



Evaluation of Oral Health Awareness and Dental Fear Levels of Dentistry Students

Diş Hekimliği Öğrencilerinin Ağız Sağlığı Bilinci ve Dental Korku Seviyelerinin Değerlendirilmesi

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ABSTRACT

Objective: The objective of this study was to compare the oral health awareness and fear levels of students enrolled in the Faculty of Dentistry at Gaziantep University, based on their education and training program.

Methods: The current study involved 381 participants, comprising 247 females and 134 males, from the Faculty of Dentistry at Gaziantep University. The Hiroshima University Dental Behavior Inventory and Dental Fear Scale, consisting of 20 questions each, were administered to the students, and their responses were recorded. The data were analyzed using Kruskal-Wallis and all pairwise tests, and statistical significance was determined at a level of $P < .05$.

Results: A significant difference was found between first-fourth, second-fourth, and second-third grades when compared in terms of the 17th question on the Dental Fear Scale ($P < .05$). According to Hiroshima University Dental Behavior Inventory, there was a significant difference between the general Hiroshima University Dental Behavior Inventory scores between the fifth grade and all other grades ($P < .05$).

Conclusion: The students who participated in the study displayed high oral health attitude and behavior scores. Furthermore, the educational process played a positive role in the development of clinical students, as they demonstrated improved dental fear and individual oral health attitudes and behaviors compared to their preclinical counterparts.

Keywords: Dental fear scale, dental student, hiroshima university dental behavior inventory

ÖZ

Amaç: Bu çalışmada Gaziantep Üniversitesi Diş Hekimliği Fakültesi öğrencilerinin ağız sağlığı bilincinin ve korku seviyelerinin eğitim-öğretim programına göre karşılaştırmalı değerlendirilmesi amaçlanmıştır.

Yöntemler: Çalışmaya Gaziantep Üniversitesi Diş Hekimliği Fakültesi'nden 247'si kız 134'ü erkek olmak üzere 381 öğrenci dâhil edilmiştir. Öğrencilerin 20 sorudan oluşan Hiroşima Üniversitesi Dental Davranış Envanteri (HU-DBI) ile Dental Korku Skalası (DKS) anketini cevaplandırmaları istendi ve veriler kaydedildi. İstatistiksel analiz için Kruskal Wallis ve All pairwise testleri kullanıldı. Anlamlılık $P < .05$ düzeyinde değerlendirilmiştir.

Bulgular: Dental Korku Skalası 17. soru açısından karşılaştırıldığında 1. ile 4., 2. ile 4. ve 2. ile 3. sınıflar arası anlamlı fark bulunmuştur ($p < 0.05$), Hiroşima Üniversite Dental Davranış Envanteri'ne göre ise 5. sınıf ile diğer tüm sınıflar arası genel Hiroşima Üniversitesi Dental Davranış Envanteri skorları arasında anlamlı fark tespit edilmiştir ($P < .05$).

Sonuç: Araştırmaya katılan öğrencilerin ağız sağlığı tutum ve davranışları Hiroşima Üniversitesi Dental Davranış Envanteri skorları bazında genel olarak yüksek bulundu. Öğrencilerin eğitim aldıkları süreç göz önünde bulundurulduğunda klinik öğrencileri prelinik öğrencilerinden hem dental korku hem de bireysel ağız sağlığı tutum ve davranışları açısından olumlu yönde gelişmektedir.

Anahtar Kelimeler: Dental korku skalası, diş hekimliği öğrencileri, hiroşima üniversitesi dental davranış envanteri

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INTRODUCTION

Dental caries, which harbors various microorganisms, is one of the most common infectious diseases affecting people worldwide.¹ The prevention of diseases related to oral health, which is of utmost importance for overall health, will become feasible through the implementation of preventive measures. The primary responsibility for this lies with dentists and dental students, who are charged with raising awareness about the importance of oral health. Recent studies have indicated that the level of knowledge among dental students regarding oral health has improved significantly.²

It has been observed that thoughts and behaviors related to oral health vary in different countries, different cultures, and even among students in different classes studying in the same faculty.³⁻⁵ The Hiroshima University Dental Behavioral Inventory (HU-DBI) was developed by Dr. Makoto Kawamura in 1988 as a tool for assessing individuals' oral and dental health and self-care habits due to challenges in conducting comparisons across international populations.⁶ The HU-DBI is a questionnaire utilized to assess the oral health knowledge, attitudes, and behaviors of dental students and professionals. The HU-DBI comprises 20 items that encompass various aspects of oral health, such as tooth brushing frequency, dental visits, diet, smoking, and self-perception. The questionnaire employs a binary response format (agree/disagree) and boasts a total score ranging from 0 to 19, with higher scores indicating more favorable oral health attitudes and behaviors.^{7,8} The HU-DBI is an effective and reliable tool for assessing the oral health status and needs of dental students and professionals. It can also be used to evaluate the impact of oral health education programs and identify areas for improvement.⁹ The HU-DBI serves as a valuable tool for dental educators and researchers to comprehend the factors that impact the oral health behaviors of their students and peers and to devise effective strategies to enhance oral health awareness and practice.

Dental fear is a state of anxiety that develops due to frequently experienced emotional factors. Although dental treatments are more comfortable with advancing technologies, the fear felt by patients continues.¹⁰ The Dental Fear Scale (DFS), developed by Kleinknecht,¹¹ utilizes a series of questions to assess an individual's response to dental treatment. Questions 1 and 2 evaluate the patient's reaction to dental care, while questions 3 through 7 assess the systemic symptoms experienced during dental interventions. From question 8 onward, the scale determines the level of fear of dentists based on the patient's response to various dental applications. The validity–reliability test of this scale in our language was conducted by Inanc et al.¹²

Upon review of the existing literature, the relationship between oral health awareness and dental anxiety or anxiety–fear scales in dental students was generally examined, but no publication was found that evaluated the relationship between oral health awareness and dental fear. The aim of this study was to evaluate the oral health attitudes and behaviors and dental fear levels of dental students according to the differences in the years of education program using the HU-DBI and DFS.

The null hypotheses were as follows;

- i. There are no differences among all students in grades in terms of HU-DBI.
- ii. There are no differences among all students in grades in terms of DFS.

MATERIAL AND METHODS

A total of 381 volunteers, 247 female and 134 male, from the first, second, third, fourth, and fifth grade students of the Faculty of Dentistry of Gaziantep University who are continuing their education and training in 2022-2023, were included in the study. Gaziantep University Clinical Research Ethics Committee applied for this study, and ethics committee approval was obtained with decision number 2023/55. The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist was used to report on the methodological quality of observational studies. The questionnaires were administered to the students on a voluntary basis at the end of the class period in order not to interfere with their class schedules. Prior to their involvement in the study, informed consent forms were obtained from the participants, and no personal identifying information was collected from the survey respondents. The inclusion criteria were that the students answered all questions completely and indicated the year of the program they were studying. Students who did not want to participate in the study are excluded.

Sample Analysis

Using Raosoft software (Raosoft Inc., Seattle, Wash, USA), the sample size was determined as 380 with a 5% margin of error at a 95% CI and a population size of 35 000. The current study was conducted with 381 volunteers.

Hiroshima Dental Behavior Inventory

It is a questionnaire consisting of 20 questions, to which answers are given as agree/disagree. In this study, the translated version of the 20 HU-DBI questions from English to Turkish was used.¹³ The validity–reliability test of the questionnaire was found to be 100% by Dogan et al.¹³ In the numerical evaluation of the HU-DBI questionnaire results, the students' scores were calculated by giving 1 point to those who answered agree and 0 point to those who answered disagree to questions 4, 9, 11, 12, 16, 19; 1 point to those who answered disagree and 0 point to those who answered agree to questions 2, 6, 8, 10, 14, 15. The maximum HU-DBI value that can be obtained with this system is 12, and there is a positive correlation between the size of the value obtained and oral health behavior. The questions of this scale are shown in Figure 1.

Dental Fear Scale

In 1973, Kleinknecht et al¹¹ introduced the DFS, a scale used to measure the level of avoidance of visiting the dentist, the impact of fear on the body, and the level of fear of dental practices. This scale, which aims to show the level of avoidance of going to the dentist, the effect of the fear on the body, and the level of fear of dentist–dentistry practices, includes 20 questions in total, and the answers to the questions in the scale are evaluated with scores between 1 and 5 (almost never answer “1” point, very little answer “2” point, a little answer “3” point, very much answer “4” point, very much answer “5” point). The maximum score that can be obtained from the scale is 100, while the minimum score is 20. With the calculations made, 80 points and above are considered as individuals with extremely high fear level; 60-80 points as individuals with high fear level, 40-60 points as individuals with moderate fear level, and 40 points and below as individuals with low fear level. The questions of this scale are shown in Figure 2.

Statistical Analysis

Statistical Package for the Social Sciences version 22.0 software (IBM Corp.; Armonk, NY, USA) program was used for statistical analysis of the findings obtained in the study. Kruskal–Wallis test

	Agree	Disagree
I don't worry much about visiting the dentist		
My gums tend to bleed when I brush my teeth		
I worry about the color of my teeth		
I have noticed some white deposits on my teeth		
I use a child sized toothbrush		
I think that I cannot help having false teeth when I am old		
I am bothered by the color of my gums		
I think my teeth are getting worse despite my daily brushing		
I brush each of my teeth carefully		
I have never been professionally taught how to brush		
I think I can clean my teeth well without using toothpaste		
I often check my teeth in a mirror after brushing		
I worry about having bad breath		
It is impossible to prevent gum disease with tooth brushing alone		
I put off going to the dentist until I have a toothache		
I have used a dye to see how clean my teeth are		
I use a toothbrush which has hard bristles		
I don't feel I've brushed well unless I brush with strong strokes		
I feel I sometimes take too much time to brush my teeth		
I have had my dentist tell me that I brush very well		

Figure 1. Hiroshima university dental behavior inventory.

was used for intergroup comparisons. Mann–Whitney *U*-test was used to determine in which group there was a statistical difference. Statistical significance level of .05 was accepted.

RESULTS

Hiroshima University Dental Behavioral Inventory Results

Table 1 displays the mean and standard deviation values of the groups under analysis. A significant discrepancy was observed in the HU-DBI evaluation between the groups ($P < .05$). Furthermore, a statistically significant difference was found between

grade 5 and grades 1, 2, 3, and 4 ($P = .001$). Specifically, the highest value was obtained from fifth-grade students, with a mean score of 6.87 and a standard deviation of 1.47.

Dental Fear Scale Results

Table 2 displays the mean and standard deviation values for each group in terms of DFS. When evaluated in terms of DFS, no statistically significant difference was found between the groups ($P > .05$). The highest value was obtained from second grade students (41.89 ± 2.18); the lowest value was obtained from fourth grade students (39.73 ± 1.81). According to these values, the student

	1	2	3	4	5
1- Has fear of dental work ever caused you to put off making an appointment?					
2- Has fear of dental work ever caused you to cancel or not appear for an appointment?					
3- When having dental work done; my muscle become tense					
4- When having dental work done; my breathing rate increases					
5- When having dental work done; I perspire					
6- When having dental work done; I feel nauseated and sick to my stomach					
7- When having dental work done; my heart beats faster					
8- Making an appointment for dentistry					
9- Approaching the dentist's office					
10- Sitting in the waiting room					
11- Being seated in the dental chair					
12- The smell of the dentist's office					
13- Seeing the dentist walk in					
14- Seeing the anesthetic needle					
15- Feeling the needle injected					
16- Seeing the drill					
17- Hearing the drill					
18- Feeling the vibrations of the drill					
19- Having your teeth cleaned					
20- All things considered, how fearful are you of having dental work done?					

Figure 2. Dental fear scale.

Table 1. Mean and Standard Deviation Values of the Groups for Hiroshima University Dental Behavioral Inventory (Mean ± SD)

Groups	(Mean ± SD)
Group 1 (grade 1)	5.90 ± 1.68 ^a
Group 2 (grade 2)	5.78 ± 1.65 ^a
Group 3 (grade 3)	5.75 ± 1.83 ^a
Group 4 (grade 4)	6.44 ± 1.61 ^a
Group 5 (grade 5)	6.87 ± 1.47 ^b

Different lowercase letters indicate statistically significant differences ($P < .05$). Significance values have been adjusted using the Kruskal–Wallis.

groups with the least fear belong to the fourth and fifth grades. In this case, fourth and fifth grades were determined as low fear level, while first, second, and third grades were determined to have moderate fear level.

A statistically significant difference was found between the first and fourth ($P = .032$), second and fourth ($P = .006$), and second and third ($P = .029$) grades according to the 17th question in this scale, "I feel fear and tension when I hear the sound of rotating instruments" ($P = .028$).

DISCUSSION

Dental schools exert a direct or indirect impact on the attitudes of students towards oral health. The high level of awareness displayed by dental students towards oral health has a significant impact on their approach to patient education, and they play a crucial role in spreading oral health awareness among the general population.^{2,12} The first null hypothesis was partly rejected, and the second hypothesis was accepted in the present study according to outcomes.

In a 2008 study, the HU-DBI questionnaire was administered to students from 2 different dental schools, and the mean score was 6.59 ± 2.0 .¹³ The HU-DBI score obtained in our study was 6.09 ± 1.70 . These findings indicate that the value obtained in the present study is lower than the mean value reported by Başak et al.¹³ It can be explained by the presence of students receiving distance education due to the coronavirus disease 2019 pandemic and the fact that this education is not as effective as face-to-face education.

It is widely documented in the literature that dental health attitudes and behaviors tend to become more favorable and exhibit improvement with increasing levels of education.¹⁴⁻¹⁷ In our study, the highest HU-DBI scores were obtained in the fourth (6.44) and fifth (6.84) grades. This score is higher than the values obtained from grades 1, 2, and 3. Peker et al¹⁸ examined oral health attitudes and behaviors according to years of education and found that the HU-DBI score of fourth and fifth grade students was significantly higher than that of first, second, and third grade students. Our investigation revealed that the statistically insignificant value for fourth graders was found to be significantly higher for fifth graders. With regards to the aforementioned study by Peker et al,¹⁸ our current research shares similarities in terms of its focus on the clinical education

Table 2. Mean and Standard Deviation Values of the Groups for Dental Fear Scale (Mean ± SD)

Groups	(Mean ± SD)
Group 1 (grade 1)	41.89 ± 2.18 ^a
Group 2 (grade 2)	43.90 ± 2.30 ^a
Group 3 (grade 3)	41.02 ± 1.88 ^a
Group 4 (grade 4)	39.73 ± 1.81 ^a
Group 5 (grade 5)	39.97 ± 1.92 ^a

Different lowercase letters indicate statistically significant differences ($P < .05$). Significance values have been adjusted using the Kruskal–Wallis.

of dentistry students. It is believed that the commencement of clinical education from the 4th grade and exposure to patient interactions for Gaziantep University dentistry students may have contributed to the higher scores attained by clinical students compared to preclinical students.

Camgoz et al¹⁹ reported that half of the volunteers disagreed with question 10 of the HU-DBI questionnaire (I have never been taught professionally how to brush), and similar results were observed in our study. However, in the same study, it was reported that question 15 (I put off going to the dentist until I have toothache) was similar to the answers to question 10.¹⁹ In our study, the majority of the students answered "disagree" in this question, which is not compatible with this aspect. It is worth noting that the study in the literature did not only include students from the faculty of dentistry but also participants from other faculties. This may explain the difference between the 2 studies.

There are many studies in the literature examining the relationship between oral health attitudes and behaviors and dental students in different countries.^{2,3,16,20} When the score obtained in our study (6.09) was compared with HU-DBI surveys conducted in other countries, it was found to be higher than the results in India (6.06)²¹ and China (5.07),²² but lower than those in the UK (7.33),²² Greece (6.86)⁹ and Japan (7.40).⁹ It is encouraging that the values obtained are higher than those of some countries, but it is notable that they are lower than those of European countries, which suggests that there is a need to enhance attitudes, behaviors, and awareness regarding oral health.

The fear of dentistry and the resulting avoidance of dental care are significant issues that affect both dental health and overall health. Despite the ever-increasing technological advances in the dental field, fear of the dentist or dental treatment still persists. A national survey in the United States found that 9% of those who do not go to the dentist cite fear as the main reason for not going.²³ A different study found that the incidence of dental treatment fear was 49.4% and this percentage was much higher than that of animals (39%), height (30.7%), and depth (13.2%). A report was conducted on the fact that many people were found to have much more fear of dental treatment than expected.²⁴

The planned treatment and the procedures performed during the treatment period are believed to have a significant impact on dental anxiety. According to Wong and Lytle,²⁵ root canal treatment and tooth extraction are the dental procedures most feared by patients. In their study, Kleinknecht et al¹¹ stated that the situations in which the fear experienced during dental treatment occurs in response should be specified and emphasized that this situation is important in terms of guiding dentists and taking precautions by the practitioner. In addition, in this study, it was reported that the stimuli that elicited the greatest fear response were anesthetic needle and rotary instrument.¹¹ This explains the significant difference between the groups in the statistical analysis conducted for the question "I feel fear and tension when I hear the sound of the aerotor (rotating device)" in the DFS.

Erten et al²⁶ found that dental fear was higher in people who had never been to a dentist before. The finding that the DFS value of clinical students was lower than that of preclinical students with no clinical experience without a significant difference was also supported by this study. At Gaziantep University's Faculty

of Dentistry, students start attending clinical training from the fourth grade, which explains why their anxiety levels are generally lower than those of preclinical students. In summary, dental students' dental fear levels decreased in relation to the period of dental education.

To the best of our knowledge, there is no study in literature evaluating HU-DBI and DFS values. In our study, there were limitations, including not conducting studies with more than one university and more participants.

The oral health attitude and behavior scores of the students participating in the study were generally high. In terms of dental fear, they were either on the low fear or moderate fear scale, and no high or very high fear values were obtained.

In light of the students' year of education and clinical experience, it was observed that clinical students demonstrated positive development in both dental fear and individual oral health attitudes and behaviors, as compared to their preclinical counterparts.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Gaziantep University Clinical Research Ethics Committee (Date: 12.04.2023, Number: 2023/55).

Informed Consent: Prior to their involvement in the study, informed consent forms were obtained from the participants, and no personal identifying information was collected from the survey respondents.

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