disease, and diabetes. The percentage of dental students who believed that smoking would affect periodontal disease incidence varied from 78% to 94% depending on their class level.¹⁸ Messer et al. (2011) reported that all dental students believed that smoking would affect the gingiva.³⁷ In this study, 93.2% of the dental students and 69.9% of the patients thought that smoking would affect periodontal health. Not only dentists but also patients were aware that quitting smoking was effective in the treatment of gingival diseases. Most patients thought that dental problems would affect the body.¹⁶ In this study, almost all the students agreed that "Yes, smoking affects the healing of gingival diseases". Patients demonstrated a high level of awareness of this issue.

In the study by Yildiz et al. (2019), only 51% of 4th and 5th-year dentistry students believed that tooth brushing alone was not effective in preventing periodontal disease.²¹ More than half of the students agreed with the statement, "It is impossible to prevent periodontal disease with tooth brushing alone".⁶ Most dentists believe that tooth brushing alone is enough to prevent periodontal disease.¹⁵ However, in this study, it was more widely accepted among dental students that toothbrushes alone were ineffective. Specifically, 92.5% of the dental students and 68.4% of the patients said that brushing alone was not sufficient.

The study was limited to a specific university and may not represent the entire population. Additionally, self-reported data may be subject to bias. Further studies involving more extensive and

diverse samples are warranted for comprehensive insights.

Conclusion

Contrary to the null hypothesis, dental students were significantly different from patients regarding tooth brushing, interdental cleaning, and general oral care compared to patients. The level of knowledge about oral hygiene and periodontal status was greater among dental students. The study findings underscore the importance of dental education in enhancing oral hygiene knowledge among future dental professionals. However, in addition, dental students' knowledge due to their education needs to be sufficiently reflected in their oral hygiene habits.

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Author Contributions

T.Ş. : found study idea / hypothesis, made study design, collected data, made analysis and/or interpretation of results, wrote article, made critical review.

Conflict of Interest

The author declare that there is no conflict of interest.

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