

Original Article

Factors Affecting Anxiety-Fear of Surgical Procedures in Dentistry

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ABSTRACT

Aim: To compare dental anxiety and fear during procedures performed under local anesthesia either in the operating room or in the clinic as well as to investigate the potential factors that might influence this psychological condition. **Subjects and Methods:** Patients who were admitted to the Department of Oral and Maxillofacial Surgery of the universities in two cities, which have a different sociocultural patient profile, were enrolled. In addition to the State-Trait Anxiety Inventory (STAI), Dental Anxiety Scale (DAS), and Dental Fear Scale (DFS), the patients were asked to answer the questions concerning previous dental experience, education level, and previous psychiatric therapy. **Statistical Analysis Used:** The results of STAI were analyzed by Mann-Whitney U-test and results of DAS and DFS were analyzed by one-way analysis of variance test. **Results:** Two hundred patients, of whom 76 were enrolled in the first center and 124 were enrolled in the second center. A statistically significant difference was observed in state anxiety levels of the patients between the two centers, whereas the difference in trait anxiety levels was not significant. The results of DAS, DFS, and STAI-trait (STAI-T) displayed a significant difference between genders; the levels of anxiety and fear were higher in females than in males (DAS $P = 0.025$, DFS $P = 0.017$, STAI-T $P = 0.045$). Comparison between the patients with and without previous dental experience revealed a statistically significant difference regarding the results of STAI. **Conclusions:** The study found that sociocultural structure and gender are the significantly effective factors on dental anxiety and fear.

KEYWORDS: Dental Anxiety Scale, Dental Fear Scale, gender, sociocultural structure, state-trait anxiety

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INTRODUCTION

Patient compliance in clinical practice is of great importance for the dentist. However, some patients develop a psychological condition called treatment anxiety, which hinders the compliance of the patient, might be predictive of the occurrence of complications during clinical procedure and response to therapy from likely complications during clinical procedures to the response to therapy.^[1]

Treatment in oral and maxillofacial surgery clinics frightens patients more than the clinical interventions performed in the other conservative sciences.^[2] Based on the degree of difficulty of procedure, different states of anxiety and fear may develop among patients treated in the oral and maxillofacial surgery clinics. Even the word “operating room” or “surgical procedure” causes emotional stress in the patient. Serious levels of stress and fear that the patient feels before or over the course

of the procedure trigger psychosomatic diseases in the patient and cause alterations in blood pressure.^[3] In case of preexisting cardiac ischemia, complications can be encountered during or after surgery.^[4,5]

The most powerful stress factors that underlie the development of anxiety and fear are fear of pain, treatment cost, needle and injections, surgeon’s failure, and fear of catching a treatment-related infectious disease.^[1] In addition, age, gender, socioeconomic status, education level, and personal differences are other personal factors that could alter the degree of anxiety.^[6] Some patients are successful in bypassing the development of anxiety although they feel pain.^[7,8] In some previous reports, the level of anxiety decreased and

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patients could cope with anxiety much more easily as socioeconomic and education levels increased.^[9-14]

Severe anxiety and fear not only lead to misdiagnosis by jeopardizing patient-doctor relationship but also may prevent receiving treatment.^[15] Hence, some tests have been developed to provide necessary psychological support before the procedure by determining the anxiety and fear level of the patients. State-Trait Anxiety Inventory (STAI), widely used to measure treatment anxiety, is a questionnaire developed in 1970 by Spielberger *et al.*; it consists of short sentences and discrimination between event-specific and continuous anxiety is made by the patient.^[16] Emotional state of the patients can be rapidly scored via this questionnaire without wasting patient's time. As STAI is a more general questionnaire, Corah's Dental Anxiety Scale (DAS) and Kleinknecht's Dental Fear Scale (DFS) were developed, which are more specific to dentistry in measuring anxiety and fear.^[17,18] This study evaluated whether sociocultural differences, history of previous dental procedure, psychiatric therapy, age, and gender differences are associated with the level of treatment anxiety and fear among patients waiting for simple clinical procedures and for surgical procedures.

SUBJECTS AND METHODS

This study is a two-center study and consisted of patients with different socioeconomic status and education, who were admitted to Selçuk University Faculty of Dentistry, Department of Maxillofacial Surgery (A) in Konya province and to Yüzüncü Yıl University Faculty of Dentistry, Department of Maxillofacial Surgery (B) in Van province. The study was approved by the Ethics Committee of the Yüzüncü Yıl University Faculty of Medicine, and informed consent of the patients was obtained. The patients were asked to complete STAI, DAS, and DFS as well as to answer the questions concerning previous dental experience, education level, and previous psychiatric therapy. The patients were divided into two groups as clinical group who were waiting for simple clinical procedures (tooth extraction, temporomandibular joint diseases, postoperative dressing and suture removal, surgical examination, abscess drainage, reimplantation, biopsy, and treatment of alveolitis) and surgery group who were waiting for surgical procedures (extraction of impacted tooth, apical resection, enucleation of small cysts and tumors not requiring general anesthesia, and implant procedures).

The STAI tests measure state and STAI-trait (STAI-T) anxiety levels, and each of them consists of 20 questions rated on a four-point scale, with scores between 20 and

80. State anxiety defines psychological stress related to the individual's current state, whereas trait anxiety depends on the personal characteristics and is unrelated to the current state. Scores between 20 and 37 indicate minimum or no anxiety, 38–44 indicates moderate anxiety, and 45–80 indicates high anxiety levels.^[6]

DAS that consists four items rated on a five-point Likert scale defines the patient's mood before dental treatment, and total score changes between four and 20, where a score of 13–14 indicates the presence of an anxiety problem and a score of 15 and higher indicates high levels of anxiety.^[17,19]

DFS consists of 20-questions rated on a five-point-scale, and it is used to measure the severity of emotions and reactions against certain conditions in dentistry. Scores between 21 and 60 indicate that the patient is fearful, whereas scores between 61 and 100 indicate that the patient has intense fear.^[20]

ANALYSIS

Data including age, gender, interventional methods of treatment, sociocultural effect, and experienced dental procedure, as well as the results of STAI, were analyzed by Mann–Whitney U-test, which is a nonparametric statistical method; whereas results of DAS and DFS were analyzed by one-way analysis of variance (ANOVA) test (SPSS, Inc., Chicago, IL, USA, Version 12.0 for Windows program, $P < 0.05$).

RESULTS

In this study, 76 (38%) patients from 200 patients were enrolled in center A and the remaining 124 (62%) patients were enrolled in center B. Of these patients, 121 (60.5%) were in the clinical group (Konya $n = 72\%$ 36, Van $n = 49\%$ 24.5) and 79 (39.5%) were in the surgery group (Konya $n = 52\%$ 26, Van $n = 27\%$ 13.5) [Table 1]. A statistically significant difference was observed in state anxiety levels of the patients between the two centers, whereas the difference in trait anxiety levels was not significant. The patients in center A had a higher sociocultural level than that of the patients in center B, and anxiety levels of the patients in center A were lower than that of the patients in center B ($P < 0.05$, one-way ANOVA, Mann–Whitney U-test).

Results of DAS, DFS, and STAI-T displayed a statistically significant difference between genders; accordingly, levels of anxiety and fear were higher in females in comparison to males (DAS $P = 0.025$, one-way ANOVA; DFS $P = 0.017$, one-way ANOVA; and STAI-T $P = 0.045$, Mann–Whitney U-test) [Table 2]. Comparison

Table 1: Demographic characteristics of the patients enrolled in the study

	<i>n</i> (%)
Province	
Konya province	76 (38.0)
Van province	124 (62.0)
Group	
Clinical	121 (60.5)
Konya province	72 (36)
Van province	49 (24.5)
Surgery	79 (39.5)
Konya province	52 (26)
Van province	27 (13.5)
Gender	
Female	115 (57.5)
Male	85 (42.5)
Previous dental treatment	
Present	165 (82.5)
Absent	35 (17.5)
Psychological problem	
Absent	180 (90.0)
Present	20 (10.0)
Age groups, years	
10-19	23 (11.5)
20-29	77 (38.5)
30-39	51 (25.5)
40-49	35 (17.5)
≥50	14 (7.0)

between the patients with and without previous dental experience revealed a statistically significant difference regarding the results of STAI ($P < 0.05$, Mann–Whitney U-test). Level of anxiety was higher among those who had a previous dental procedure when compared to those who did not. No statistically significant relationship was determined between the level of anxiety and history of previous psychological treatment, age, and type of intervention ($P > 0.05$, Mann–Whitney U-test). There was a significant difference between the clinical and surgery groups in terms of gender; the rate of females was significantly higher in the surgery group ($P = 0.027$, Mann–Whitney U-test). There was also a significant difference between the clinical and surgery groups regarding previous dental treatment; the rate of the presence of previous dental treatment was significantly higher in the clinical group ($P = 0.019$, Mann–Whitney U-test) [Table 3].

There was a significant difference between Konya and Van provinces in terms of previous dental treatment and the presence of a psychological problem. The rate of patients receiving previous dental treatment was significantly higher in Konya province than in Van province ($P = 0.001$, Mann–Whitney U-test). The rate of patients with the psychological problem was significantly higher in Van province ($P = 0.025$, Mann–Whitney U-test) [Table 4].

Table 2: Comparison of variables according to DAS, DFS, STAI-T - STAI-S

	DAS		DFS		STAI-T		STAI-S	
	Mean±SD	<i>P</i>	Mean±SD	<i>P</i>	Mean±SD	<i>P</i>	Mean±SD	<i>P</i>
Province								
Konya	10.30±3.42	0.784	47.14±15.62	0.058	2.1309±0.46	0.001	2.4039±0.46	0.243
Van	10.16±3.61		42.73±16.10		1.9149±0.29		2.3435±0.027	
Group								
Clinical	10.31±3.62	0.654	44.63±16.23	0.808	2.0314±0.40	0.110	2.3744±0.39	0.698
Surgery	10.08±3.41		44.06±15.80		1.9443±0.33		2.3544±0.29	
Gender								
Female	10.70±3.64	0.025*	46.73±16.40	0.017*	1.9709±0.33	0.255	2.4096±0.32	0.045
Male	9.56±3.29		41.26±15.03		2.0324±0.44		2.3082±0.40	
Previous dental treatment								
Present	10.16±3.61	0.619	43.99±16.21	0.425	2.0200±0.38	0.061	2.3658±0.36	0.949
Absent	10.49±3.14		46.37±15.20		1.8886±0.32		2.3700±0.33	
Psychological problem								
Absent	10.16±3.39	0.476	43.74±15.75	0.078	2.0036±0.38	0.458	2.3553±0.36	0.180
Present	10.75±4.68		50.40±17.64		1.9375±0.33		2.4675±0.26	
Age groups, years								
10-19	10.26±3.44	0.198	46.26±15.07	0.758	1.8152±0.27	0.088	2.3696±0.20	0.705
20-29	10.69±3.59		45.84±14.32		1.9942±0.30		2.3558±0.34	
30-39	9.37±3.38		42.63±17.18		2.0510±0.39		2.3569±0.32	
40-49	9.91±3.48		43.37±18.32		2.0686±0.51		2.3486±0.47	
≥50	11.36±3.73		42.50±17.23		1.9357±0.43		2.5000±0.42	

*Significant at $P < 0.05$. DAS=Dental Anxiety Scale; DFS=Kleinknecht's Dental Fear Scale; STAI-T=State-Trait Anxiety Inventory-Trait; STAI-S=State-Trait Anxiety Inventory-State; SD=Standard deviation

Table 3: Comparison of the clinical and surgery groups

	Clinical group (n=121)	Surgery group (n=79)	P
Gender, n (%)			
Female	62 (51.2)	53 (67.1)	0.027
Male	59 (48.8)	26 (32.9)	
Previous dental treatment, n (%)			
Present	106 (87.6)	59 (74.7)	0.019
Absent	15 (12.4)	20 (25.3)	

Table 4: Comparison of Konya and Van provinces

	Konya province	Van province	P
Previous dental treatment, n (%)			
Present	74 (97.4)	91 (73.4)	0.001
Absent	2 (2.6)	33 (26.6)	
Psychological problem, n (%)			
Absent	73 (96.1)	107 (86.3)	0.025
Present	3 (3.9)	17 (13.7)	

DISCUSSION

The hypothesis of this study was that level of anxiety would be different in patients waiting to undergo procedures requiring an operating room in comparison to that of patients waiting to undergo simple clinical procedures; and additionally, sociocultural level, gender, and the presence of a history of psychiatric treatment would influence the level of anxiety. Results of the study indicated that nature of the surgical procedure was not associated with the level of anxiety. Hermes *et al.* conducted a study in quite a large group of patients from different medical departments undergoing general anesthesia, sedation, and local anesthesia.^[21] They concluded that anxiety is a personal issue and is not changed in different surgical fields. Nevertheless, Hermes *et al.*^[21] did not include the patients who would undergo operations for more invasive procedures due to trauma and tumor considering that psychological states of such patients might not be suitable. In this study, we did not make such discrimination, and the questionnaire was utilized in all voluntary patients waiting for surgery. From this aspect, the study objectively reveals that the nature of surgical intervention does not play an important role on the level of anxiety and fear [Table 2]. A difference could have been observed in the level of anxiety and fear if a general anesthesia group had been included in the study groups; because general anesthesia and sedation could substantially improve anxiety considering that some patients want to get through treatment steps unconsciously – although there is no indication.

As compared to an inexperienced individual, anxiety level during the next procedure is expected to be higher in patients with a previous unfavorable experience. If a painless procedure has been performed in a short period of time not causing stress on the patient, and if no serious problem has been encountered in the postoperative period, this may have an improving effect on the level of anxiety for the further procedures. In a study that seems to corroborate this theory, López-Jornet *et al.*, found the level of anxiety significantly low over the course of a 7-day follow-up in the patients who had undergone tooth extraction and had no problems during or after the procedure.^[6] Nevertheless, it should be taken into account that a bad treatment experience and specific conditions would not leave a bright impression concerning anxiolytic effect and patient expectations.^[21] Moreover, although it seems that it is possible to much more reduce anxiety by informing the patients about the procedure, information may trigger the development of additional stress in the individuals. In literature, there are numerous studies in which different authors have reached different conclusions about the effect of explaining the procedure or previous experiences on the level of anxiety and fear.^[3,22-25] In this study, it was observed that previous experiences caused an increase in the level of anxiety; thereby, not having information about the procedure or not having had a previous experience can be regarded as an advantage as previous experiences, regardless of being good or bad, trigger the emotional state.

Fear and anxiety in dentistry can be directly associated with poor oral hygiene that results from poor socioeconomic conditions, lack of self-confidence, psychological problems, and low morale.^[26] Other factors include age, gender, education level, and personality of the patient. McGrath and Bedi reported a high level of anxiety among people with a low standard of living.^[27] Moreover, it was reported that low level of education together with low socioeconomic status results in poor outcomes for anxiety.^[28] However, there is no consensus on this subject, and there are authors^[29] defending that dental anxiety is higher among well-educated people.

In this study, which was conducted in two different centers in two different cities having significantly different patient profiles in terms of socioeconomic status and level of education, the difference in the level of anxiety and fear was statistically significant. Incomes of the patients who were admitted to these two centers are different [Table 4]. However, it was concluded that rather than the economic conditions, education, and cultural level are more important in the development of treatment anxiety and fear, since social health security provides equal rights for everyone in this country.

In the study, gender was found to be an effective factor on the level of anxiety and fear [Table 3]. In general, it is argued that preoperative anxiety is higher in females and that females display more anxious behaviors as compared to males.^[23] From this aspect, the result of this study is consistent with literature.

While the history of previous psychological treatment suggests that patients would be psychologically more sensitive, the result, in fact, was not consistent with our theory. Although there are authors^[25,30] who claim that a previous sad life event that required psychological treatment increases psychological stress during subsequent traumatic event, there was no consistent finding in this study and no relationship was determined between the presence of a history of psychological treatment and the level of dental anxiety and fear. Of the patients that completed the questionnaire, 10% stated that they had received psychological treatment previously. However, although the number of patients who seek psychiatric treatment for any psychological problem appears to be low in the population, the ratio, in fact, increases when the individuals that keep on living without treatment are taken into account. Getting knowledge about the previous psychological trauma by including detailed questions in the questionnaires used in this study would have led to a different result on this subject.

We explored whether there was a difference between anxiety levels of patients in decades of age groups; it was observed that anxiety level shows a decrease from the 10 to 20 year age group to the age group over 50 years. The level of anxiety decreases with increasing age, as the number of medical experiences increases with increasing age. The likelihood of having an experience less or more on the procedure increases with increasing age. From this aspect, the results concerning age and previous experiences are conflicting in this study. Anxiety decreases as the age increases but having an experience on the procedure enhances anxiety. This can be explained by the following points: The probability of having more hospital experience and accordingly coping with more serious problems than dental interventions are higher for older individuals as compared to young individuals. Whatever the nature of dental interventions is they do not create much anxiety or expectation in the elderly patient group. However, dental interventions are so important that they may cause serious trauma in the young patient group. Any previous bad experience enhances anxiety in the early ages.

CONCLUSION

Results of this study reveal that gender, sociocultural differences, and previous bad experiences of the patients

are the major factors that can lead to problems in the future procedures. Therefore, solving the fears at first and considering gender-based differences would be of help for the patient and the dentist in the periods during and after therapy. Although physicians do not have much effect on sociocultural structure, it would be advantageous to inform patients about expectations and likely outcomes before starting treatment in a way that they can understand.

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Conflicts of Interest

There are no conflicts of interest.

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