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Socio-Demographic Determinants of Dental Anxiety and Fear Among College Students

Esin Ozlek[1*], Abdullah Yıldırım[2], Alaettin Koc[3], Murat Boysan[4]

[1]*Department of Endodontics, Faculty of Dentistry, The University of Yuzuncu Yil, Van, Turkey*
[2]*Department of Psychiatry, Kahramanmaras Sutcu Imam University School of Medicine, Kahramanmaras, Turkey*
[3]*Department of Oral and Maxillofacial Radiology, The University of Yuzuncu Yil, Van, Turkey*
[4]*Department of Psychology, Faculty of Social Sciences, The University of Yuzuncu Yil, Van, Turkey*

ABSTRACT

The purpose of this study is to investigate the relationships of dental anxiety and fear with socio-demographic and clinical features, as well as physical exercise frequency.

A total of 230 undergraduate students from five different majors including dentistry, medicine, veterinary medicine, physical education vocational high school, and faculty of education participated in the study. The mean age of participants was 23.27 (SS=2.09). A socio-demographic questionnaire, the Modified Dental Anxiety Scale (MDAS) and the Dental Fear Scale (DFS) were used in the study. In order to evaluate the correlates of dental fear and anxiety, two multiple regression analyses were performed where the scores of Dental Fear Scale and Dental Anxiety Scale were dependent variables.

Multiple regression analyses showed that both dental fear and dental anxiety were significantly associated with being of younger age, being female, having a prior history of a psychiatric disorder, and less likely to exercise physically. Considering differences across five majors, medicine and dentistry students were less likely to report dental fear and anxiety relative to other majors.

We concluded that females, individuals with a younger age, individuals with a psychiatric history, an those less likely to exercise physically were at greater risk of dental anxiety and fear.

Key Words: Dental anxiety, Dental fear, Dental phobia, Gender, Physical exercise

Introduction

Anxiety as a pathological condition is certain with intense feelings of fear, accompanied by somatic symptoms associated with over-reactivity of the autonomic nervous system (1-2). Dental anxiety refers to intense physiological responses regarding to any kind of dental treatment. Dental anxiety is a condition that extends from the past to the present and prevents patients from taking advantage of dental treatment (3).

Individuals with dental anxiety have negative beliefs associated with the dentist and tend to exaggerate treatment-related events. For example, a simple, short-term, painless treatment under local anesthesia can be defined as a very stressful and challenging experience by the patient (4-5). Therefore, individuals with high dental anxiety tend to postpone their treatment consistently that intervenes with the early interventions and results in exacerbation of oral health problems.

The most important factor affecting dental anxiety is an experience of traumatic dental treatment during childhood. However, the approach of the family to dental treatment is also considered to be an effective factor in the development of dental anxiety, as well as anxious temperament and social environmental factors (6-7).

People with dental anxiety are not a homogenous group; the frequency is higher among females and individuals with low income (10-11). There are varying opinions about how the level of education and age affect the level of anxiety. Various studies have been conducted to investigate the relationship between education level and anxiety. Some of these studies have found that educational level is better able to cope with anxiety and stressful situations. Yet some studies show that there is no relationship between education and dental anxiety (3-8-9).

In some countries, there are centers for "Oral Psychophysiology" and "Dental Fear Research and Treatment". Individuals with dental anxiety either apply to these centers on their own accord, or patients are referred accordingly between institutions. Patients in these centers are treated with behavior management techniques that allow them to defeat their fears, and sedation

***Corresponding Author:** Esin Ozlek, Department of Endodontics, Faculty of Dentistry, The University of Yuzuncu Yil, Van, Turkey
E-mail: e.ozlek@yyu.edu.tr, Phone: +9(0432) 225 17 44; Fax: +9(0432) 225 17 47
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Table 1. Socio-demographic characteristics

		Mean	SD
Age		23.27	2.09
Age of visiting the dentist for the first time		14.05	5.17
		N	%
Gender	Male	140	60.87
	Female	90	39.13
Marital Status	Never married	222	96.52
	Married	6	2.61
	Widow/widower	1	0.43
	Divorced	1	0.43
Psychiatric history		7	3.04
Mental illness		10	4.35
Medication		15	6.52
The frequency of visiting the dentist	When I have complaints	179	77.83
	occasionally	39	16.96
	regularly	12	5.22
Last visit to the dentist	in 1 year	127	55.22
	Before 1 year	103	44.78
Frequency of brushing teeth	Does not brush teeth	23	10.00
	1-2 times per day	177	76.96
	After each meal	18	7.83
	Rinsing with water	7	3.04
	Gum chewing	5	2.17
Exercise frequency	None	33	14.35
	Sometimes	155	67.39
	Regularly	42	18.26

Table 2. Multiple regression analysis on scores of the Dental Fear Scale

	B	Standard error	β	t	P
Age	-1.454	0.554	-0.193	-2.624	0.009
Age of first visit to the doctor	0.196	0.204	0.064	0.960	0.338
Gender	-6.697	2.221	-0.208	-3.015	0.003
Marital status	-4.554	6.431	-0.047	-0.708	0.480
Psychiatric history	17.739	7.267	0.195	2.441	0.015
Mental illness	-8.042	6.102	-0.105	-1.318	0.189
Use of medications	1.633	4.685	0.025	0.349	0.728
Frequency of visits to the dentist	-0.334	1.957	-0.011	-0.170	0.865
Last visit to the dentist	0.347	2.107	0.011	0.165	0.869
Exercise frequency	-3.609	1.813	-0.130	-1.991	0.048

Explanation. β = Standardized beta coefficient; B = Non-standardized beta coefficient; P values of statistical significance were presented in bold

applications or general anesthesia with an array of pharmacological agents. In our country, the approach to dental anxiety is mostly at the individual level and the dentists try to produce individual solutions (12-13-14).

The negative effects of dental anxiety on oral health and related quality of life have been

investigated since the 20th century. When the literature is examined, most of the studies were conducted to determine the level of anxiety in society. Bradt, in his study, reported that having patients listened to music reduced the level of dental anxiety. Similarly, the effect of regular exercise on dental anxiety has not been evaluated, although it was demonstrated by many studies that it improves mood and positive affect through various physiological and biological mechanisms (15-16). The purpose of this study is to investigate the relationships of dental anxiety and fear with socio-demographic and clinical features, as well as physical exercise frequency.

Materials and Methods

Participants: Two hundred thirty undergraduate students were included in the study from five different faculties which were dentistry, medicine, veterinary medicine, physical education vocational high school, and the faculty of education. The mean age of the participants was 23.27 (SS=2.09). The objective and method of the study and its contribution to science were explained in detail to the students. After the written informed consent forms were signed, the volunteered students were asked to complete a battery set including a socio-demographic questionnaire, the Modified Dental Anxiety Scale (MDAS) and the Dental Fear Scale (DFS).

Instruments

Socio-demographic Questionnaire: Using the socio-demographic (Table 1) questionnaire, participants were asked about their age, age at the first visit to the dentist, gender, marital status, psychiatric history, current mental illness, use of medications, frequency of visits to the dentist and last visit to the dentist.

Modified Dental Anxiety Scale (MDAS): The MDAS was used to evaluate levels of dental anxiety. The MDAS consists of 5 self-report items, each was rated on a five-point scale between 1 (without worry) to 5 (excessively anxious). The instrument yields composite scores, ranging from 5 to 25, with grater scores indicative of dental anxiety (7).

Dental Fear Scale (DFS): The DFS consist of 20 self-report items designed to assess feelings of fear relevant to dental treatment (18). Each item is rated on a five-point Likert-type scale ranging from 1 to 5. The instrument yields a total score between 20 and 100. Turkish version of the instrument was adapted by by Firat et al. (17-20).

Compliance with ethical standards: This study was approved by the Clinical Research Ethics Committee (21.09.2017/07). Also, the protocol of the study was conducted with due diligence in observance of ethical standards of the 2017 Helsinki Declaration, and the "Good Clinical Practices Guide" being taken into consideration.

Statistical Analysis: We began with computing descriptive statistics. Using two multiple regression analyses, we regressed socio-demographic characteristics (age, age of first visit to the doctor, gender, marital status, psychiatric history, mental illness, use of medications, frequency of visits to the dentist, last visit to the dentist and exercise frequency) onto the MDAS and DFS total scores separately. Finally, we compared differences in the MDAS and DFS total across five different faculties using one-way analysis of variance (ANOVA). We conducted the statistical analyses with R program (21). The statistical significance threshold was set at $p < 0.05$.

Results

Socio-demographic characteristics of the sample were presented in Table 2. In order to evaluate the determinants of dental fear and anxiety levels, two multiple regression analyses were performed in which the DFS and MDAS total scores were dependent variables. In the regression analyses age, age of the first visit to a physician, gender, marital status, medical history of psychiatric content, presence of mental illness, use of medications, frequency of visits to the dentist, the last visit to the dentist, and the frequency of physical exercise were taken as independent variables.

In the first multiple regression analysis on the DFS total scores, a statistically significant F value was found for the regression model ($F(10, 214) = 3.444$, $p<0.001$) and the independent variables in the model explained 14% of the unique variance in dental fear. As can be seen in Table 2, those of younger age ($\beta = -0.19$, $t = -2.624$, $p<0.01$), female participants ($\beta = -0.21$ $t = -3.015$, $p<0.01$), those with a medical history of psychiatric content ($\beta = 0.20$ $t = 2.441$, $p<0.05$), and those who exercise less ($\beta = -0.13$ $t = -1.991$, $p <0.05$) reported significantly higher levels of dental fear.

In the second multiple regression analysis on the DAS total scores, a statistically significant F value was found for the regression model ($F(10, 214)= 5.013$, $p<0.001$) and the independent variables in the model explained 19% of the unique variance

Table 3. Multiple regression analysis on scores of the Dental Anxiety Scale

	B	Standard error	β	t	P
Age	-0.410	0.154	-0.190	-2.653	0.009
Age of first visit to the doctor	0.071	0.057	0.081	1.249	0.213
Gender	-2.281	0.619	-0.246	-3.685	<0.001
Marital status	-0.812	1.792	-0.029	-0.453	0.651
Psychiatric history	5.582	2.025	0.214	2.756	0.006
Mental illness	-0.784	1.701	-0.036	-0.461	0.645
Use of medications	-0.948	1.306	-0.051	-0.726	0.468
Frequency of visits to the dentist	-0.426	0.545	-0.051	-0.782	0.435
Last visit to the dentist	0.096	0.587	0.011	0.163	0.870
Exercise frequency	-1.315	0.505	-0.165	-2.603	0.010

Table 4. Analysis of variance of scale scores across five faculties

				Dental Anxiety Scale	Dental Fear Scale
Faculty	School of medicine	Mean±SD	n =45	4.69±3.65	13.42±14.77
	Faculty of dentistry	Mean±SD	n =42	4.79±3.38	13.24±11.86
	Faculty of education	Mean±SD	n =48	8.60±4.93	28.42±17.12
	School of Physical Education and Sports	Mean±SD	n =59	7.10±4.64	22.98±14.20
	Faculty of veterinary medicine	Mean±SD	n =36	5.97±4.64	18.14±16.11
		F (4, 225)		6.817	8.899
		P		<0.001	<0.001
		η2		0.108	0.137

Note. Post hoc analysis conducted using Bonferroni multiple comparison test

of dental anxiety variable. As can be seen in Table 3, similar with dental fear, participants of younger age (β =-0.19, t =-2.653, p<0.01), females (β =-0.25 t =-3.685, p<0.01), those with psychiatric problems in the past (β = 0.21 t = 2.756, p<0.01), and those of subjects with limited physical exercise (β =-0.17 t =-2.603, p<0.05) reported statistically significantly higher levels of dental anxiety.

Differences in the mean total scores on the DFS and MDAS across undergraduates enrolled in five faculties were evaluated using one-way analysis of variance (ANOVA). ANOVA results (Table 4) showed that undergraduates from five different majors statistically signifcantly differed in dental anxiety (F(4, 225)= 6.817; p<0.001) and dental fear (F(4, 225)=8.889; p<0.001) Using Bonferroni multiple comparison test, it was found that college students enrolled in the faculties of medicine and dentistry had lower scores on dental anxiety than those students from the faculty of education (p<0.01); whereas, the difference between veterinary medicine and physical education vocational high school students was not statistically significant. Turning on the DFS total scores, medicine and dentistry students had lower scores than those students participated from the faculty of education and of physical education vocational high school (p<0.05). It was observed that veterinary students reported lower dental fear compared to the students of the faculty of education (p<0.05).

Discussion

In this study, relationships of socio-demographic characteristics and physical exercise with dental anxiety and fear level were investigated. The results showed that age, gender, having a prior psychiatric problem and less regular physical exercise were significant correlates of dental-related fear and anxiety.

To date, an inverse association between age and dental anxiety has been observed (4,12,19).

However, the findings are not equivocal (22) Liddell et al. reported in their study that young individuals showed higher levels of dental anxiety (23), while Doganer et al. reported in their study that there was no relationship between age and the level of dental anxiety (24). Discrepancies relevant to relations to age may be a function of social and cultural environments. In this study, it was determined that those of younger age had a higher level of dental anxiety. We surmise that the decrease in the level of dental anxiety with increasing age could be attributed to increased levels of education. In the literature review, it was determined that the level of dental anxiety was negatively correlated with the educational level (7,19) which supports the results of this study. Stabholz and Peretz reported that coping skills with stressful situations evolved more easily in individuals with a high level of education (25). However, there are also studies where no relationship was identified between the level of education and dental anxiety (26).

When the difference between genders was inspected, the level of dental anxiety in women was found to be higher than that of male respondents. Consistent with the previous studies addressing the significant relations between gender and dental anxiety (27-28), females reported greater levels of dental anxiety than those of male participants in the current study. This was also in consonant with the notion that females might be more vulnerable to difficulties in affective regulation such as stress, depression, fear, social phobia, and panic attacks (10). The difference between genders may be arising due to the structural and functional differences of the male and female brain. It was reported in studies that estrogen had anxiolytic effects (27). While the higher level of dental anxiety in women may be explained by biological structure, it can also be due to females expressing their feelings more openly and voluntarily whereas men act under the prejudice that they should be more durable and fearless (29).

It was detected in the current study that those with a prior history of psychiatric disorder were at greater risk of developing both dental fear and dental anxiety. There are few studies examining the relationship between dental anxiety and psychiatric disorders. Locker et al. reported in their study that incidence of psychiatric disorders were far exceed among individuals high in dental anxiety In addition, it was identified that prevalence rates of psychiatric disorders such as specific phobia, alcohol addiction, social phobia, conduct disorder and agoraphobia were higher among people with high levels of dental anxiety than those individuals without dentist-related anxiety (30). The results of our study were in accordance with data in the literature.

The U.S. National Mental Health Association recognizes physical exercise as a valid treatment for anxiety and depression and recommends it as an alternative to standard medical treatment. There are many studies indicating that physical exercise can be as effective as pharmacological treatment and can reduce symptoms of anxiety (31-33). Only 18% of the participants in our study reported that they took regular exercise, while majority of the sample did not take regular exercise and had significantly high levels of dental anxiety. There is one single study in the literature which investigated the clinical and neurobiological effects of physical exercise on dental anxiety. Lidenberger et al. reported in their study that taking physical exercise prior to dental treatment significantly reduces dental fear. The results of these studies are in concordance with our study (34).

Unfortunately, in our country, studies of large-scale regarding levels of physical activity are insufficient. Our country was included in a worldwide research related with child and adolescent health, held by the World Health Organization. In the 2009-2010 report of this study they stated that 19% of the girls and 27% of the boys at 11 years of age, 12% of the girls and 23% of the boys at 13 years of age, 9% of the girls and 18% of the boys at 15 years of age had at least 1 hour of medium and heavy levels of physical activity every day (34). 1871 high school students of adolescent age group from various ethnic groups participated in another study in the U.S., at the end of which it was reported that female students had less physical activity than male students (35). Many studies were conducted at the end of which it was reported that the physical activity level of male students was significantly higher than that of female students (36-37). We think that the difference in dental anxiety level between genders and women having higher dental anxiety levels may be due to a lack of physical activity. In this study, it was found that students from different faculties presented with statistically significant differences in their levels of dental anxiety and dental fear. The number of studies addressing dental anxiety and fears among community samples is limited. Al-Omari et al. compared dental anxiety levels of college students from different faculties and reported that medical

and engineering faculty students had higher levels of dental anxiety than dentistry students, which is in concordance with our study (10). This demonstrated that having knowledge and experience through dentistry education had positive effects on dental anxiety and fear levels. On the other hand, in another study conducted in Turkey, the dental anxiety level of dentistry students was compared to that of students from all other faculties except dentistry, but no statistically significant difference was detected (3). We surmise that the difference between this study and ours stemmed from the other included faculties not being predisposed to health sciences, and from the number of female participants being higher.

We observed that those individuals with younger of age, those with a history of psychiatric disorder, females and those less likely to physically exercise were at greater risk of experiencing dental anxiety and fear. Dentistry and medical school students were more desensitized to dental fears and anxiety.

The increase in the prevalence of oral and dental problems with each passing day, both in the world and in Turkey, lends higher importance to this study. Oral and dental problems affect individuals not only physically, but also in economic, social and psychological terms. This significantly reduces the quality of life of individuals and affects many aspects of quality of life, such as physical and mental functioning, external appearance and interpersonal relationships. In light of the results of this study: We believe that giving training for oral and dental health and encouraging regular exercise can reduce or even prevent dental anxiety symptoms. This will lead to an increase in the quality of life by positively affecting both the oral and dental health of the individuals and their general health. Regarding this topic, comprehensive studies to be conducted with an increased number of participants would be even more illuminating, where exercise types and durations would be examined in detail.

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