

Evaluating the Relationship of Dental Fear with Dental Health Status and Awareness

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ABSTRACT

Introduction: Dental fear is one of the most common problems in dentistry, for both the patient and for the dentist. This issue can have an important effect on an individual's dental health.

Aim: The aim of this paper was to report on the prevalence of dental anxiety and to explore if high levels of anxiety are associated with sociodemographic factors, oral health status, and level of oral health awareness.

Materials and Methods: The sample for this cross-sectional study included 294 patients (154 males and 140 females). All participants filled out a Dental Fear Survey (DFS) to evaluate their level of dental fear. Gender, age, education level, socioeconomic status and oral health awareness were also noted. Oral health behaviors and oral health awareness levels were investigated using seven questions. Also, the periodontal status of all participants was evaluated using the Community Periodontal Index of Treatment Needs (CPITN). Differences between different subgroups were tested using the chi-square test.

Results: There was a statistically significant difference between the DFS groups with regard to sociodemographic data. Women had significantly higher scores than men, and young patients had significantly higher scores than others. Patients with low education levels and low socioeconomic status had high DFS scores. Periodontal status was better in groups that had scores in the low and moderate ranges compared to groups that had high scores on the DFS.

There was a statistically significant difference between the groups of DFS and CPITN ($p < 0.05$). Patients with low and moderate levels of DFS answered the oral health knowledge questions correctly. There was a statistically significant difference between the DFS groups based on correct answers to the oral health knowledge questions ($p < 0.05$).

Conclusion: The elimination of dental fear is very important and should be treated according to a patient-centered assessment. These individuals were informed about the dental treatment procedure so their prejudices were eliminated. Patients with a high level of dental fear may be given psychiatric support for comfortable treatment procedure.

Keywords: Dental fear survey, Periodontal disease, Periodontal status, Oral health behaviors

INTRODUCTION

Despite advances in dental equipment and pain control associated with dental treatment procedures and an increased awareness of the importance of building trustful relationships by dentists, dental fear still remains a serious problem for dentists and their patients [1]. Dental fear and dental anxiety are different psychological states for patients. Dental anxiety is a reaction to feeling danger or apprehension in dental situations; on the other hand, fear is generally regarded as a physiological, behavioral and emotional response to a feared stimulus. Fear and anxiety are extremely concerned and are frequently used interchangeably in the studies [2].

Dental fear is a complex phenomenon affected by several variables [3]. Dental anxiety and fear have been shown to vary according to age, gender, education level and socioeconomic factors [4-6].

Previous studies have reported that dental fear is more common among women than men [4,7]. In general, dental fear has been reported to be more widespread among younger adults [8,9]. Dental fear has been found to be more common among individuals with lower educational levels. This issue is more common in individuals who are single than in individuals in relationships [5,10].

Dental fear is commonly encountered in patients receiving dental treatment and also is a syndrome causing major problems for both dentists and patients. In dental practice, fear could be the main reason for missed or cancelled dental appointments [11,12]. This can have harmful effects on the dental health of individuals with dental anxiety [12].

Dental anxiety has been related to poor dental health status, as measured clinically and by self-assessment [11]. Moreover, the periodontal status of individuals with dental fear was found to be poor [12].

AIM

The purpose of this study was to determine the dental fear level related to age, gender, education level, socioeconomic factors, periodontal health status, knowledge levels of dental oral health of patients attending Diyarbakir Mouth and Dental Health Center in Diyarbakir, Turkey.

MATERIALS AND METHODS

Study population: This cross-sectional study was conducted in the Department of Periodontology of Diyarbakir Mouth and Dental Health Center, in Diyarbakir, Turkey. The study sample, which consisted of 294 patients (154 males and 140 females), was randomly drawn from the periodontology clinic between 2013 and 2014. A comprehensive definition of the sampling size had been previously published [13,14].

Inclusion criteria for the subjects in this study were participants, who were older than 18 years, had no cognitive impairments or eye diseases and were able to complete the questionnaire independently. Participants with a history of mental illness, illiteracy, non-cooperation and had taken anxiolytic, sedative, or analgesic agents within three days before the survey were excluded.

All participants volunteered to participate and all patients received information about the study verbally and in the written form. At first, all participants were informed about this research, then the participants who agreed to participate in the study filled in the questionnaires. Ethics committee approval for this study was received from Firat University Ethics Committee (21.04.2015-08-10).

Study design: The Dental Fear Survey (DFS) was carried out to assess dental fear level amongst the patients and the patients were divided into four groups, including no fear, moderate fear, high fear and extreme fear. This study was also designed to determine knowledge levels about dental health. Patients were asked oral health awareness questions and were categorized into four groups based on age (18–29, 30–39, 40–49, and 50–59 years). Education levels were divided into four groups (primary school, secondary school, high school, university). Socioeconomic status was assessed by asking participants for their total monthly household income and was categorized into four groups (very low level: 950 Turkish Liras [TL], low level: 950-1500 TL, mid level: 1500-200 TL, high level: >2000 TL).

Measures: Dental fear levels were evaluated using the DFS [Table/Fig-1] [15]. The DFS consists of 20 items grouped into three dimensions: avoidance, physiological reactions, and specific dental stimuli, according to which a patient's dental anxiety is assessed on a Likert scale [15]. Subjects were asked to answer the questions with scores varying from 1 to 5 (1: no fear, 2: low fear, 3: afraid, 4: very afraid, 5: terrified). Subjects who gave a score of 3 or more to a stimulus were said to be afraid of it [6,16]. Scores ranged from 0-40 (low fear), 40-60 (moderate fear), 60-80 (high fear), and >80 (extreme fear). The DFS used in this study was the Turkish translation of the scale used by Kvale et al., [16]. Also participants were asked questions to evaluate oral health awareness level.

Oral health indices: Clinical examination included evaluation of periodontal status according to the Community Periodontal Index of Treatment Needs (CPITN) [17]. A Community Periodontal Index (CPI) probe and a mouth mirror were used to make the examinations

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 to appear for an appointment?
When having dental work done:	
3.	My muscles become tense
4.	My breathing rate increases
5.	I perspire
6.	I feel nauseated and sick to my stomach
7.	My heart beats faster
Situations:	
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
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?

[Table/Fig-1]: The items of the dental fear survey.

in accordance with World Health Organization criteria and methods [17]. CPITN scores were divided into five groups (0: healthy, 1 and 2: gingivitis, 3 and 4: periodontitis).

STATISTICAL ANALYSIS

The SPSS 21 package program for windows was used for statistical analysis. Initially described by descriptive statistics and the percentage incidence of DFS and CPITN and oral health awareness, assessment of oral care situation for questions was analyzed using chi-square test. Differences between different subgroups were tested using the chi-square test. A result of $p < 0.05$ was accepted as statistically significant.

RESULTS

The sample consisted of 140 females and 154 males. Of these, 97 patients had low (0-40), 124 of patients had moderate (40-60), 57 of patients had high (60-80), and 16 of patients had very high (>80) dental fear. Regarding education level, 25 patients had completed primary school, 72 had completed secondary school, 110 had completed high school, and 87 had attended university. Regarding, the socioeconomic level of the participants: 63 were of very low level socioeconomic level, 60 were of low level, 87 were of mid-level, and 84 were of high level [Table/Fig-2]. There was a statistically significant difference between the groups with respect to levels of dental fear and sociodemographic status ($p < 0.05$).

The percentage of individuals with high dental fear (60-80) varied between 0% to 30.6% in men and 0% to 22.1% in women, which was statistically significant (chi-squared 125.684, d.f. = 3, $p < 0.01$) [Table/Fig-2].

The percentage of individuals with moderate dental fear (40-60) varied from 0.7% in the 50-59 year olds to 21.1% in the 18-29 year olds, and high dental fear varied from 0% in the 50-59 year olds to 15.3% in the 18-29 year olds [Table/Fig-2]. There was a statistically significant difference in the distribution of DFS scores between the age groups (chi-squared 137.303, d.f. = 9, $p < 0.01$).

Socio-Demographic Data	DFS GROUP					Total	p-value*
	0-40 n (%)	40-60 n (%)	60-80 n (%)	80 < n (%)			
Gender							
Female	7(2.4)	65(22.1)	52(17.7)	16(5.4)	140(47.6)	p<0.001	
Male	90(31.6)	59(20.1)	5(1.7)	0(0)	154(53.4)		
Age Group							
18-29	11(3.7)	62(21.1)	45(15.3)	16(5.4)	134(45.5)	p<0.001	
30-39	20(6.8)	39(13.3)	10(3.4)	0(0)	69(23.5)		
40-49	36(12.2)	21(7.1)	2(0.7)	0(0)	59(20)		
50-59	30(10.2)	2(0.7)	0(0)	0(0)	32(10.9)		
Education Level							
Primary School	0(0)	1(0.3)	16(5.4)	8(2.7)	25(8.4)	p<0.001	
Secondary School	5(1.7)	28(9.5)	31(10.5)	8(2.7)	72(24.4)		
High School	35(11.9)	67(22.8)	8(2.7)	0(0)	110(37.4)		
University	57(19.4)	28(9.5)	2(0.7)	0(0)	87(29.6)		
Socioeconomic Level							
Very Low Level	0(0)	10(3.4)	37(12.6)	16(5.4)	63(21.4)	p<0.001	
Low Level	0(0)	43(14.6)	17(5.8)	0(0)	60(20.4)		
Mid- Level	25(8.5)	59(20.1)	3(1)	0(0)	87(29.6)		
High Level	72(24.5)	12(4.1)	0(0)	0(0)	84(28.6)		

[Table/Fig-2]: The distribution of the DFS group of socio-demographic factors. *Chi-square

DFS Group	CPITN Group					p-value*
	0	1	2	3	4	
0-40	7(2.4%)	41(13.9%)	38(12.9%)	11(3.7%)	0(0%)	p<0.001
40-60	0(0%)	13(4.4%)	62(21.1%)	42(14.3%)	7(2.4%)	
60-80	0(0%)	5(1.7%)	8(2.7%)	33(11.2%)	11(3.7%)	
>80	0(0%)	0(0%)	0(0%)	7(2.4%)	9(3.1%)	
Total	7(2.4%)	59(20.1%)	108(36.7)	93(31.6%)	27(9.2%)	

[Table/Fig-3]: The distribution of the DFS group of periodontal health status and treatment needs.
*Chi-square

Patients with low levels of education and low socioeconomic status had high (60-80) DFS scores. There was a statistically significant difference in the distribution of DFS scores between the education level and socioeconomic status groups. The results showed that education level and socioeconomic status had a significant effect on dental fear (chi-squared 186.302, d.f.= 9, $p < 0.01$ chi-squared 302.711, d.f.= 9, $p < 0.01$ respectively) [Table/Fig-2].

The prevalence of periodontal diseases was significantly different between DFS groups (low fear, moderate fear, high fear, extreme fear) (chi-square 152.056, d.f. = 12, $p < 0.000$). The distribution of DFS scores varied between 0% in the CPITN Group 0 to 21.1% in the CPITN Group 2. There was a statistically significant difference between the DFS and CPITN groups [Table/Fig-3].

Statistically significant results between the DFS groups were found for all of the items (frequency of brushing teeth, the times of change of toothbrush, the importance of toothbrush selection, the importance of brushing time, frequency of dentist visits, the cause of tooth and gingival disease, prevent tooth and gingival disease) on the questionnaire [Table/Fig-4].

DISCUSSION

Despite advances in dental equipment in contemporary dentistry, anxiety associated with dental practice and fear of pain related to dentistry remain common [11]. Marya et al., showed that 73% to 79% of individuals have at least some dental anxiety [18]. Thus, dental fear is a common issue and it affects individuals' oral health.

Previous studies have reported that serious dental anxiety with phobic avoidance of dental treatment procedures has a detrimental effect on dental health [19]. Generally, dental anxiety and fear are related to poor oral health [6]. Individuals who have high levels of dental fear have poorer oral function and a higher frequency of oral diseases. There are longer intervals between dental visits for these persons [10]. Schuller et al., reported that patients who had high fear visit the dentist less often and these individuals have more decayed and more missing teeth [4]. Another study showed the relationship between dental fear and less frequent dental visits [20]. Similar findings have been reported in other researches [1,21].

The clinical effect of dental fear on dental issues such as caries and periodontitis has been reported in previous studies [22]. In the present study, there were significant differences between individual CPITN scores and the groups with high and low dental fear. Individuals with low dental fear scored significantly better objective CPITN scores than those with high dental fear [4]. Similarly, Liu et al., reported that in subjects with periodontal disease, the dental fear score was significantly higher than in subjects without periodontal disease based on the DFS. Dental visits and oral health behaviors were related to dental fear in the DFS [23]. Fear of dental treatment procedures can affect patient compliance and result in deterioration of periodontal status [24].

There was a positive correlation between dental anxiety and oral health status in various studies. Schuller et al., found that people with high fear visit the dentist less often and have more decayed and more missing teeth [1,4]. Milgrom et al., reported that poor oral health is associated with high dental fear [25]. Patients with high

Oral health awareness questions	DFS GROUP					p-value*
	0-40 n (%)	40-60 n (%)	60-80 n (%)	80 < n (%)	Total	
What is your frequency of brushing teeth?						
Don't tooth brushes	0(0%)	2(0.7%)	13(4.4%)	16(5.4%)	31(10.5%)	p<0.001
Once a day	5(1.7%)	46(15.6%)	40(13.6%)	0(0%)	91(30.9%)	
Twice a day	44(15%)	71(24.1%)	1(0.3%)	0(0%)	116(39.4%)	
Three times a day#	48(16.3%)	5(1.7%)	3(1%)	0(0%)	56(19%)	
How often do you change your toothbrush?						
Don't change	1(0.3%)	5(1.7%)	6(2%)	6(2%)	18(6%)	p<0.001
0-3 months#	79(26.9%)	65(22.1%)	4(1.4%)	2(0.7%)	150(51.1%)	
4-6 months	13(4.4%)	43(14.6%)	35(11.9%)	5(1.7%)	96(32.6%)	
7- more months	4(1.4%)	11(3.7%)	12(4.1%)	3(1%)	30(10.2%)	
What is important in toothbrush selection?						
Hardness of clay#	76(25.9%)	86(29.3%)	11(3.7%)	0(0%)	173(58.9%)	p<0.001
Price	5(1.7%)	12(4.1%)	16(5.4%)	3(1%)	36(12.2%)	
Color	1(0.3%)	2(0.7%)	5(1.7%)	4(1.4%)	12(4.1%)	
Mark	15(5.1%)	24(8.2%)	25(19.4%)	9(3.1%)	73(35.8%)	
What is your frequency of going to the dentist?						
Six month intervals#	44(15%)	11(3.8%)	1(0.3%)	0(0%)	56(19.1%)	p<0.001
One year intervals	5(1.7%)	18(6.1%)	10(3.4%)	3(1%)	36(12.2%)	
Longer intervals	4(1.4%)	16(5.5%)	9(3.1%)	0(0%)	29(10%)	
When I need	43(14.7%)	79(27%)	37(12.6%)	13(4.4%)	172(58.7%)	
What is the cause of tooth and gingival disease?						
Dental plaque#	66(22%)	43(14.6%)	8(2.7%)	2(0.7%)	119(40%)	p<0.001
Dental calculus	11(3.7%)	28(9.5%)	8(2.7%)	3(1%)	50(16.9%)	
Dental caries	19(6.5%)	50(17%)	22(7.5%)	19(6.5%)	110(37.5%)	
I don't know	1(0.3%)	3(1%)	19(6.5%)	7(2.4%)	30(10.2%)	
How do we prevent the tooth and gingival disease?						
Regular oral care, dental visit	76(25.9%)	72(24.5%)	14(4.8%)	4(1.4%)	166(56.6%)	p<0.001
Using drugs	0(0%)	10(3.4%)	15(5.1%)	2(0.7%)	27(9.2%)	
Brushing teeth	16(5.4%)	37(12.6%)	22(7.5%)	8(2.7%)	83(28.2%)	
I don't know	5(1.7%)	5(1.7%)	6(2%)	2(0.7%)	18(6.1%)	
time for brushing your teeth?						
Morning	6(2%)	21(7.1%)	11(3.7%)	6(2%)	44(9.4%)	p<0.001
Noon	0(0%)	4(1.4%)	15(5.1%)	5(1.7%)	24(8.2%)	
Before bed time#	85(28.9%)	95(32.5%)	9(3.1%)	2(0.7%)	191(65.2%)	
I don't know	6(2%)	4(1.4%)	22(7.5%)	3(1%)	35(11.9%)	

[Table/Fig-4]: The distribution of the DFS group of oral health awareness questions.
*Chi-square

dental fear have dental problems such as toothache or bleeding gums and report a need for dental care. Similarly, Locker and Liddell reported that individuals with dental anxiety are more likely to perceive a need for dental care, to rate their oral health as poor, and to report problems with chewing [26].

The findings of this research show that females demonstrate higher levels of dental fear than males. Consistent with the results in our paper, Liu et al., reported that the prevalence of dental fear is significantly higher in females [23]. Psychological disorders such as stress, depression, fear, social phobia and panic are more common in women, and dental anxiety maybe associated with such disorders

[27,28]. This conclusion is supported by studies which show that women have higher levels of neuroticism (tendency to experience negative emotional states) than men and that anxiety is positively related to neuroticism [18,29]. Our result is similar to most previous studies that have shown that women tend to be more anxious than men [20,30].

Another generally reported variable associated with dental fear is age. Although findings from some studies showed that the relationship between age and dental fear are conflicting, younger individuals have commonly been shown to be more anxious than older individuals [2]. Many studies have shown dental fear is more prevalent among younger subjects, but other studies have indicated that younger individuals (15-25 year olds) have less dental fear than older individuals [10]. There was a significant reverse association of age and fear: fear decreases with advancing age. In the present study, we found that DFS values were higher among younger individuals. This result may be relevant, as younger people are more affected by environmental factors such as bad experiences of other people. Thus, younger adults have prejudices about dental procedures. A general clinical impression is that the older patients were more tolerant to pain. Also, the high anxiety level in young patients could be due to insufficient experience of dental treatment equipment, such as the needle, hand piece, or any other fear-invoking equipment [23].

Differences in education level affected the level of dental fear between the groups. Many studies have reported that people with lower socioeconomic status and with less education have more anxiety; however, other studies have reported more dental anxiety in those with higher education levels [6,31]. Hallstrom et al., reported that the prevalence of dental phobia was higher among persons with lower education [32,33]. The findings of this study show that there was an association between dental anxiety and different levels of education. In the present study, patients with only primary school education had the highest anxiety scores and were therefore more anxious about dental treatment compared with those with secondary school, high school, university, and postgraduate education. Some previous studies have indicated that education level is a factor affecting the dental anxiety level of patients [34,35]. Possible reasons might be that subjects with a higher level of education are more aware of dental treatment procedures and the importance of dental care.

Patients' fear may be affected by socioeconomic status. There is major evidence that subjects with low socioeconomic status have a higher prevalence of dental fear. Socioeconomic status was effectively a parameter for a raft of behavioral, social, economic, and psychological covariates [2]. The current findings are consistent with evidence that people from lower socioeconomic backgrounds have poorer dental health [2,36]. This research indicates that socioeconomic status is related to dental fear. Individuals with low socioeconomic status were found to have a significantly higher prevalence of dental fear than those with a high socioeconomic status.

Dental fear is a common problem in dentistry and there have been many studies about this issue, but this study assessed only individuals attending a periodontology clinic. Also, all participants were evaluated for periodontal status using the CPITN. There is limited research about dental fear and periodontal status. In addition, we investigated the association between dental fear and oral health awareness level and periodontal status. Our findings show that dental fear affects oral health awareness levels, which has indirect, adverse effects on the periodontal health status of affected individuals. There is no other study that has evaluated both periodontal status and oral health awareness level in relation to dental fear.

LIMITATION

Some limitations of this study are that the participants were selected from only one center and only the DFS was used to evaluate their dental fear. In future studies, other psychiatric variables should be taken into consideration when patients are assessed, as general psychiatric status assessable by a psychiatrist could have clinical implications.

CONCLUSION

In conclusion, dental fear is a widespread problem both for dentists and for patients, which can have a significant impact on the individual's oral health. Elimination of dental fear is very important and should be treated according to a patient-centered assessment. In this study, dental fear levels were related to many other variables (age, gender, education level and socioeconomic status). The study subjects were informed about dental treatment procedures, so their anxiety was eliminated. Patients with a high level of dental fear can be given psychiatric support so they can be comfortable with the treatment procedure.

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