Evaluation of Dental Anxiety Levels and Oral Health-Related Quality of Life of Patients Attending A Periodontology Clinic

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Abstract

Background: Dental anxiety is a problem that develops against dental treatments and practices, has negative effects on the patient's oral health, and affects a large population. This situation may affect individuals' oral health-related quality of life. The purpose of this study was to determine the dental anxiety levels and oral health-related quality of life of patients admitted to our clinic and investigate the relationship between them.
Materials and methods: Three hundred volunteer individuals were included in the study. Participants were asked questions to determine personal characteristics. The Oral Health Impact Profile-14 Scale (OHIP-14) was used to determine the level of quality of life related to oral health, and the Modified Dental Anxiety Scale (MDAS) was used to evaluate the level of dental anxiety. The periodontal status of the participants was evaluated using the gingival index, plaque index, clinical attachment levels, periodontal pocket depth, and the bleeding on probing index.
Results: According to the results of the evaluations, a statistically significant relationship was found between educational status, the frequency of visiting the dentist, and OHIP-14 (p<0.05). MDAS scores of primary school graduates were significantly higher than the other groups (p<0.05). A positive correlation was observed between periodontal parameters and MDAS and OHIP-14 scores (p<0.001). There was also a statistically significant and positive correlation between MDAS and OHIP-14 scores (p<0.001).
Conclusion: Within the limits of this study, high dental anxiety score may negatively affect periodontal parameters and quality of life.

Research Article (HRU Int J Dent Oral Res 2024; 4(2):38-46)

Keywords: Dental anxiety; quality of life; periodontium.

Introduction

Dental anxiety is a state of uneasiness that develops due to fear felt due to dental treatment. This situation can cause various problems for both the patient and the physician (1). Dental anxiety can negatively affect people's quality of life by causing negative effects on both the oral health and general health of patients (2). The etiology of dental anxiety is thought to depend on many factors such as sex, age, and socioeconomic status. These factors can be listed as the environment (the sight and sound of the instruments used, the examination room and its smell), past traumatic experiences, having a low pain threshold, the physician's approach, the negative effects of people around, TV programs watched, and the presence of bad experiences (3). Therefore, in studies aiming to evaluate dental anxiety, not only dental anxiety should be measured, but also the factors affecting dental anxiety should be evaluated (2).

Periodontal diseases are an inflammatory response to microbial dental plaque that affects the supporting tissues of the teeth and can lead to tooth loss when it progresses (4). Dental plaque and poor oral hygiene are important risk factors for periodontal diseases. Stress is one of the important factors in the etiology of numerous inflammatory diseases, including periodontal diseases (5). Periodontal diseases may be associated with dental anxiety and may affect quality of life in adults (6). Dental anxiety has been identified as a significant barrier to the receipt of dental services and may be exacerbated by situations such as sounds, smells, previous experiences, and friends (7).

Population-based epidemiologic studies have shown that 5-20% of adults experience dental anxiety,

which ranges from a feeling of mild-to-significant anxiety and dental phobia (5). According to the results of studies conducted in Turkey, this rate was reported as between 21.3% and 23.5% (8). Dental anxiety is an important public health problem due to its prevalence and because it has significant psychosocial effects (5). As noted by Berggren and Meynert (9), dental anxiety leads to avoidance of dental treatment, resulting in deterioration of dental health. This situation causes depression, social isolation, feelings of guilt and shame, and lower quality of life (5). Studies have shown that there is a positive correlation between dental anxiety and avoiding dental treatment (10, 11). For this reason, physicians' awareness can be increased by determining the anxiety levels of patients before dental treatment, and thus they can approach and treat the patient more easily.

There are various situations in the daily life of many patients that affect their oral health-related quality of life. For many years, oral health was identified only by the clinic, which did not allow the assessment of the real impact of oral diseases on the daily lives of patients (12). Identifying factors related to dental anxiety can both improve the oral health of patients and provide more successful dental treatments. In the light of this information, this study was planned with the hypothesis that dental anxiety has an effect on the frequency of dental visits, oral care habits and oral health-related quality of life. In the light of this information, this study was planned with the hypothesis that individuals with high dental anxiety avoid dental visits and have poor oral care habits. The aim of this study was to investigate the dental anxiety levels of individuals who applied to our clinic, to evaluate the factors affecting dental anxiety and the effect of dental anxiety on quality of life.

Materials and Methods

The present study included 300 individuals who were admitted for treatment to the Department of Periodontology, Faculty of Dentistry, Recep Tayyip Erdoğan University, between March 2019 and June 2019. The content and aim of the study were clarified to the participants and they signed a voluntary consent form. Approval for the research was received from the XXX University Non-Interventional Clinical Research Ethics Committee (Ethics Committee Decision No: 2019/20). The study was conducted in accordance with the Declaration of Helsinki.

Individuals aged 18 to 65 years, who were literate, had no periodontal treatment in the last 6 months, and who agreed to sign the voluntary consent form were included in the study. Individuals receiving anxiety treatment, using medications that affected anxiety levels, and receiving psychiatric treatment were not included in the study. The Oral Health Impact Profile-14 (OHIP-14) (Figure 1) and Modified Dental Anxiety Scale (MDAS) (Figure 2) were administered to individuals who agreed to participate in the study, with questions to determine personal characteristics. To determine personal characteristics, questions were asked about the participants' education levels, sex, age, smoking status, systemic disease, medications used, and oral hygiene habits (Figure 3).

Figure 1: Oral Health Impact Profile-14 (OHIP-14) Scale

1. Have you had trouble pronouncing any words because of problems with your teeth, mouth or dentures?
2. Have you felt that your sense of taste has worsened because of problems with your teeth, mouth or dentures?
3. Have you had painful aching in your mouth?
4. Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth or dentures?
5. Have you been self conscious because of your teeth, mouth or dentures?
6. Have you felt tense because of problems with your teeth, mouth or dentures?
7. Has your diet been unsatisfactory because of problems with your teeth, mouth or dentures?
8. Have you had to interrupt meals because of problems with your teeth, mouth or dentures?
9. Have you found it difficult to relax because of problems with your teeth, mouth or dentures?
10. Have you been a bit embarrassed because of problems with your teeth, mouth or dentures?
11. Have you been a bit irritable with other people because of problems with your teeth, mouth or dentures?
12. Have you had difficulty doing your usual jobs because of problems with your teeth, mouth or dentures?
13. Have you felt that life in general was less satisfying because of problems with your teeth, mouth or dentures?
14. Have you been totally unable to function because of problems with your teeth, mouth or dentures?

Figure 2: Modified Dental Anxiety Scale (MDAS)

Received date: June 7, 2024 / Accept date: July 27, 2024
DOI: 10.61139/ijdor.1497831

1. If you went to your dentist for treatment tomorrow, how would you feel?
   (1) Not anxious
   (2) Slightly anxious
   (3) Fairly anxious
   (4) Very anxious
   (5) Extremely anxious
2. If you were sitting in the waiting room (waiting for treatment), how would you feel?
   (Same alternatives as Q.1)
3. If you were about to have a tooth drilled, how would you feel?
   (Same alternatives as Q.1)
4. If you were about to have your teeth scaled and polished, how would you feel?
   (Same alternatives as Q.1)
5. If you were about to have a local anaesthetic injection in your gum, above an upper back tooth, how would you feel?
   (Same alternatives as Q.1)

Figure 3: Oral Examination Form

ORAL EXAMINATION FORM

Name-Surname: ..... Sex: .....

Age: ..... Job: .....

Education level: .....

Systemic anamnesis

Systemic diseases: .....

Medications: .....

Dental anamnesis

Main complaint: .....

Frequency of visits to the dentist: .....

Reason for last dentist visit: .....

Do you think there is a disease in your gums: .....

Smoking status: Smoker ( ) Non-smoker ( )

Oral hygiene habits

1- Do you think you need treatment for your oral health? Yes ( ) No ( )

2- When was the last time you went to the dentist?

3- What was the reason for your last visit to the dentist?

Control ( ) Pain ( ) Bleeding ( ) Caries ( ) Missing teeth ( ) Tooth Extraction ( ) Other ( )

4- What was the last treatment performed?

Filling/root canal treatment ( ) Tooth extraction ( ) Scaling ( ) Surgical procedures ( )

Prosthodontic treatment ( ) Orthodontic treatment ( ) Other ( )

5- Have any complications developed after the dental procedures? Yes ( ) No ( )

6- Tooth brushing frequency

Once a day ( ) 2 times a day or more ( ) 1-2 times a week ( ) Rarely ( )

7- Do you use other dental hygiene tools? Yes ( ) No ( )

To determine the dental anxiety level of the participants, the Turkish version of MDAS, the reliability and validity of which were tested by two different research groups, was used (13, 14). MDAS consists of five questions. Questions are evaluated between 1 and 5 points. Total scores range between 5 and 25.

OHIP is one of the most frequently used scales today to determine oral health-related quality of life in adults (15). In this study, to determine oral health-related quality of life, the short version of OHIP-14 was used. The reliability and validity of the Turkish version were evaluated by Mumcu et al. (16). In this survey, each question is given a score of 0-4 and the total score is between 0 and 56. A high total score means that the quality of life is low (15).

A Williams periodontal probe was used in clinical periodontal examination. The gingival index (GI) (17), plaque index (PI) (18), bleeding on probing (BOP), clinical attachment loss (CAL), periodontal pocket depth (PPD) were evaluated and recorded. Measurements of clinical periodontal parameters were performed by a single examiner (P.C.).

Statistical analysis

The sample size of the study was calculated with type 1 error margin of 5% and power of at least 80% for each variable. The SPSS (IBM SPSS for Windows, ver. 26) statistical package program was used to analyze the data. Kolmogorov-Smirnov (n>50) and Skewness-Kurtosis tests were used to check whether the data in the study were distributed normally. Since the measurements were normally distributed, parametric tests were performed. Descriptive statistics for the variables in the study are expressed as number (n) and percentage (%), mean, standard deviation. The one-way analysis of variance (ANOVA) or independent t-test was applied for comparison between groups. Following ANOVA, the Duncan test was used to identify different groups. Pearson correlation coefficients were calculated to identify the association between measurements. The statistical significance level was acknowledged as $p<0.05$.

Results

Three hundred individuals, 113 (37.7%) female and 187 (62.3%) male, with an average age of 41.74±12.76 years, were included in the study (Table 1). Table 2 shows the association between MDAS and OHIP-14 scores and demographic data. No statistically significant difference was observed between MDAS and OHIP-14 scores according to sex ($p>0.05$). When MDAS scores were compared according to education levels, the MDAS scores of primary school graduates (16.07±4.18) were statistically significantly higher than those of the others ($p<0.05$). The lowest MDAS score was observed in university graduates (14.16±4.90). A statistically significant difference was observed between educational status and OHIP-14 scores ($p<0.05$). The highest OHIP-14 score was found in primary school graduates (18.40±8.38), and the lowest score was observed in university graduates (11.33±7.53). A statistically significant difference was determined between the frequency of visiting the dentist and OHIP-14 scores

(p<0.05). Those who reported going to the dentist whenever they had a problem had the highest OHIP-14 score. A statistically significant difference was found between the answers to the questions "Do you need oral health treatment?" and "What was the reason for your last visit to the dentist?" and OHIP-14 scores (p<0.05). MDAS scores of those who did not perform additional care were found to be statistically significantly higher than those who did (p<0.05) (Table 2).

There was a statistically significant and positive correlation between MDAS and OHIP-14 scores and periodontal parameters and age (p<0.001). There was also a statistically significant and positive correlation between MDAS and OHIP-14 scores (p<0.001) (Table 3).

Table 1. Demographic characterictics and periodontal status of the study population.

Baseline characteristics	**n**	**(%)**
Sex		
Female	113	37.7
Male	187	62.3
Smoking status		
Smoker	88	29.3
Non-smoker	212	70.7
	Mean± SD	
Age	41.74±12.76	
PI (score)	1.52±0.61	
GI (score)	1.52±0.61	
BOP (%)	49.91±34.25	
PPD (mm)	3.44±1.27	
CAL (mm)	2.82±3.44	

PI: plaque index, GI: gingival index, BOP: bleeding on probing, PPD: periodontal pocket depth, CAL: clinical attachment loss, SD: standard deviation

Table 2. Evaluation of MDAS and OHIP-14 scores according to participants' demographic data

		n	**MDAS Mean±SD**	**OHIP-14 Mean±SD**
Sex	**Female**	113	14.85±5.05	14±8.05
	Male	187	14.94±4.24	14.65±7.86
	p		0.874	0.491
Education level	**Primary school**	89	16.07±4.18[a]	18.40±8.38[a]
	Middle school	35	14.66±4.55[b]	15.03±8.96[b]
	High school	97	14.53±4.45[b]	13.02±5.66[c]
	University	79	14.16±4.90[b]	11.33±7.53[d]
	p		**0.033**	**0.001**
Frequency of visiting the dentist	**Every 6 months**	46	13.67±5.30	11.96±8.17[c]
	1 time per year	32	15.50±4.44	13.28±7.57[b]
	Whenever there is a problem	222	15.07±4.38	15.08±7.84[a]

	p		0.122	**0.036**
Do you need oral health treatment?	**Yes**	199	14.96±4.60	15.37±8.38
	No	101	14.79±4.48	12.51±6.58
	p		0.764	**0.003**
When was the last time you went to the dentist?	**0-3 months**	54	14.07±4.35	14.50±8.63
	3-6 months	78	14.71±4.43	13.59±7.97
	6 months-1 year	84	14.61±5.04	13.39±7.68
	>1 year	84	15.92±4.16	16.12±7.48
	p		0.091	0.105
Tooth brushing frequency	**Once a day**	89	14.89±4.82	13.88±7.71
	2 times a day or more	163	14.61±4.50	14.06±7.88
	1-2 times a week	17	15.35±3.69	16.12±6.89
	Rarely	31	16.26±4.41	16.81±9.02
	p		0.309	0.227
What was the reason for your last visit to the dentist	**Control**	66	14.61±4.92	12.73±7.48[c]
	Pain	48	14.77±4.91	15.31±8.90[c]
	Bleeding	28	14.04±4.27	13.68±6.96[c]
	Caries	75	15.21±4.71	13.44±6.90[c]
	Missing teeth	34	15.74±3.18	17.94±7.61[b]
	Tooth extraction	45	14.47±4.04	14.53±8.34[c]
	Others	4	19.50±7.14	23.00±14.02[a]
	p		0.293	**0.011**
Have any complications developed after the dental procedures?	**Yes**	24	16.21±4.93	15.50±11.36
	No	276	14.79±4.51	14.31±7.57
	p		0.143	0.482
Additional care	**Yes**	39	13.44±5.12	12.72±8.89
	No	261	15.12±4.43	14.66±7.76
	p		**0.032**	0.154

MDAS: Modified Dental Anxiety Scale, OHIP-14: Oral Health Impact Profile-14,
SD (standard deviation), Statistically significant at $p<0.05$,
Independent T-test: for two group comparisons, One-way ANOVA: for more than two group comparisons, a, b, c: Indicates difference between groups (Duncan post-hoc test), there is no difference between groups with the same letter

Table 3. Correlation analysis

		Age	PI	GI	BOP	PPD	CAL	OHIP-14
MDAS	**p**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
	r	0.217**	0.378**	0.378**	0.418**	0.317**	0.168**	0.453**
OHIP-14	**p**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**	
	r	0.415**	0.624**	0.628**	0.625**	0.582**	0.409**	

PI: plaque index, GI: gingival index, BOP: bleeding on probing, PPD: periodontal pocket depth, CAL: clinical attachment loss
MDAS: Modified Dental Anxiety Scale, OHIP-14: Oral Health Impact Profile-14
** Statistically significant at p≤0.001, r: correlation coefficient

Discussion

Dental anxiety is a condition that reduces people's quality of life by causing negative effects on both oral health and general health.

The most important step in eliminating dental anxiety is to determine the cause of the anxiety. Verbal and written surveys are used to determine dental anxiety levels and oral health-related quality of life.

In present study, MDAS was used to determine dental anxiety and OHIP-14 was used to determine oral health-related quality of life.

In the present study, as a result of evaluations made according to sex, no statistically significant difference was found between men and women according to MDAS scores. In the literature, many studies reported that the level of dental anxiety was statistically significantly higher in women than in men (1, 2, 19, 20), but some studies found no significant differences according to sex and dental anxiety levels, similar to our study (21, 22). This difference between studies may be due to cultural differences and the sample size examined.

In our study, it was observed that the dental anxiety levels of primary school graduates were statistically significantly higher than the other groups, and the dental anxiety levels of the other groups was similar to each other. In the literature, although there are studies reporting that fear and anxiety towards dentists decrease as the level of education increases (13, 23, 24), there are also studies reporting that there is no association between the level of education and dental anxiety (1, 2, 25). These differences observed between the study results may be due to factors such as differences in the education level classification used in the studies and the numbers of participants, unequal distribution of individuals in the groups, and socio-cultural structures of the individuals.

Providing regular oral care plays an important role in maintaining periodontal health (2). In present study, although the level of dental anxiety increased as the frequency of visiting the dentist and brushing teeth decreased, no statistically significant difference was found. The level of dental anxiety was low in individuals who performed additional care, such as using an interdental brush and mouthwash. Kayaaltı Yuksek and Beşiroğlu (2) reported that individuals with lower levels of dental anxiety had more regular tooth brushing habits. Pohjola et al. (26) reported that individuals with high dental anxiety had lesser tooth brushing frequency. Additionally, there are studies that found no relationship between the need for additional care (2, 3, 27, 28), visiting the dentist (2, 27), and frequency of tooth brushing and dental anxiety (27, 28). Sohn et al. (29) reported that individuals with dental anxiety had irregular dentist visits and that these individuals tended to reduce the number of dentist visits. Armfield et al. (30) reported that individuals who did not fear of dentists visited the dentist at a higher rate. Hagglin et al. (11) found a strong relationship between irregularity in the frequency of visiting the dentist and high dental anxiety.

In this study, the dental anxiety rate of individuals who developed complications at their last dentist visit was higher than those who did not develop complications, although there was no statistically significant difference. In the literature, similar to our findings, it was reported that individuals with a negative dental treatment history had high dental anxiety (2, 27, 31, 32). Deogade et al. (31) found that the anxiety levels of patients who thought their oral health was poor were higher. In present study, although the dental anxiety levels of those who thought they needed oral health treatment were higher, there was no statistically significant difference.

Considering previous studies, there are studies reporting that OHIP-14 scores are higher in women (1, 33), but there are also studies reporting that sex has no effect on oral health-related quality of life (15, 34). In present study, no significant relationship was detected between sex and OHIP-14 score.

In this study, when the association between oral health-related quality of life and educational status was evaluated, it was observed that the oral health-related quality of life values of primary school graduates were significantly higher than those of middle school, high school, and university graduates. In the study conducted by Ng and Leung (34), similar to ours, the association between oral health-related quality of life and educational status was found to be statistically significant. Diken Türksayar and Bulut (1) found that the OHIP-14 scores of primary and secondary school graduates were statistically significantly higher than those of high school and university graduates.

Ng and Leung (34) reported that non-regular dentist visits were associated with low quality of life scores. In the present study, it was found that quality of life worsened as the frequency of visiting the dentist and brushing teeth decreased. Additionally, the oral health-related quality of life of those who did not perform additional oral care was worse than among those who did. The OHIP-14 score of those who thought they needed dental treatment was found to be higher. It can be thought that the oral health-related quality of life of individuals worsens because the decrease in the frequency of tooth brushing and the lack of additional care will cause periodontal health to worsen and the number of decayed and lost teeth to increase. In our study, oral health-related quality of life was found to be worse in those who developed complications as a result of previous dental treatment, although not statistically significant. This may be due to worsening oral health because of fear of complications and avoidance of treatment.

It is known that dental anxiety causes postponement of dentist appointments and dental treatments (30, 35). This causes periodontal diseases and caries to progress, causing conditions such as bad breath, bleeding gums, tooth displacement, difficulty in chewing, and nutritional problems, and thus deteriorating the quality of life of individuals. In present study, it was observed that individuals with high dental anxiety had worse oral health-related quality of life. Similar to our findings, there are studies reporting that high dental anxiety levels and fear negatively affect the quality of life (2, 6, 15, 26, 36). Gisler et al. (15) reported that the level of quality of life related to dental anxiety and oral health had a statistically significant relationship, and the quality of life of patients with high anxiety levels was 3.5 times lower than patients with lower anxiety levels. Diken Türksayar and Bulut (1) found a significant but weak correlation between MDAS and OHIP-14 scores.

In the present study, a statistically significant and positive association was found between dental anxiety scores and periodontal parameters. Levin et al. (5) also found a positive correlation between PI, BOP, radiographic bone loss, PPD, and dental anxiety, similar to our study. In another study, Levin et al. (6) reported that radiographic bone loss and high plaque scores were positively correlated with high dental anxiety, but they found no correlation between BOP and PPD and dental anxiety. According to the results of present study, a statistically significant and positive correlation was found between oral health-related quality of life and periodontal parameters. The increase in pocket depth makes plaque removal more difficult and causes increased plaque formation. Thus, periodontal infection progresses in cycles, which negatively affects the quality of life. In a study conducted in patients with chronic periodontitis, a significant relationship was found between probing pocket depth and radiographic bone loss and OHIP-14 scores (6). Levin et al. (5) reported that there was a significant relationship between bleeding index, PI, radiographic bone loss, pocket depth, and OHIP-14 scores. Şahin Aydınyurt and Altındal (37) found a strong positive correlation between total OHIP-14 scores and PI and GI scores. Similar to our study, Ng and Leung (34) also found a significant relationship between clinical periodontal parameters and quality of life.

Applying scales to determine patients' anxiety levels before treatment can create a different perspective in approaching patients with high anxiety levels. Thus, patients' anxiety can be controlled and dental treatments can be performed more easily. Dental anxiety of patients admitted for treatment should be eliminated and the patient should be relaxed before starting treatment. Communication should be established with patients, the tools to be used should be introduced, the procedures to be performed should be explained to the patients in a clear manner, the patients' questions should be answered, and patients should be prepared for procedures that will be performed.

Additionally, training should be provided on topics such as what approaches should be used to reduce patients' dental anxiety. The oral hygiene motivation of society, especially among individuals with high dental anxiety, should be increased, and they should be encouraged to have regular dental examinations and receive treatment at an early stage. Thus, quality of life related to oral health can be increased.

This study has some limitations. In present study, only patients who were admitted to the periodontology clinic were evaluated. For this reason, considering the possibility that individuals with high dental anxiety might not even come for an examination, or that those who were examined might only receive emergency treatments and left our clinic without visiting, it was possible that

we were not able to reach individuals with high anxiety or who had never been to the dentist. Other limitation is the small sample size in the study. It may be more useful to conduct more detailed evaluations in a larger population, including subgroups of the scales used.

Conclusion

According to the results of this study, there was a relationship between education level, frequency of going to the dentist, thinking that oral health treatment was needed, periodontal status, and MDAS and OHIP-14 scores. However, because not all factors that cause dental anxiety are known, more detailed scales should be developed to determine factors that cause anxiety. Learning the factors that cause dental anxiety and procedures to reduce dental anxiety during treatment may help dental treatment to be more successful and improve oral health.

Conflict of interest: No conflict of interest was declared by the authors.

Ethics committee approval: Approval for the research was received from the Recep Tayyip Erdoğan University Non-Interventional Clinical Research Ethics Committee (Ethics Committee Decision No: 2019/20).

Authors' contributions to the article

H.Y. and O. K. constructed the main idea and hypothesis of the study. H.Y. and P.Ç. developed the theory and arranged/edited the material and method section. H.Y., O.K. and P.Ç. have done the evaluation of the data in the Results section. Discussion section of the article written by H.Y. O.K. and P.Ç. reviewed, corrected and approved. In addition, all authors discussed the entire study and approved the final version.

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