EVALUATION OF DENTAL ANXIETY IN PATIENTS REQUESTING PERIODONTAL TREATMENT WITH STATE-TRAIT ANXIETY INVENTORY

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ABSTRACT

Objective: The aim of this study is to determine the anxiety levels of patients who apply to our clinic and to determine the relationships between gender, age and education levels, tooth brushing habits and frequency of going to the dentist. Anxiety is a condition that has both psychological and physiological parameters, which is generally accepted as an expression of the person's struggle against stress. Psychological symptoms; delusion, fear, fatigue, exhaustion, insomnia and difficulty concentrating. Physiological symptoms are; headache, dizziness, palpitations, chest pain, shortness of breath, restlessness, paresthesias, and dry mouth. Dental anxiety is strong negative feelings about dental procedures. Delaying or avoiding dental treatment due to fear and expectation of pain may cause more serious dental problems over time, and this may be the beginning of serious systemic disorders. For all these reasons, eliminating dental anxiety is very important in dental practice.

Methods: The study was carried out on 925 individuals who applied to Dicle University Faculty of Dentistry, Department of Periodontology. Spielberger's State-Trait Anxiety Inventory (STAI) was used to determine anxiety levels. In addition, gender, age and education levels, previous visit to the dentist, incidence of complications, tooth brushing habits and frequency of going to the dentist were used. related data has been recorded.

Result: The level of anxiety was found to be higher in women, in the 30-39 age group, in people with low educational status, who had not been to the dentist before, and who did not have regular brushing habits.

Conclusion: we think that the level of anxiety may play an important role during periodontal treatment and it is necessary to take the necessary measures to relax the patients.

Keywords: Anxiety, dental anxiety, periodontal treatment, demographic data.

DOI: 10.19193/0393-6384_2023_4_135

Introduction

Dental anxiety and fear is a very common problem in almost all societies. Dental anxiety affects a significant part of people of almost all ages and different social classes. As a result, inadequate oral health, irregular dental care or poor cooperation have been reported, often with complete avoidance of dentistry. Individuals with dental anxiety, often due to negative thoughts, feelings, and fears, problems such as deterioration in professional and social life quality and sleep disorders may occur. Since such individuals are not willing for dental treatments, they may experience oral health problems[1-4]. It was determined that 41% of individuals with high dental anxiety levels had at least one of the symptoms of post-traumatic stress disorder (insomnia, avoidance, etc.) due to their bad experience with dental treatment. For this reason, it has been reported that dental trauma not only causes avoidance from treatment that affects oral health, but also negatively affects mental health and may lead to serious consequences such as post-traumatic stress disorder[5]. In a study examining the different variables between dental anxiety and analgesic use, smoking, severe periodontal inflammation and

dental anxiety was associated with postoperative pain after adjusting for age, gender, and state and trait anxiety scores. However, 46.8% of the subjects used analgesics for some time during the 48-hour follow-up period, and it was reported that the relationship between postoperative analgesic use and dental anxiety was the only factor[6].

Similarly, in a study in which dental anxiety was evaluated, data were evaluated on a questionnaire form for each patient who was told that periodontal treatment was needed, and at a regularly scheduled periodontal appointment 2 weeks after the actual treatment. They used the revised dental anxiety scale, state-trait anxiety inventory, and Iowa dental control indexes to measure psychosocial factors. Their results suggested that patients were less likely to have dental concerns in general and the more they trusted their provider, the more likely they were to accept surgical periodontal treatment[7]. Today, there are many different tests reported in the literature to detect preoperative dental anxiety. Inventory, anxiety measurement during orthodontic treatments; determining the anxiety level of patients who smoke and have dental treatments; It has been used for different purposes such as determining the relationship between dental treatments and pain[8-11].

However, the State-Trait Anxiety Inventory has been the most preferred inventory during different clinical applications in dentistry[12-18]. Bronzo et al studied 71 patients who needed periodontal therapy. After resting for ten minutes, they infiltrated local anesthetic (prilocaine) with and without the addition of felipressin. Blood pressure was measured with an automatic oscillometric device and recorded peak anesthetic effect 10 minutes after anesthesia administration. They conducted an assessment using STAI to assess the patients' trait anxiety. As a result, they stated that there were increases in systolic blood pressure in some procedures in patients with high trait anxiety, which may be related to fear or anxiety[12]. Similarly, Portmann et al. stated that there is a significant relationship between dental anxiety and trait anxiety. However, they argued that dental anxiety is a nonspecific phenomenon[14]. The effect of dental conditions on patients' quality of life has also been the subject of some researchers. It has been reported that the quality of life of the patients was not affected by dental fears[15, 17].

The State-Trait Anxiety Inventory includes two separate scales consisting of a total of forty items. State anxiety (STAI-S) is a measurement tool consisting of statements that indicate how the person feels at a certain moment, and trait anxiety (STAI-T) is a measurement tool that indicates how the person generally feels[1]. Researchers state that a score of 39-40 on this scale is the cut-off point in indicating the presence of clinical anxiety.

However, it has been reported that this value can be accepted as 44-45 in preoperative patients[19]. Determining the level of anxiety in advance will lead physicians to apply different therapy methods such as music therapy, hypnotherapy, acupuncture, relaxation therapy, cognitive-behavioral therapies, relaxation therapies with lavender oil, premedication, benzodiazepines, sedation with nitrous oxide during dental treatments[20]. Based on this information, in our study, patients who applied to our clinic in need of periodontal treatment were evaluated in terms of their anxiety levels and gender, age, educational status, previous visit to the dentist, frequency of complications, brushing habits and frequency of going to the dentist, and the relationship between them was examined.

Materials and methods

Study design and sampling
Our study was randomly selected among individuals over the age of 18 who applied to the Department of Periodontology due to gingival disease. People with any psychiatric disorder and using psychiatric drugs were not included in the study. Before the questionnaire, patients were informed about the study and an informed consent form was obtained.

Ethical permission
This study, which was approved by Dicle University Clinical Research Ethics Committee on 29.09.2021 with protocol number 2021-49, was conducted in accordance with the ethical principles of the World Medical Association Declaration of Helsinki.

The applied questionnaire consists of two parts:
• Sociodemographic data form: the purpose of using the sociodemographic data form is to obtain detailed information about the individuals who contributed to the applied questionnaires.

Questions were formed to reinforce the questionnaire and certain forms and to complete the requested data. It includes questions about age, gender, education level, frequency of going to the dentist, and oral care habits.

• State-Trait Anxiety Inventory (STAI): it includes two separate scales consisting of a total of forty items. STAI-S is a measurement tool consisting of expressions that indicate how a person feels at a certain moment, while STAI-T is a measurement tool consisting of expressions that indicate how a person generally feels[1].

The response options collected in four classes in the state anxiety scale are:
• Not at all;
• A little;
• A lot;
• Completely.

The options in the trait anxiety scale are:
• Almost never;
• Sometimes;
• Often;
• Almost always.

The scores obtained from both scales theoretically vary between 20 and 80. A large score indicates a high level of anxiety, and a small score indicates a low level of anxiety.

Statistical analysis

Data were analyzed with IBM SPSS V23. Conformity to normal distribution was evaluated with the Kolmogorov-Smirnov Test. In the analysis of the data that did not fit the normal distribution in the paired groups, the Mann-Whitney U Test was used. In the analysis of the data that were not normally distributed in groups of three or more, the Kruskal Wallis Test was used, and multiple comparisons were made with the Dunn Test.

The Wilcoxon Test was used to compare the STAI-S and STAI-T values that were not normally distributed in each group. Analysis results were presented as mean ± standard deviation and median (minimum–maximum). Significance level was taken as p<0.05.

Results

While 39% of 925 individuals participating in the study were male, 61% were female. Looking at the age groups, 42.2% are in the 18-29 age range, 28.2% are in the 30-39 age range, 19.9% are in the 40-49 age range and 9.7% are 50+ years old. Considering the education levels of the participants, 7.6% were literate, 35.5% primary-secondary school, 36% high school graduate and 21% college graduates. While

the rate of those who went to the dentist before was 81.4%, the rate of those who had complications was 13.7%. Considering the brushing frequency, 7.5% do not brush, 29.1% brush occasionally, 32.4% brush once a day and 31% brush 2+ times a day.

When we look at the frequency of going to the dentist, the rate of those who go to the dentist when there is pain is 64.2%, the rate of those who go to the dentist once a year is 23.9%, and the rate of those who go once every 6 months is 11.9%. The average of the STAI-S value was 40.01, while the average of the STAI-T value was 41.82 (Table 1).

Gender	Frequency	Percent
Men	361	39
Women	564	61
Age		
18-29 years	390	42,2
30-39 years	261	28,2
40-49 years	184	19,9
50+ years	90	9,7
Educational status		
Literate	70	7,6
Primary-Secondary School	328	35,5
High school	333	36
College	194	21
Go to the dentist		
Yes	753	81,4
No	172	18,6
Complication		
Yes	127	13,7
No	798	86,3
Brushing frequency		
No brushing	69	7,5
Sometimes	269	29,1
1 per day	300	32,4
2+ per day	287	31
Frequency of going to the dentist		
With pain	594	64,2
Once a year	221	23,9
Once in 6 months	110	11,9
	mean ± sd	Median (min-max)
STAI-S	40,01±9,08	41 (20-58)
STAI-T	41,82±6,62	43 (23-59)

Table 1: Frequency distributions of sociodemographic characteristics.
mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum).

Trait anxiety value was found to be higher in both women and men, and there was a statistically significant difference (p<0.001). State anxiety value did not show a statistically significant difference

between genders (p=0.115). The trait anxiety value according to gender was higher in women than in men, and this was statistically significant (p=0.029) (Table 2).

	Gender		Mann Whitney U-Test	p
	Men	Women		
STAI-S	39,35±9,45	40,43±8,82	U= 95565,5	0,115
	40 (20-56)	42 (20-58)		
STAI-T	41,24±6,61	42,19±6,61	U= 93183,5	0,029*
	42 (24-56)	43 (23-59)		
Wilcoxon Test	Z=-4,013	Z=-5,424		
p	<0,001*	<0,001*		

Table 2: Comparison of STAI-S and STAI-T values by gender.
*U: Mann Whitney U-Test; Z: Wilcoxon Test; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤0.05 is statistically significant.*

The state anxiety values of individuals aged 30-39 differed from those aged 18-29 and 50+ years old (p=0.002). There was no statistically significant difference between the median values of STAI-T according to age (p=0.212).

The median values of STAI-T values in the 18-29, 40-49 and 50+ age groups were found to be higher than the STAI-S value, which is statistically significant (p<0.001) (Table3).

	Age				Kruskal Wallis Test	p
	18-29 years	30-39 years	40-49 years	50+ years		
STAI-S	39,15±9,12	41,34±8,79	40,82±8,93	38,23±9,45	χ^2=14,357	0,002*
	40 (20-58)ᵃ	43 (20-56)ᵇ	42 (20-54)ᵃᵇ	39 (20-57)ᵃ		
STAI-T	41,35±6,89	42,1±6,31	42,32±6,44	42,01±6,66	χ^2 =4,507	0,212
	42 (23-59)	44 (25-55)	43 (24-54)	42 (25-56)		
Wilcoxon Test	Z=-5,707	Z=-1,205	Z=-2,309	Z=-3,955		
p	<0,001*	0,228	0,021*	<0,001*		

Table 3: Comparison of STAI-S and STAI-T values by age.
*χ^2: Kruskal Wallis Test; Z: Wilcoxon Test; ᵃ⁻ᵇ: There is no difference between groups with the same letter; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤ 0.05 is statistically significant.*

The median values of both STAI-S and STAI-T according to education level were found to be lower in college graduates than in other education levels. The median values of STAI-T values were found to be higher than the STAI-S value in individuals who were literate, high school graduates, and college graduates, and this was statistically significant (p<0.001) (Table 4).

Both STAI-S and STAI-T median values were found to be higher in individuals who had never

been to the dentist before (p<0.001). Trait anxiety was found to be higher than state anxiety in both groups (p=0.008) (Table 5).

	Educational status				Kruskal Wallis Test	p
	Literate	Primary-Secondary School	High school	College		
STAI-S	39,17±9,25	42,1±8,34	41,27±8,67	34,6±8,77	χ^2=91,409	<0,001*
	41 (20-54)ᵇ	44 (20-57)ᵇ	43 (20-58)ᵃ	35 (20-57)ᵃ		
STAI-T	42±6,8	42,9±5,86	42,37±6,64	38,97±6,97	χ^2=47,809	<0,001*
	42 (25-55)ᵇ	44 (25-56)ᵇ	44 (23-59)ᵇ	39 (23-56)ᵃ		
Wilcoxon Test	Z=-2,924	Z=-0,748	Z=-2,447	Z= -7,465		
p	0,003*	0,455	0,014*	<0,001*		

Table 4: Comparison of STAI-S and STAI-T values by education level.
*χ^2: Kruskal Wallis Test; Z: Wilcoxon Test; ᵃ⁻ᵇ: There is no difference between groups with the same letter; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤0.05 is statistically significant.*

	Go to the dentist		Mann Whitney U-Test	p
	Yes	No		
STAI-S	39,01±9,11	44,4±7,54	U=41846,5	<0,001*
	40 (20-58)	46 (20-56)		
STAI-T	41,43±6,79	43,53±5,54	U=52204,5	<0,001*
	42 (23-59)	45 (26-56)		
Wilcoxon Test	Z=-8,319	Z=-2,644		
p	<0,001*	0,008*		

Table 5: Comparison of STAI-S and STAI-T values according to the status of going to the dentist.
*U: Mann Whitney U-Test; Z: Wilcoxon Test; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤0.05 is statistically significant.*

Trait anxiety value was found to be higher than state anxiety value in both groups according to the occurrence of complications. (p=0.004) (Table 6).

	Complication		Mann Whitney U-Test	p
	Yes	No		
STAI-S	40,34±8,26	39,96±9,21	U=50019,5	0,815
	41 (23-54)	41 (20-58)		
STAI-T	42,52±6,42	41,7±6,65	U=48243,5	0,384
	43 (27-57)	42 (23-59)		
Wilcoxon Test	Z=-2,895	Z=-6,076		
p	0,004**	<0,001*		

Table 6: Comparison of STAI-S and STAI-T values according to the presence of complications.
*U: Mann Whitney U-Test; Z: Wilcoxon Test; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤0.05 is statistically significant.*

According to brushing frequency, both STAI-S and STAI-T were found to be lower in those who

brushed once a day and twice a day. The median values of STAI-T were found to be higher than the median value of STAI-S in those who brushed once a day and 2+ times a day (p<0.001) (Table 7).

	Brushing frequency				Kruskal Wallis Test	p
	No brushing	Sometimes	1 per day	2+ per day		
STAI-S	43,12±7,97	42,28±8,18	39,24±9,41	37,95±9,16	χ^2=41,908	<0,001*
	45 (23-58)^b	44 (20-56)^b	40 (20-57)^a	38 (20-55)^a		
STAI-T	42,43±5,88	42,79±6,1	41,71±6,66	40,86±7,1	χ^2=15,36	0,002*
	44 (27-52)^{ab}	44 (24-56)^b	42 (23-56)^{ab}	41 (23-59)^a		
Wilcoxon Test	Z=-1,372	Z=-0,296	Z=-5,633	Z=-5,942		
p	0,170	0,767	<0,001*	<0,001*		

Table 7: Comparison of STAI-S and STAI-T values according to brushing frequency.
*χ^2: Kruskal Wallis Test; Z: Wilcoxon Test; $^{a-b}$: There is no difference between groups with the same letter; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤0.05 is statistically significant.*

According to the frequency of going to the dentist, the median values of STAI-S were found to be lower in those who went when they had pain (p<0.001). According to the frequency of going to the dentist, the median STAI-T value was found to be the highest in those who went once a year (p=0.009).

The median values of STAI-T were higher than the STAI-S value in those who went to the dentist when they had pain (p<0.001) (Table 8).

	Frequency of going to the dentist			Kruskal Wallis Test	p
	With pain	Once a year	Once in 6 months		
STAI-S	38,89±9,05	42,5±8,54	41,08±9,22	χ^2=28,973	<0,001*
	40 (20-58)^b	45 (20-57)^a	43 (20-56)^a		
STAI-T	41,33±6,74	42,92±6,31	42,22±6,36	χ^2=9,348	0,009*
	42 (23-59)^b	44 (25-56)^a	42,5 (27-55)^{ab}		
Wilcoxon Test	Z=-7,182	Z=-0,712	Z=-1,476		
p	<0,001*	0,477	0,140		

Table 8: Comparison of STAI-S and STAI-T values according to the frequency of going to the dentist.
*χ^2: Kruskal Wallis Test; Z: Wilcoxon Test; $^{a-b}$: There is no difference between groups with the same letter; mean±sd: mean±standard deviation; Median (min-max): median (minimum-maximum). *: p≤0.05 is statistically significant.*

Discussion

In this study, the state and trait anxiety scores of the patients who applied to the clinic were calculated with the "State and Trait Anxiety" inventory, and it was aimed to investigate the relationship between gender, age, education level, going to the dentist, frequency of complications, brushing habits and frequency of going to the dentist. It is quite common for physicians to face fear and anxiety reactions in dental practice[1]. Whether the patients have concerns and concerns can be determined with specially prepared scales. Spielberger's "State and Trait Anxiety" inventory is also a questionnaire used to investigate anxiety. It allows the assessment of the person's current anxiety, tension, irritability, anxiety and the activated state of the autonomic nervous system. In addition, it has been reported that it allows to measure the general calmness of the person in his daily life, the feeling of self-confidence and security, and the relative susceptibility to anxiety[19].

It has been reported that these rapid and reliable questionnaires can be used by dentists and this strategy can help identify patients who need specialized psychological consultation and adapt the periodontal treatment strategy. It was emphasized that short reminders of periodontal care would be of interest for patients exhibiting psychological distress to maintain periodontal health through continuous motivation of patients and reinforcement of oral hygiene procedures[21]. While there was no significant difference between gender and state anxiety levels in our study, trait anxiety was found to be significantly higher in women. Similar to our results, many studies have shown that women exhibit more generalized anxiety, regardless of which anxiety scale is used in any dental treatment[19, 22, 23]. It is stated that this may be due to the fact that women pronounce their fears and anxieties more easily than men, regardless of cultural differences[10].

In another study, they reported that this could be partially explained by research suggesting that women are more affected by negative emotional states than men, and that there may be differences in dental anxiety due to differences in reported pain thresholds between men and women. It has also been reported that men's fear of expressing their concerns openly may be another factor[3, 24]. These results show parallelism with our findings. When the anxiety scores of the age groups were examined, the anxiety values of the 18-29 age group and the over 50 age group were found to be lower than the other two groups, and no significant difference was found between them. Anxiety values in the 30-39 age group were found to be higher than both young individuals and individuals over 50 years of age.

While results from the published literature on the relationship between age and dental fear are inconsistent, it has been found that young people

are generally more anxious than older people[11, 25-27]. Similar to our results, in the study of Ay et al., the lowest anxiety scores were determined in the group over 50 years of age. They stated that this could be attributed to the increase in the number of encounters with the dentist and the loss of importance of the fear of the dentist with the increase in other health problems[26]. However, it has been reported that the probability of accepting surgical periodontal treatment and the success rates increase when the dental concerns of the patients are minimized and the environment of trust in dentists is provided. These results highlight the importance of good patient-dentist communication[7].

In our study, it was determined that the group graduated from high school experienced both state and trait anxiety significantly lower than the other groups according to education level. This suggests that as the level of education increases, the awareness of individuals also increases and they gain success in the fight against anxiety. Similarly, there are also studies reporting an inverse relationship between education level and anxiety[28, 29]. There are many studies reporting that lower education level is negatively correlated with higher anxiety level. They even reported that in addition to education level, being educated in different disciplines can have an effect on dental anxiety[30, 31]. They emphasized that high education level strengthens the ability to cope with factors that cause momentary anxiety[19], and these findings support our results. When our findings were reviewed according to the status of going to the dentist, both state and trait anxiety scores were found to be higher in people who had not been to the dentist before. Jeddy et al. revealed that dental anxiety has a wide prevalence that includes both genders. They found a significant dominance among women (65.2%) and professionals (66.9%), displaying a higher degree of anxiety. Pain and shooting were reported as forcing and anxiety-provoking procedures (72.6%)[32].

On the other hand, it has been reported that patients delay their visits to the dentist due to fear of the dentist[33], and these results are in line with our findings. In addition, Pekkan et al. reported that dental anxiety was positively related to the general anxiety level of patients and was higher in women and younger ages[34]. In previous studies, high anxiety scores were found in patients with a history of complications during dental treatment. This is supported by the high scores observed in patients with trauma-related symptoms in the studies of De

Jongh et al. Experienced "bad experiences" are summarized as pain and consequently the patient's need for help, problems with the dentist's negative behavior or personality, and advanced treatment errors (filling or pulling a healthy tooth)[35]. In our study, although the anxiety scores of patients with a history of complications (pain, bleeding, swelling) were slightly higher, no significant difference was found between the groups.

When the anxiety status was examined according to brushing frequency, both the state and trait anxiety scores of the individuals who did not brush and brushed occasionally were found to be high. Ay et al. reported that there was no relationship between brushing frequency and anxiety[26]. Similar to our results, in a study conducted in the Norwegian army, more oral problems, irregular compliance with dental controls, and less frequent brushing were reported in individuals with high anxiety scores[36].

In the study of Talo Yıldırım et al., the periodontal treatment needs index was found to be lower in individuals who brush their teeth regularly than those who do not brush at all[22]. Pohjola et al. In another study they conducted, they found that the anxiety levels of patients with poor oral care were quite high[37]. In addition, Portmann et al. reported that in patients with very high dental anxiety, this anxiety may lead to rejection and avoidance of dental hygiene or care, resulting in further deterioration of oral health[14]. In a similar study, it was determined that the number of individuals with periodontal disease increased as the severity of anxiety increased, and they reported that fear of the dentist could be accepted as an indicator of an effective role in applying to the dentist[38]. In our study, the state anxiety value was found to be lower in individuals who went to the dentist when they had pain. The trait anxiety value was found to be high in the group that went to the dentist once a year.

In a study, when the frequency of going to the dentist was examined in general, no difference was found in terms of anxiety levels between the individuals who went to the dentist regularly and those who did not[26]. Sohn et al., on the other hand, reveal that the dental visits of individuals with anxiety are irregular. It also reveals that the presence of anxiety changes the number and order of dental visits, and that patients with anxiety report their desire to reduce the number of dental sessions[39]. The scales used to determine the level of anxiety show different results in different societies. The cultural background of the society can also affect the content

of the event that causes anxiety, its interpretation and the response. In most studies, it was emphasized that the basic comparisons and interpretations were limited because the scales used for anxiety were not adapted to cultural differences[26].

While our results are consistent with some studies, they differ with some studies. We think that the fact that other studies were carried out in different cultures and samples with different characteristics and the differences in the methods used may cause inconsistency between our results. According to our results, in our study, the anxiety value was found to be higher in women, in the 30-39 age group, in individuals with a low level of education, who did not go to the dentist before, and who did not have a regular brushing habit.

Conclusion

Occasional anxiety is a normal part of life, but constant, seemingly uncontrollable, and overwhelming anxiety has been found to be disabling. Dentists need to be knowledgeable about anxiety-related problems and be more attentive and careful about how such patients feel and how they should approach them. According to the statistically significant results we obtained, we believe that it is important to evaluate periodontal treatments with STAI. And we think that more comprehensive socioeconomic and sociodemographic studies are needed to reduce dental fears in this regard.

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