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An Investigation into Foreign Students' Attitudes and Behaviours Regarding Oral and Dental Health

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ABSTRACT

Objectives: This study investigates the socio-demographic characteristics of international students at a state university, their knowledge of oral and dental health, and their attitudes toward this subject.

Materials and Methods: The study population comprised 600 international students at Sivas Cumhuriyet University between May 15 and November 15, 2024. A total of 227 students voluntarily participated. Data were collected via face-to-face and online questionnaires using the Oral Health Attitude Scale developed by Fidan et al. (2024). Analyses were performed with SPSS 23.0. Since parametric test assumptions were not met, the Mann-Whitney U test was used for two-group comparisons and the Kruskal-Wallis H test for three or more groups. Relationships between socio-demographic variables and oral health attitudes and behaviours were evaluated.

Results: Of participants, 62.6% were male and 37.4% female; 52% were aged 17–20, 33.5% 21–24, and 14.5% 25 or older. Educationally, 55.1% were undergraduates, 27.8% associate degree, and 17.2% postgraduates. Family income levels were: 26.4% at 26,000 TL or below, 26.4% between 26,001–45,000 TL, 26.4% between 45,001–60,000 TL, and 20.7% above 60,001 TL.

Conclusions: The findings show international students have limited education regarding oral and dental health. Targeted programs are essential to raise awareness and improve oral health behaviours. Good oral health enhances overall well-being and supports vital functions such as speaking, smiling, and social interaction.

Keywords: Health, health attitude, international student, oral and dental health

Yabancı Öğrencilerin Ağız ve Diş Sağlığına İlişkin Tutum ve Davranışlarının İncelenmesi

Araştırma Makalesi

Süreç

Geliş: 30/09/2025
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ÖZ

Amaç: Bu çalışma, bir devlet üniversitesinde öğrenim gören uluslararası öğrencilerin sosyo-demografik özelliklerini, ağız ve diş sağlığı konusundaki bilgi düzeylerini ve bu konuya yönelik tutumlarını incelemektedir.

Gereç ve Yöntemler: Araştırma evrenini, 15 Mayıs – 15 Kasım 2024 tarihleri arasında Sivas Cumhuriyet Üniversitesi'ndeki 600 uluslararası öğrenci oluşturmuştur. Çalışmaya gönüllü olarak 227 öğrenci katılmıştır. Veriler, Fidan ve ark. (2024) tarafından geliştirilen Ağız Sağlığı Tutum Ölçeği kullanılarak yüz yüze ve çevrim içi anketlerle toplanmıştır. Analizler SPSS 23.0 programı ile yapılmıştır. Parametrik test varsayımları karşılanmadığından, iki grup karşılaştırmalarında Mann-Whitney U testi, üç ve daha fazla grup karşılaştırmalarında Kruskal-Wallis H testi uygulanmıştır. Sosyo-demografik değişkenler ile ağız sağlığı tutum ve davranışları arasındaki ilişkiler değerlendirilmiştir.

Bulgular: Katılımcıların %62,6'sı erkek, %37,4'ü kadındır; %52'si 17–20 yaş, %33,5'i 21–24 yaş, %14,5'i ise 25 yaş ve üzerindedir. Eğitim düzeyine göre %55,1'i lisans, %27,8'i önlisans, %17,2'si lisansüstü programdadır. Aile gelir düzeyleri: %26,4'ü 26.000 TL ve altı, %26,4'ü 26.001–45.000 TL, %26,4'ü 45.001–60.000 TL, %20,7'si ise 60.001 TL ve üzeridir.

Sonuçlar: Bulgular, uluslararası öğrencilerin ağız ve diş sağlığı konusunda sınırlı eğitim aldığını göstermektedir. Farkındalığı artırmak ve ağız sağlığı davranışlarını geliştirmek için hedeflenmiş programlar gereklidir. Yeterli ağız sağlığı, genel iyilik halini güçlendirir ve konuşma, gülümseme ve sosyal etkileşim gibi temel işlevleri destekler.

Anahtar Kelimeler: Ağız ve diş sağlığı, sağlık, sağlık tutumu, uluslararası öğrenci

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Introduction

Oral and dental health has become one of the most prevalent health problems worldwide in recent years. The World Health Organization and various epidemiological studies have revealed that oral and dental health is not limited to intraoral issues alone; it directly affects individuals' overall health status, quality of life, and

psychosocial well-being.[1] Indeed, oral and dental health disorders lead to serious consequences not only at the individual level but also at social and economic levels, imposing significant costs on health systems.[2] For this reason, oral and dental health is currently considered among the priority public health issues on a global scale.

Good oral and dental health refers to the capacity of individuals to maintain the integrity of their oral structures by adapting to physiological changes that may occur throughout life. This condition is not limited merely to an aesthetic appearance or the presence of healthy teeth; it also encompasses the ability of the individual to actively participate in functions such as speaking, smiling, eating, and engaging in social interactions.[3] Therefore, oral health holds a central position in maintaining quality of life. Disorders of oral and dental health negatively affect the basic functions of daily life and cause significant discomfort in individuals. Problems such as dental caries, periodontitis, tooth loss, and halitosis create difficulties in eating, speaking, and social interactions, thereby reducing social adaptation.[4,5] Furthermore, these conditions have been reported to be associated in the long term with systemic diseases such as cardiovascular diseases, diabetes, and respiratory infections.[1]

Among the main risk factors negatively affecting oral and dental health are the use of cigarettes and tobacco products, alcohol consumption, unbalanced nutrition, stress, and inadequate hygiene practices. In particular, the excessive consumption of sugary and acidic foods and beverages increases the risk of dental caries and enamel erosion.[6] The literature emphasizes that insufficient oral hygiene, due to bacterial plaque metabolism, is one of the primary causes of problems such as caries, gingivitis, and periodontitis.[7] Poor oral hygiene is prevalent across all age and gender groups; however, it appears more prominently as a serious public health issue in low- and middle-income countries. This situation highlights the close relationship between socio-economic variables and oral health.[8] Furthermore, oral health disorders are reported to be among the most costly health problems worldwide, placing a significant burden on healthcare expenditures.[2]

Oral and dental health services primarily include preventive and aesthetic dentistry practices. In countries where preventive dentistry is prioritized, significant reductions in the rates of caries, tooth loss, and fillings have been observed thanks to regular hygiene practices and health policies.[9] However, in many societies, a considerable portion of individuals consult a dentist only in cases of pain or emergency. Routine dental check-ups are often regarded as either insignificant or financially burdensome.[10,11] This situation demonstrates how critical the accessibility of dental health services and health education truly is. Health education is a fundamental tool in the protection and promotion of oral and dental health. In particular, individuals' attitudes and behaviors toward oral hygiene are directly related to the health education they receive, contributing to the improvement of the overall oral health of society.[8,12] Revealed a significant relationship between individuals' access to health education and their oral hygiene behaviors. This finding indicates that oral and dental health education should be disseminated widely throughout society.[13]

International students face not only academic but also multidimensional social and health-related challenges in the countries where they pursue their education. Among these challenges, language and communication barriers are particularly prominent. Effective communication, which is essential for benefiting from healthcare services, becomes even more difficult due to the complexity of medical terminology.[14] Low language proficiency may prevent students from accurately expressing their symptoms, while healthcare professionals may fail to fully understand their needs; this situation can cause serious disruptions in both diagnosis and treatment processes.

Cultural differences similarly represent a significant factor affecting the use of healthcare services. Students from diverse cultural backgrounds may hold differing perceptions of illness, attitudes toward treatment, and expectations from healthcare systems, which may not align with the host country's healthcare practices. Such cultural mismatches can reduce students' satisfaction with healthcare services and undermine their trust in the system.[15] Moreover, some students may feel that healthcare professionals are not sufficiently sensitive to their cultural or religious values, leading to avoidance or delays in seeking medical care.

Another important issue is the lack of familiarity with the healthcare system. International students often experience difficulties accessing healthcare services because they are unfamiliar with complex bureaucratic procedures such as appointment scheduling, referrals, and specialist consultations.[16] The combination of language barriers and the use of digital health platforms or insurance systems further complicates access to accurate information.

Financial barriers also deepen these challenges. Inadequate health insurance coverage, lack of understanding about insurance policies, or misinterpretations of insurance entitlements may result in difficulties covering medical expenses. Consequently, students may avoid seeking healthcare, which can lead to worsening health conditions.[17] Additionally, long waiting times, appointment cancellations, and service delays due to overcrowding are further sources of dissatisfaction.[18]

Insufficient psychological support and counselling services also negatively affect international students' overall health experiences. The process of adapting to a new culture, academic pressure, loneliness, and social isolation can increase the likelihood of mental health issues such as anxiety and depression. However, many students do not seek psychological support due to language barriers, fear of cultural stigma, or concerns about privacy.[19,20] Privacy concerns, especially within small communities or among students from the same country, can further limit help-seeking behavior.

In conclusion, to ensure that international students can fully benefit from healthcare services, not only

linguistic and cultural barriers but also structural, financial, and psychological obstacles must be systematically addressed. Expanding cultural sensitivity training in healthcare institutions, increasing the availability of multilingual informational materials, and strengthening psychosocial support services will facilitate students' access to healthcare and enhance their overall satisfaction.

Oral and dental health is not limited solely to an individual's own health status but should also be considered in the context of migration, cultural differences, and socio-demographic variables. International students, coming from diverse cultural and social backgrounds, may exhibit variations in their attitudes and behaviors toward oral health. Therefore, examining the level of awareness of international students regarding oral and dental health is important both for understanding their health needs and for developing more inclusive health policies. The literature includes studies investigating the oral health habits of different demographic groups such as students, adolescents, children, and pregnant women, emphasizing that dental caries remains a prevalent problem among these groups.[21-24] Moreover, demonstrated that the level of knowledge regarding oral and dental health shows statistically significant differences according to socio-demographic variables such as age, gender, and education. In this context, examining the relationship between international students' socio-demographic characteristics and their oral health attitudes can be considered an important area of research that would contribute to the literature.[25]

Oral and dental health is a phenomenon that directly affects individuals' overall well-being and plays a decisive role in fundamental functions such as speaking, smiling, and participating in social life. Therefore, examining international students' attitudes and knowledge levels regarding oral and dental health will contribute both to improving their individual health and to shaping strategies for public health. In addition, identifying differences according to socio-demographic variables will allow the development of targeted interventions within the university and in general health policies. This study aims to determine international students' knowledge levels, attitudes, and behaviors related to the use of health services concerning oral and dental health. At the same time, it seeks to reveal the relationships between students' socio-demographic characteristics and their oral health attitudes. The findings obtained are expected to contribute to understanding the health habits of international students and to the development of more inclusive health policies.

Materials and Methods

The aim of this study is to assess the socio-demographic characteristics of international students studying at a state university, as well as their knowledge levels and attitudes regarding oral and dental health. The research was conducted between May 15 and November 15, 2024, among international students enrolled at Sivas Cumhuriyet University Prior to the commencement of the research, ethical approval was obtained from the Ethics Committee for Scientific Research Proposals of the Sivas Cumhuriyet, with decision number 6 dated 22.05.2024 and document number 2024/12. Before the study, participants were provided with both written and verbal information regarding the purpose, duration, and scope of the research, and informed consent was obtained on a voluntary basis. Students were assured that the data collected would be used solely for research purposes.

Population and Sample

The population of the study consists of international students (N = 600) enrolled at the central campus of Sivas Cumhuriyet University as of 2024. From this population, a sample of 227 students who agreed to participate in the research was formed. A convenience sampling method based on voluntariness was used in the selection of the sample.

Data Collection Process and Analysis

The research data were collected through face-to-face interviews. The obtained data were analyzed using the SPSS (Statistical Package for the Social Sciences) version 23.0 software package. Descriptive statistics were summarized with frequency, percentage, mean, standard deviation, and median range. The Kolmogorov-Smirnov test was applied to assess whether the distribution of the data was normal.

Data Collection Tools

Introductory Information Form: This form, prepared by the researchers, was designed to determine the socio-demographic characteristics of the students and their habits related to oral and dental health. The form includes questions on age, gender, educational status, frequency of tooth brushing, frequency of toothbrush replacement, number of dental visits within the last year, use of dental floss, and whether they have received oral care education.

Oral Health Attitude Scale (OHAS): In this study, the Oral Health Attitude Scale was used.[26] The scale consists of 43 items and 6 sub-dimensions. The sub- dimensions are grouped under the headings of sensitivity, importance, avoidance of harmful factors, tendency toward products and activities, awareness, and social influence.26 The Cronbach's Alpha values for the sub- dimensions were calculated as $\alpha = 0.89$ for factor 1, $\alpha = 0.85$ for factor 2, $\alpha = 0.84$ for factor 3, $\alpha = 0.83$ for factor 4, $\alpha = 0.80$ for factor 5, and $\alpha = 0.77$ for factor 6. The overall internal consistency coefficient of the scale was determined as 0.91. This result indicates that the scale has a high level of reliability.

As shown in Table 1, since the Cronbach α coefficient value for each dimension in the scale and for the entire scale is greater than 0.7, it can be stated that the scale has "high reliability".[27]

Table 1. Cronbach's alpha coefficient values of the scale and factors

Reliability statistics Dimensions	Cronbach's alpha coefficient value
Sensitivity	(0.826)
Significance	(0.829)
Tendency towards products and activities	(0.836)
Awareness	(0.815)
Social impact	(0.869)
General average	(0.797)

According to the Kolmogorov-Smirnov and Shapiro-Wilk test results in Table 2, at a 95% confidence level, the distribution is considered normal when the significance (p) value is above 0.05, and not normal when it is below this value. In the tests conducted, it was determined that the significance (p) value for all dimensions was below 0.05. This indicates that the distribution is not normal. When the analysis results are evaluated together, it is accepted that the distribution in all dimensions is not normal, and therefore non-parametric tests were preferred in the analyses.

Table 2. Normal distribution test results

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Sensitivity	0.130	227	0.000	0.955	227	0.000
Significance	0.141	227	0.000	0.939	227	0.000
Avoiding harmful elements	0.113	227	0.000	0.958	227	0.000
Tendency towards products and activities	0.114	227	0.000	0.972	227	0.000
Awareness	0.094	227	0.000	0.972	227	0.000
Social impact	0.107	227	0.000	0.971	227	0.000
General average	0.117	227	0.000	0.966	227	0.000

Results

As presented in Table 3, 62.6% of participants were male and 37.4% were female. Regarding age distribution, 52% were between 17–20 years old, 33.5% were between 21–24 years old, and 14.5% were 25 years and older. In terms of education level, 55.1% were undergraduate students, 27.8% were associate degree students, and 17.2% were postgraduate students. With respect to family income, 26.4% reported a monthly income of 26,000 TL or below, 26.4% between 26,001–45,000 TL, another 26.4% between 45,001–60,000 TL, and 20.7% reported 60,001 TL or above. Regarding family structure, 52.4% had a nuclear family, while 47.6% had an extended family. Concerning dental visits, 40.1% stated that they had not visited a dentist in the last year. In terms of tooth-brushing habits, 70.5% brushed their teeth two or three times daily, while 7.5% reported brushing once a week. Most participants (70.9%) changed their toothbrush every three months, 26.9% every six months, and 2.2% every twelve months. When asked to rate their oral health status, 27.3% rated it as 6 points. Furthermore, 66.1% did not use dental floss, whereas 33.9% did. Finally, 70.5% had not received any oral care education, while 29.5% reported having received such education (Table 3).

According to the results presented in Table 4, the Mann–Whitney U Test revealed no statistically significant differences in the subscales of the Oral and Dental Health Attitude Scale—namely avoidance of harmful elements, tendency towards products and activities, awareness, and social impact—according to gender. However, statistically significant differences were found in the overall scale scores and in the *Sensitivity* and *Importance* subscales ($p < 0.05$), indicating that women were both more sensitive and placed greater importance on oral and dental health compared to men (Table 4).

Additionally, no statistically significant difference was found in participants' overall mean scores or sub-dimensions of the scale according to family structure ($p > 0.05$).

According to Table 5, the results of the Mann-Whitney U Test regarding dental floss usage showed a significant difference in the overall mean score of the Oral Dental Health Attitude Scale, as well as in the sub-dimensions of sensitivity, importance, tendency toward products and activities, and awareness. The scores of those who use dental floss were higher. No significant difference was found in the sub-dimensions of avoidance of harmful elements and social impact ($p > 0.05$).

Additionally, no significant difference was observed in the overall and sub-dimension scores of the scale based on whether participants received Oral Care Education ($p > 0.05$).

When examining Table 6, according to the results of the Kruskal-Wallis test conducted to determine the difference in the Oral and Dental Health Attitude Scale based on the age variable, statistically significant differences ($p < 0.05$) were found in Sensitivity, Importance, Tendency towards Products and Activities, Awareness, and Overall Average. According to these results, it is observed that those aged 17-20 have lower averages in Sensitivity, Importance, Tendency towards Products and Activities, Awareness, and Overall Averages

compared to those aged 25 and above. Similarly, those aged 21-24 have lower averages in these dimensions compared to those aged 25 and above.

According to Table 7, the Kruskal-Wallis test results regarding educational status showed significant differences in the sub-dimensions of Tendency Toward Products and Activities and Awareness ($p < 0.05$). Participants with postgraduate education had higher scores, indicating that as the level of education increases, awareness of oral and dental health also increases.

In terms of monthly family income, significant differences were found in the Importance, Awareness, and Social Impact sub-dimensions ($p < 0.05$). Participants with an income of 26,000 TL or below had higher scores in some sub-dimensions, while those earning 60,001 TL or more had higher scores in Awareness and Social Impact. No significant differences were found in the other sub-dimensions ($p > 0.05$).

When examining Table 8, according to the results of the Kruskal-Wallis test conducted to determine the difference in the Oral Dental Health Attitude Scale based on Tooth Brushing Frequency, statistically significant differences ($p < 0.05$) were found in the Sensitivity, Awareness, and Social Impact sub-dimensions. Based on these results, in the Sensitivity sub-dimension, it was concluded that those who brush their teeth 2 or 3 times a day and those who brush more than 3 times have statistically higher average scores. In the Awareness sub-dimension, it is observed that the average scores of participants who brush once a week and those who brush 2 or 3 times a day are higher than the average score of those who brush every day. It can be said that the average social impact dimension of those who brush their teeth once a week is lower compared to those who brush every day and more than three times; and those who brush more than three times have a higher average social impact dimension than others. There is no statistically significant difference between the other dimensions ($p < 0.05$).

Table 3. Demographic characteristics of research participants

Gender	N	Percent
Male	142	62.6
Female	85	37.4
Total	227	100.0
Age	**N**	**Percent**
Between 17-20 years old	118	52.0
Between 21-24 years old	76	33.5
25 and Over	33	14.5
Total	227	100.0
Educational status	**N**	**Percent**
Associate degree	63	27.8
Bachelor's degree	125	55.1
Graduate degree	39	17.2
Total	227	100.0
Your family's monthly income	**N**	**Percent**
26000 and Under	60	26.4
Between 26001 - 45000	60	26.4
Between 45001 - 60000	60	26.4
60001 and Over	47	20.7
Total	227	100.0
Family structure	**N**	**Percent**
Nuclear family	119	52.4
Extended family	108	47.6
Total	227	100.0
Dental visit in the last year	**N**	**Percentage**
0	91	40.1
1.00	61	26.9
2.00	21	9.3
3.00	25	11.0
5.00	10	4.4
6.00	5	2.2
7.00	2	.9
8.00	7	3.1
9.00	1	.4
10.00	4	1.8
Total	227	100.0

Your tooth brushing frequency?	N	Percent
Once a week	17	7.5
Every day	26	11.5
2 or 3 times a day	160	70.5
More than 3	24	10.6
Total	227	100.0
How often do you change your toothbrush?	**N**	**Percent**
Every 3 months	161	70.9
Every 6 months	61	26.9
Every 12 months	5	2.2
Total	227	100.0
Your general oral health status	**N**	**Percent**
0	6	2.6
1.00	5	2.2
3.00	9	4.0
4.00	5	2.2
5.00	19	8.4
6.00	62	27.3
7.00	26	11.5
8.00	53	23.3
9.00	13	5.7
10.00	29	12.8
Total	227	100.0
Floss use	**N**	**Percentage**
Yes	77	33.9
No	150	66.1
Total	227	100.0
Have you received oral care training?	**N**	**Percentage**
Yes	67	29.5
No	160	70.5
Total	227	100.0

Table 4. Mann-Whitney U test results of the Oral Dental Health Attitude Scale according to gender

	Gender	N	Mean rank	Sum of ranks	U	Sig.
Sensitivity	Male	142	106.03	15056.00	4903.0	0.018*
	Female	85	127.32	10822.00		
	Total	227				
Importance	Male	142	107.39	15250.00	5097.0	0.049*
	Female	85	125.04	10628.00		
	Total	227				
Avoiding harmful elements	Male	142	108.60	15421.50	5268.5	0.108
	Female	85	123.02	10456.50		
	Total	227				
Tendency towards products and activities	Male	142	108.64	15426.50	5273.5	0.110
	Female	85	122.96	10451.50		
	Total	227				
Awareness	Male	142	107.89	15320.00	5167.0	0.069
	Female	85	124.21	10558.00		
	Total	227				
Social impact	Male	142	108.05	15343.00	5190.0	0.076
	Female	85	123.94	10535.00		
	Total	227				
Overall average	Male	142	105.74	15014.50	4861.5	0.014*
	Female	85	127.81	10863.50		
	Total	227				

Table 5. Mann-Whitney U test results of the Oral Dental Health Attitude Scale according to dental floss usage

	Floss use	N	Mean rank	Sum of ranks	U	Sig.
Sensitivity	Yes	77	135.45	10430.00	4123.0	0.000*
	No	150	102.99	15448.00		
	Total	227				
Importance	Yes	77	126.05	9706.00	4847.0	0.047*
	No	150	107.81	16172.00		
	Total	227				
Avoiding harmful elements	Yes	77	117.42	9041.50	5511.5	0.573
	No	150	112.24	16836.50		
	Total	227				
Tendency towards products and activities	Yes	77	129.70	9987.00	4566.0	0.009*
	No	150	105.94	15891.00		
	Total	227				
Awareness	Yes	77	135.07	10400.50	4152.5	0.001*
	No	150	103.18	15477.50		
	Total	227				
Social impact	Yes	77	123.94	9543.00	5010.0	0.100
	No	150	108.90	16335.00		
	Total	227				
Overall average	Yes	77	131.33	10112.50	4440.5	0.004*
	No	150	105.10	15765.50		
	Total	227				

When examining Table 9, according to the results of the Kruskal-Wallis test conducted to determine the difference in the Oral and Dental Health Attitude Scale based on the frequency of toothbrush replacement, statistically significant differences ($p < 0.05$) were found in the sub-dimensions of Sensitivity, Importance, Avoidance of Harmful Elements, and Tendency towards Products and Activities. According to these results, it was concluded that in the sub-dimensions of sensitivity, importance, and avoidance of harmful elements, those who change their toothbrush every 3 months have a higher average than those who change their toothbrush every 12 months. Similarly, when we look at the relationship between those who change their toothbrush every 6 months and those who change it every 12 months in the sensitivity and importance sub-dimensions, it was concluded that those who change their toothbrush every 6 months have a higher average than those who change it every 12 months. There is no statistically significant difference between the other dimensions ($p < 0.05$). As a result, we can see that the international students participating in the study change their toothbrushes every 3 months.

Table 6. Kruskal-Wallis test results of the Oral Dental Health Attitude Scale according to the age variable

	Age	N	Row avg.	Chi-square	p value	Difference
Sensitivity	17-20 age range[1]	118	109.36	11.553	0.003*	1-3 2-3
	21-24 age range[2]	76	105.72			
	25 and over[3]	33	149.64			
	Total	227				
Importance	17-20 age range[1]	118	112.91	4.479	0.106	
	21-24 age range[2]	76	106.51			
	25 and over[3]	33	135.15			
	Total	227				
Avoiding harmful elements	17-20 age range[1]	118	114.23	1.078	0.583	
	21-24 age range[2]	76	109.47			
	25 and over[3]	33	123.62			
	Total	227				
Tendency towards products and activities	17-20 age range[1]	118	101.54	15.938	0.000*	1-3 2-3
	21-24 age range[2]	76	116.58			
	25 and over[3]	33	152.61			
	Total	227				
Awareness	17-20 age range[1]	118	105.69	8.938	0.011*	1-3 2-3
	21-24 age range[2]	76	113.80			
	25 and over[3]	33	144.18			
	Total	227				
Social impact	17-20 age range[1]	118	109.56	3.125	0.210	
	21-24 age range[2]	76	113.01			
	25 and over[3]	33	132.17			
	Total	227				
Overall average	17-20 age range[1]	118	108.75	8.186	0.017*	1-3 2-3
	21-24 age range[2]	76	109.04			
	25 and over[3]	33	144.21			
	Total	227				

Table 7. Kruskal-Wallis test results of the Oral Dental Health Attitude Scale according to educational status

	Education level	N	Row avg.	Chi square	p value	Difference
Sensitivity	Associate degree[1]	63	111.46	3.125	0.210	
	Bachelor's degree[2]	125	110.03			
	Postgraduate degree[3]	39	130.83			
	Total	227				
Importance	Associate degree[1]	63	116.56	1.652	0.438	
	Bachelor's degree[2]	125	109.50			
	Postgraduate degree[3]	39	124.28			
	Total	227				
Avoiding harmful elements	Associate degree[1]	63	112.60	1.120	0.571	
	Bachelor's degree[2]	125	111.57			
	Postgraduate degree[3]	39	124.05			
	Total	227				
Tendency towards products and activities	Associate degree[1]	63	109.12	13.646	0.001*	1-3 2-3
	Bachelor's degree[2]	125	105.54			
	Postgraduate degree[3]	39	149.00			
	Total	227				
Awareness	Associate degree[1]	63	114.01	7.081	0.029*	1-3 2-3
	Bachelor's degree[2]	125	106.41			
	Postgraduate degree[3]	39	138.32			
	Total	227				
Social impact	Associate degree[1]	63	118.17	1.596	0.450	
	Bachelor's degree[2]	125	109.23			
	Postgraduate degree[3]	39	122.55			
	Total	227				
Overall average	Associate degree[1]	63	114.05	5.288	0.071	2-3
	Bachelor's degree[2]	125	107.40			
	Postgraduate degree[3]	39	135.08			
	Total	227				

Table 8. Kruskal-Wallis test results of the Oral Dental Health Attitude Scale according to tooth brushing frequency

	Tooth brushing frequency	N	Row avg.	Chi-square	p value	Difference
Sensitivity	Once a week[1]	17	102.00	10.121	0.018*	3-4
	Every day[2]	26	98.52			
	2 or 3 times a day[3]	160	122.47			
	More than 3[4]	24	82.81			
	Total	227				
Significance	Once a week[1]	17	108.38	4.681	0.197	
	Every day[2]	26	93.42			
	2 or 3 times a day[3]	160	119.70			
	More than 3[4]	24	102.29			
	Total	227				
Avoiding harmful elements	Once a week[1]	17	115.53	2.437	0.487	
	Every day[2]	26	102.12			
	2 or 3 times a day[3]	160	113.27			
	More than 3[4]	24	130.65			
	Total	227				
Tendency towards products and activities	Once a week[1]	17	102.00	2.151	0.542	
	Every day[2]	26	100.27			
	2 or 3 times a day[3]	160	117.36			
	More than 3[4]	24	115.00			
	Total	227				
Awareness	Once a week[1]	17	111.97	6.938	0.074	1-2 2-3
	Every day[2]	26	84.52			
	2 or 3 times a day[3]	160	120.04			
	More than 3[4]	24	107.08			
	Total	227				
Social impact	Once a week[1]	17	102.91	11.413	0.010*	1-2 1-4 2-3 3-4
	Every day[2]	26	140.42			
	2 or 3 times a day[3]	160	106.60			
	More than 3[4]	24	142.54			
	Total	227				
General average	Once a week[1]	17	106.24	3.025	0.388	
	Every day[2]	26	96.87			
	2 or 3 times a day[3]	160	118.58			
	More than 3[4]	24	107.52			
	Total	227				

According to Table 10, a strong positive relationship was found between sensitivity and importance (r = 0.741), and a very strong relationship between sensitivity and awareness (r = 0.675) (p < 0.001). Sensitivity showed significant positive correlations with avoidance of harmful elements, tendency toward products and activities, awareness, and the overall average.

The importance sub-dimension was positively correlated with avoidance, tendency, awareness, and social impact. Additionally, strong positive relationships were found between awareness, social impact, and the overall average. Overall, significant and positive correlations were observed among the sub-dimensions of the scale (p < 0.001).

Discussion

This study aimed to examine the differences in attitudes towards oral and dental health among international students. The research results revealed a significant relationship in the overall average, sensitivity, and importance dimensions based on gender, showing that female students had higher attitudes towards oral and dental health compared to male students. Reported that women had higher levels of oral and dental health literacy than men.[36] However, no statistically significant difference was observed in other dimensions. One study found no difference in terms of gender,[23] while another reported that the frequency of dental visits varied by gender, with female students visiting dentists more often than males.[28] In addition, it was reported that there was no significant relationship between age and the use of dental floss or frequency of tooth brushing.[29] Similarly, another study indicated no significant difference between regular mouthwash use and gender,[8] while another found no relationship between age and tooth brushing or dental floss use.[30]

The research has found a statistically significant difference between the overall average of the oral and dental health scale and its sub-dimensions of sensitivity, importance, tendency towards products and activities, and awareness, and the use of dental floss. However, it was determined that the rate of dental floss usage among

students was low. This result shows parallels with previous findings.[31] In a study conducted on pregnant women, it was reported that there was no significant difference in regular tooth brushing and dental floss use among women who received information from health professionals (doctors, nurses, midwives).[29] Another study concluded that there was no significant difference between dental floss use and visiting a dentist.[32]

Table 9. Kruskal-Wallis test results of the Oral Dental Health Attitude Scale according to toothbrush replacement frequency

	Frequency of toothbrush replacement	N	Row avg.	Chi-square	p value	Difference
Sensitivity	Once every 3 months[1]	161	111.93	6.483	0.039*	1-3 2-3
	Once every 6 months[2]	61	124.67			
	Once every 12 months[3]	5	50.40			
	Total	227				
Significance	Once every 3 months[1]	161	115.81	5.797	0.055*	1-3 2-3
	Once every 6 months[2]	61	114.93			
	Once every 12 months[3]	5	44.40			
	Total	227				
Avoiding harmful elements	Once every 3 months[1]	161	113.51	4.234	0.120	1-3
	Once every 6 months[2]	61	110.47			
	Once every 12 months[3]	5	172.90			
	Total	227				
Tendency towards products and activities	Once every 3 months[1]	161	120.94	7.356	0.025*	1-2
	Once every 6 months[2]	61	99.50			
	Once every 12 months[3]	5	67.50			
	Total	227				
Awareness	Once every 3 months[1]	161	116.92	1.671	0.434	
	Once every 6 months[2]	61	105.15			
	Once every 12 months[3]	5	128.10			
	Total	227				
Social impact	Once every 3 months[1]	161	112.46	2.472	0.291	
	Once every 6 months[2]	61	114.37			
	Once every 12 months[3]	5	159.00			
	Total	227				
General average	Once every 3 months[1]	161	114.63	3.212	0.201	
	Once every 6 months[2]	61	116.57			
	Once every 12 months[3]	5	62.30			
	Total	227				

Table 10. Correlation coefficients between the Oral Dental Health Attitude Scale and its sub-dimensions

	1	2	3	4	5	6	7
1. Sensitivity	1	0.741**	0.312**	0.463**	0.675**	0.171**	0.840**
		0.000	0.000	0.000	0.000	0.010	0.000
		227	227	227	227	227	227
2. Significance		1	0.200**	0.345**	0.706**	0.297**	0.787**
			0.003	0.000	0.000	0.000	0.000
			227	227	227	227	227
3. Avoiding harmful elements			1	0.393**	0.257**	0.445**	0.607**
				0.000	0.000	0.000	0.000
				227	227	227	227
4. Tendency towards products and activities				1	0.646**	0.303**	0.693**
					0.000	0.000	0.000
					227	227	227
5. Awareness					1	0.315**	0.824**
						0.000	0.000
						227	227
6. Social impact						1	0.525**
							0.000
							227
7. General average							1

When students were asked if they had received oral care education, it was observed that the vast majority had not received such training. This situation reveals the need for organizing seminars or short-term training sessions in universities. It is believed that educational programs will make a significant contribution to increasing students' awareness of oral and dental health.

When examining the age variable, while no significant relationship was found between age and the dimensions of importance, avoidance of harmful elements, and social influence; it was determined that as age increased, attitudes towards oral and dental health developed positively in terms of the overall scale average, awareness, tendency towards products and activities, and sensitivity dimensions. These findings are also consistent with the results of some studies.[8,25]

When examining the relationship between education level and oral and dental health, it has been determined that as the level of education increases, students place more importance on their oral and dental health. One study found no significant relationship between mouthwash use and grade level.[8] Another revealed a statistically positive and moderate correlation between education level and knowledge level.[25]

When examining the relationship between tooth brushing and the overall average of the scale and its sub-dimensions, a significant correlation was observed between the sensitivity, awareness, and social impact sub-dimensions and the frequency of tooth brushing. No significant difference was found in other dimensions. It was reported that more than half of the students brushed their teeth with sufficient frequency.[31] Another study stated that the frequency of tooth brushing affected dental visit behavior.[26] It was also determined that there was a significant relationship between referral to a dentist during pregnancy and regular tooth brushing.[29]

Similarly, significant differences were found between tooth brushing frequency and oral and dental health sub-dimensions. It was emphasized that brushing frequency and dental visit behavior affected the incidence of dental caries.[33] Another study revealed that individuals largely brushed their teeth regularly.[32]

Studies conducted in Croatia have examined the oral health habits of different demographic groups (adolescents, pregnant women, students, children) and have shown that dental caries remains a significant public health problem.[21-24] It was emphasized that geographical location, socioeconomic status, and access to healthcare services are determining factors in accessing oral and dental health services.[34] Another study reported that asylum seekers face serious barriers in accessing health services and have low utilization of oral and dental health services.[35]

The research findings indicate that there are generally positive and significant relationships among the variables. This suggests that the examined dimensions support each other, and an increase in one dimension leads to a similar change in the others. Therefore, it can be stated that as individuals' sensitivity levels increase, their sense of importance, awareness, and overall attitudes also tend to rise.

Conclusions

This study revealed that international students' knowledge and attitudes towards oral and dental health were not at a sufficient level. The findings showed that the majority of students had only the habit of tooth brushing, while the use of complementary oral care products such as dental floss was considerably lower. In addition, it was determined that as age and education level increased, positive attitudes towards oral and dental health improved. These results demonstrate that educational and awareness programs to be implemented within the university environment play a critical role in improving students' knowledge and behaviors related to oral and dental health. For future research, it is recommended to conduct comparative studies across different cultural and socioeconomic groups, to monitor students' oral and dental health attitudes longitudinally, and to test the effectiveness of educational programs through experimental methods. Furthermore, gaining an in-depth understanding of the barriers and motivations experienced by students through qualitative studies, as well as evaluating the adequacy and accessibility of university health services, will provide significant contributions both to the scientific literature and to the development of health policies.

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Conflicts of Interest Statement

The authors declare no conflict of interest.

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