



EVALUATION OF EFFECTS OF PERIODONTAL DISEASES ON SOCIAL ANXIETY LEVEL

ABSTRACT

Objectives: The aim of this study was to determine the level of social anxiety in patients with periodontal disease, and to examine its relationship with the clinical characteristics of periodontal disease.

Materials and Methods: This study investigated 200 patients in a cross-sectional design. Sociodemographic data, clinical periodontal parameters and patient complaints were recorded. Patients were divided into four groups according to their clinical periodontal index values: chronic periodontitis (CP), aggressive periodontitis (AP), gingivitis (G), and periodontally healthy (PH). Social anxiety levels of the patients were assessed based on the Liebowitz Social Anxiety Scale (LSAS).

Results: A negative relationship was observed between LSAS scores and age, a positive relationship was observed with education level ($p<0.05$). The Liebowitz total score and total anxiety, socially related anxiety and total avoidance levels of patients with halitosis complaints were found significantly higher ($p<0.05$). LSAS scores for patients with complaints of aesthetics and mobility were significantly higher for all seven sub-items ($p<0.05$). Total avoidance and performance avoidance values were significantly higher in patients with complaints of gingival bleeding ($p<0.05$). All of the LSAS scores were higher in the AP and CP groups compared to the PH group and higher in the AP group than in the CP and G groups ($p<0.05$). In the G group, the performance-related avoidance level was significantly higher than in the PH group ($p<0.05$).

Conclusions: Periodontal diseases may negatively affect the psychological and emotional states of dental patients.

Key Words: Anxiety, periodontal diseases, social phobia

*Ayşegül Sarı¹,
Süleyman Ziya Şenyurt²,
Kemal Üstün³,
Seval Kul⁴,
Kamile Erciyas²

ORCID IDs of the authors:
A.S.0000-0001-6180-9776
S.Z.Ş.0000-0001-5536-9110
K.Ü.0000-0001-9696-2041
Ş.K.0000-0002-4716-9554
K.E.0000-0001-9940-0423

¹ Department of Periodontology, Faculty of Dentistry, Mustafa Kemal University, Hatay, Turkey.

² Department of Periodontology, Faculty of Dentistry, Gaziantep University, Gaziatep, Turkey.

³ Department of Periodontology, Faculty of Dentistry, Akdeniz University, Antalya, Turkey.

⁴ Department of Biostatistic, Faculty of Medicine, Gaziantep University, Gaziatep, Turkey.

Received : 13.08.2018
Accepted : 23.01.2019

How to Cite: Sarı A., Şenyurt SZ., Üstün K., Kul S., Erciyas K. Evaluation of Effects of Periodontal Diseases on Social Anxiety Level. Cumhuriyet Dent J 2019;22:1:92-101.

*Corresponding Author

Mustafa Kemal University, Faculty of Dentistry, Department of Periodontology 31040 Hatay/Turkey

Phone: +90 5071110868 Fax: +90 326 2455060 E-mail: aysegulsari@edu.tr

INTRODUCTION

Periodontal diseases, some of the most common multifactorial diseases in society, are chronic infectious diseases characterized by inflammation and destruction of the supporting tissues of the tooth that may result in tooth loss.¹ Although the most prevalent periodontal disease is gingivitis, past or active periodontitis has been reported in 80-90% of the adult population and severe periodontitis in 7-15%.^{2,3}

Oral health affects facial aesthetics and physical functions such as eating, drinking and speaking in social environments.⁴ Periodontal diseases that negatively affect oral health, have many pathological symptoms, such as gingival bleeding, periodontal tissue loss, periodontal pocket formation, mobility and displacement of tooth, tooth loss, and oral malodor (halitosis).^{5,6} While these symptoms affect the quality of life of the individual, they may also have negative effects on that person's psychiatric condition.^{4,7}

Social anxiety is a psychiatric disorder characterized by fear of humiliation in the social environment that prevents individuals from expressing themselves among strangers and causes them to avoid specific actions such as speaking, eating, and observing in public.^{8,9} Social anxiety negatively affects people's professional roles and daily activities and decreases the quality of life.^{10,11} Excessive stress in individuals with this psychiatric disorder is manifested externally through an essential tremor, stuttering, strabismus, physical conditioning, or skin diseases such as acne.¹²⁻¹⁴ Periodontal diseases with non-aesthetic features such as tooth mobility and loss, halitosis, gingival bleeding, and gingival recession can negatively affect the physical appearance of an individual.¹⁵

This suggests that periodontal diseases may affect the individual's self-confidence and behavior in the social environment. The purpose of this study was to determine the level of social anxiety in patients with periodontal disease, and to examine its relationship with socio-demographic variables and the clinical characteristics of periodontal disease.

MATERIALS AND METHODS

Study participants

The study protocol was approved by the Ethics Committee for the Use of Human Subjects in Research, Gaziantep University, Gaziantep, Turkey (Protocol No. 19.03.2013/125) and the study was performed pursuant to the Declaration of Helsinki. Patients who applied to the Department of Periodontology, Faculty of Dentistry, Gaziantep University for treatment and examination between April 2013 and March 2014 were informed about the content of the study. Patients who consented to take part in the study were included. The study included 200 patients (109 males, 91 females) ranging in age from 21 to 65 years. Periodontal examinations were performed before periodontal treatments were planned for the patients, and clinical periodontal indexes were recorded by a single researcher (A.S).

Power analysis was performed for this study. To detect a significant difference (Cohens $d=0.80$) for large effect size between groups, minimum sample size for each group was determined as 26 ($\alpha=0.05$, $1-\beta=0.20$)

Patients were asked to complete the Liebowitz Social Anxiety Scale and a questionnaire that assessed anamnesis data such as demographic data, frequency of visiting the dentist, and smoking status as well as patient complaints while waiting in the waiting room.

Evaluation of periodontal parameters

Clinical periodontal parameters of the patients, including pocket depth (PD), periodontal attachment loss (CAL), bleeding on probing (BOP-%), plaque index (PI), and gingival index (GI) scores were recorded using the Williams periodontal probe (Hu-Friedy, Chicago, IL, USA). These parameters were measured from six areas (mesial-buccal, disto-buccal, mid-buccal, mesial-lingual, mid-lingual, disto-lingual) of the teeth. At least 15 teeth were present in the mouths of the patients. Patients without any clinical attachment loss and with $PD \leq 3$ mm and $BOP < 25\%$ ¹⁶ were included in the group of periodontally healthy¹⁷, patients without any clinical attachment loss with $PD \leq 3$ and $BOP \geq 25\%$ were included in the gingivitis group,¹⁷ and patients with at least four teeth with $PD \geq 5$ mm, $CAL \geq 2$ mm

were included in chronic periodontitis groups.¹⁸ Patients with interproximal attachment loss affecting the most 2 permanent teeth other than the first molars and incisors were included in localized aggressive periodontitis, and generalized interproximal attachment loss affecting at least 3 permanent teeth other than the first molars and incisors were included in generalized aggressive periodontitis in the <35 years of age people.¹⁹

Patients were classified according to their index values into four groups: periodontally healthy (PH), gingivitis (G), chronic periodontitis (CP) and aggressive periodontitis (AP).

Liebowitz Social Anxiety Scale

The Liebowitz Social Anxiety Scale (LSAS) was originally developed by Michael R. Liebowitz to determine a person's degree of anxiety and avoidance in socially relevant and performance states.² The validity and reliability of the questionnaire for treating of patients with social anxiety are accepted.²¹ The reliability of the scales in Turkey was evaluated by Soydan *et al.*²²

The LSAS consists of 48 questions; 24 on anxiety and 24 on avoidance. Each group of 24 questions is composed of 11 socially-related and 13 performance-related questions. Anxiety and avoidance were scored from 0 to 3 (anxiety: 0: absent, 1: weak, 2: moderate, 3: serious; avoidance: 0: never, 1: rarely, 2: frequently, 3: usually); scores ranged from 0 to 72 for each subsection, and the total score was between 0 and 144. The recommended cutoff score was 25 for each subscale and 50 for the total score.

LSAS scores were shown in seven sub-items including the Liebowitz total score, total anxiety, performance anxiety, socially-related anxiety, total avoidance, performance avoidance and socially-related avoidance.

Statistical analysis

We evaluated the normality of the distribution continuous variables using the Shapiro-Wilk test. Student's t-test was used to compare two independent variable groups with a normal distribution, and post-hoc analyses of variance (one-way ANOVA) and least significant difference

(LSD) test were used to compare more than two groups. The relationship between the categorical variables was assessed using the chi-square test. General linear regression analysis model was used to calculate adjusted means of the LSAS scores for age. Descriptive statistical parameters are presented as frequencies, percentages (%) and means± standard deviations. SPSS for Windows version 22.0 was used for statistical analyses, and p value <0.05 was considered statistically significant.

RESULTS

Demographic data for the individuals included in the study are shown in Table 1.

Table 1. Distribution of demographic data by group

Variable* n(%)	PH (n:45)	G (n:67)	CP (n:60)	AP (n:28)	P*	
Sex	Male	24(53.3%)	37(55.2%)	32 (53.3%)	16 (56.1%)	0.985
	Female	21(46.7%)	30(44.8%)	28 (46.7%)	12 (43.9%)	
Age	< 30	24(53.3%)	33(49.3%)	14(23.3%)	18(64.3%)	0.001†
	30-50	11(24.4%)	26(38.8%)	38(63.3%)	10(35.7%)	
	>50	10(22.2%)	8(11.9%)	8(13.3%)	0(0%)	
Education Levels	Lower secondary education	0(0%)	10(14.9%)	21(35%)	3 (10.7%)	0.001†
	High school	6(13.3%)	22(32.8%)	23(38.3%)	16(57.1%)	
	University	39(86.7%)	35(52.2%)	16(26.7%)	9(32.1%)	
Monthly Income	≤750 TRY	10(22.2%)	22(32.8%)	16(26.7%)	10(35.7%)	0.012†
	750-1,500 TRY	3(6.7%)	20(29.9%)	16(26.7%)	8(28.6%)	
	≥1,500 TRY	32(71.1%)	25(37.3%)	28(46.7%)	10(35.7%)	
Frequency of Going to the Dentist	Yes	45 (100%)	60(89.6%)	50(83.3%)	25 (89.3%)	0.006†
	No	0	7 (10.4%)	10(16.7%)	3 (10.7%)	
Smoking Status	Yes	33(73.3%)	48(71.6%)	48(81.4%)	25(89.3%)	0.214
	No	12(26.7%)	19(28.4%)	12(18.6%)	3(10.7%)	

* Chi-square test † Statistically significant at p< 0.05

There were no statistically significant differences in terms of sex distribution among the groups (p: 0.989). Individuals were divided by age into three subgroups as: 1 (< 30 years), 2 (30-50 years) and 3 (>50 years). There was a significant difference in age between the groups with periodontal disease (p: 0.001). Middle age group patients were present in the CP group, and young patients in the AP group.

Educational status was classified as secondary education, high school and university. There was a significant difference in education level between the groups and the education levels of the PH and G groups were higher (p:0.001). Monthly income was categorized as ≤ 750 TRY, 750-1,500 TRY, and ≥ 1,500 TRY. There was a significant difference among the groups income level, where the PH group

contained more patients from the $\geq 1,500$ group. There was also a significant difference among the groups, in patients visiting the dentist (p: 0.006). The healthy group was under dental control. There were no significant differences among the groups in smoking status (p: 0.189).

Demographic data for the patients and the results of comparison with LSAS scores are provided in Table 2.

Table 2. Comparison of demographic data and LSAS scores

Variable* n(%)	PH (n:45)	G (n:67)	CP (n:60)	AP (n:28)	P*	
Sex	Male	24(53.3%)	37(55.2%)	32 (53.3%)	16 (56.1%)	0.985
	Female	21(46.7%)	30(44.8%)	28 (46.7%)	12 (43.9%)	
Age	< 30	24(53.3%)	33(49.3%)	14(23.3%)	18(64.3%)	0.001†
	30-50	11(24.4%)	26(38.8%)	38(63.3%)	10(35.7%)	
	>50	10(22.2%)	8(11.9%)	8(13.3%)	0(0%)	
Education Levels	Lower secondary education	0(0%)	10(14.9%)	21(35%)	3 (10.7%)	0.001†
	High school	6(13.3%)	22(32.8%)	23(38.3%)	16(57.1%)	
	University	39(86.7%)	35(52.2%)	16(26.7%)	9(32.1%)	
Monthly Income	≤ 750 TRY	10(22.2%)	22(32.8%)	16(26.7%)	10(35.7%)	0.012†
	750-1.500 TRY	3(6.7%)	20(29.9%)	16(26.7%)	8(28.6%)	
	≥ 1.500 TRY	32(71.1%)	25(37.3%)	28(46.7%)	10(35.7%)	
Frequency of Going to the Dentist	Yes	45 (100%)	60(89.6%)	50(83.3%)	25 (89.3%)	0.006†
	No	0	7 (10.4%)	10(16.7%)	3 (10.7%)	
Smoking Status	Yes	33(73.3%)	48(71.6%)	48(81.4%)	25(89.3%)	0.214
	No	12(26.7%)	19(28.4%)	12(18.6%)	3(10.7%)	

* Mean \pm standard deviation †Student's t test

‡ Statistically. significant at $p < 0.0$

No significant differences were observed when the Liebowitz scores were evaluated according to the sex, the total anxiety and socially related avoidance levels in women were significantly higher. When we compared age and LSAS scores, we found that scores increased as age decreased: Total score (p:0.007 and 0.002 respectively), total anxiety (p: 0.016 and 0.013 respectively), socially related anxiety (p: 0.002 and 0.017 respectively), total avoidance (p: 0.008 and 0.001 respectively), performance avoidance (p: 0.026 and 0.003 respectively) and socially related avoidance (p: 0.003 and 0.009 respectively) levels in the < 30 age group were statistically higher than in the 30-50 and >50 age groups, and performance anxiety levels of the < 30 and 30-50 age groups were higher than those of the >50 age group individuals (p: 0.001 and 0.009, respectively). Due to the increased educational level, the Liebowitz total (p: 0.028 and 0.005, respectively), total anxiety (p: 0.027 and 0.004, respectively), performance anxiety (p: 0.018 and 0.03, respectively), total avoidance (p: 0.025 and 0.016, respectively) scores of the groups studying at

the high school and university levels were significantly higher, and the performance avoidance scores showed a statistically significant increase in the group studying only at university compared to the group with secondary education (p: 0.036). Due to the decrease in monthly income level, there was a significant increase in the Liebowitz total, total anxiety and socially related avoidance scores of the group with ≤ 750 TL monthly income compared to the group with ≥ 1.500 TRY monthly income, while there was a statistically significant increase in total avoidance (p: 0.002 and 0.024, respectively) and performance avoidance (p:0.001 and 0.0, respectively) in the groups with ≤ 750 TL and 750-1.500 TRY monthly income compared to the group with ≥ 1.500 TRY monthly income.

Patient complaints recorded in the patient's anamnesis were divided into six subgroups: gingival bleeding, tooth sensitivity, halitosis, aesthetic problems, mobility and abscess (Table 3).

Table 3. Distribution of patient complaints by group

Variable*		PH (n:45)	G (n:67)	CP (n:60)	AP (n:28)	p*
Halitosis	Yes	8 (17.8%)	46 (68.7%)	43 (71.7%)	27 (96.4%)	0.001 [†]
	No	37 (82.2%)	21 (31.3%)	17 (28.3%)	1 (3.6%)	
Aesthetic Problems	Yes	19 (42.2%)	35 (52.2%)	45 (75%)	26 (92.9%)	0.001 [†]
	No	26 (57.8%)	32 (47.8%)	15 (25%)	2 (7.1%)	
Mobility	Yes	4 (8.9%)	26 (38.8%)	33 (55%)	27 (96.4%)	0.001 [†]
	No	41 (91.1%)	41 (61.2%)	27 (45%)	1 (3.6%)	
Gingival Bleeding	Yes	9 (20.0%)	22 (32.8%)	44 (73.3%)	26 (92.9%)	0.001 [†]
	No	36 (80.0%)	45 (67.2%)	16 (26.7%)	2 (7.1%)	
Tooth Sensitivity	Yes	2 (4.4%)	13 (19.4%)	31 (51.7%)	25 (89.3%)	0.001 [†]
	No	43 (95.6%)	54 (80.6%)	29 (48.3%)	3 (10.7%)	
Abscess	Yes	3 (6.7%)	24 (35.8%)	16 (26.7%)	27 (96.4%)	0.001 [†]
	No	42 (93.3%)	43 (64.2%)	44 (73.3%)	1 (3.6%)	

*Chi-square test

[†]Statistically significant at p<0.0

There was a significant difference among the groups in patient complaints (p:0.001). Although these complaints were most prevalent in the AP

group, the CP group had more complaints than the PH and G groups. A comparison of patient complaints and LSAS scores is shown in Table 4.

Table 4. Comparison of patient complaints and LSAS scores

Variable*		Liebowitz Total score	Total Anxiety	Performance Anxiety	Socially Related Anxiety	Total Avoidance	Performance Avoidance	Social Related Avoidance
Halitosis	Present	84.81±25.32	43.67±12.96	23.67±7.53	22.53±5.89	41.17±12.64	23.81±7.24	21.15±6.11
	None	76.96±17.45	39.49±9.44	22.53±5.89	19.76±7.04	37.50±9.21	21.15±6.11	17.29±5.66
	P	0.014 [‡]	0.012 [‡]	0.232	0.023 [‡]	0.005 [‡]	0.055	0.055
Aesthetic Problems	Present	86.23±22.20	44.39±11.75	24.27±6.95	20.22±6.50	41.56±11.29	23.83±6.84	17.65±5.17
	None	74.65±19.51	38.29±10.03	21.79±6.20	17.02±5.26	36.69±10.19	20.84±6.36	15.41±4.47
	P	0.001 [‡]	0.001 [‡]	0.008 [‡]	0.001 [‡]	0.002 [‡]	0.002 [‡]	0.001 [‡]
Mobility	Present	87.97±24.46	45.59±12.69	25.32±7.05	20.79±6.74	42.55±11.78	24.18±6.69	18.23±5.73
	None	76.38±18.80	39.05±9.80	21.78±6.15	17.45±5.42	37.28±10.12	21.34±6.61	15.62±4.22
	P	0.001 [‡]	0.001 [‡]	0.001 [‡]	0.001 [‡]	0.001 [‡]	0.004 [‡]	0.001 [‡]
Gingival Bleeding	Present	82.15±24.013	41.94±12.361	23.64±7.056	18.77±6.523	40.39±11.855	23.54±7.108	16.88±5.312
	None	77.79±16.935	40.43±9.418	22.07±5.961	18.41±5.441	37.13±9.198	20.41±5.688	16.00±4.302
	P	0.167	0.362	0.107	0.682	0.042 [‡]	0.001 [‡]	0.225
Tooth Sensitivity	Present	81.79±20.440	42.38±10.600	23.32±6.288	19.28±5.811	39.89±10.256	22.76±6.344	16.70±4.530
	None	78.33±23.528	39.69±12.350	22.57±7.330	17.56±6.508	37.92±12.141	21.67±7.404	16.28±5.627
	P	0.275	0.105	0.446	0.054	0.222	0.269	0.56
Abscess	Present	86.14±25.438	44.24±13.152	24.63±7.335	20.00±7.207	42.07±12.443	24.44±6.852	17.51±5.934
	None	77.45±18.728	39.82±9.934	22.18±6.177	17.90±5.338	37.58±9.855	21.22±6.465	16.02±4.282
	P	0.013 [‡]	0.015 [‡]	0.013 [‡]	0.034 [‡]	0.01 [‡]	0.001 [‡]	0.066

* Mean ± standard deviation †Student's t test

[‡] Statistically significant at p<0.05

The Liebowitz total score and total anxiety, socially related anxiety and total avoidance levels of patients with halitosis complaints were found significantly higher. Liebowitz scores for patients with complaints of aesthetics and tooth mobility

were significantly higher for all seven sub-items. Total avoidance and performance avoidance values were significantly higher in patients with complaints of gingival bleeding. No significant differences were found for any Liebowitz sub-item

in patients with tooth sensitivity, although all sub-items (except social related avoidance) were found significantly higher in patients with abscess complaints.

A comparison of LSAS scores among periodontal disease groups is shown in Table 5.

Table 5. Comparison of LSAS scores among all groups

Variable* (n)	PH (n:45)	G (n:67)	CP (n:60)	AP (n:28)	p	Adjusted p
Liebowitz Total Score	71.02±14.95	76.46±20.92	83.57±21.28	98.79±21.7	0.001 .§.¶.***‡‡	p< 0.05 .§.¶.***‡‡
Total Anxiety	36.93±7.9	39.19±11.01	42.80±11.07	50.64±11.91	0.001 .§.¶.**	p< 0.05 .§.¶.***‡‡
Performance Anxiety	20.82±4.89	22.24±6.97	23.07±6.5	28.4±6.27	0.001 .§.¶.**	p< 0.05 .§.¶.**
Socially Related Anxiety	16.78±5.34	17.31±5.13	19.28±6.01	23.39±7.2	0.001 .§.¶.**	p< 0.05 .§.¶.***‡‡
Total Avoidance	34.38±8.72	37.57±10.37	40.6±10.7	47.5±11.48	0.001 .§.¶.**	p< 0.05 .§.¶.***‡‡
Performance Avoidance	18.56±4.75	21.79±6.44	23.55±6.81	27.21±6.69	0.001 .§.¶.***††	p< 0.05 .§.¶.***††‡‡
Socially Related Avoidance	14.78±4.1	15.99±4.7	16.75±4.52	20.29±5.87	0.001 .§.¶.**	p< 0.05 .§.¶.**

* Mean ± standard deviation † One-way ANOVA and LSD post-hoc tests ‡ Statistically significant at p< 0.05
 ||: PH versus CP §: PH versus AP ¶: G versus AP **: CP versus AP ††: PH versus G ‡‡:G versus CP

All scores including the Liebowitz total score, total anxiety, performance anxiety, socially related anxiety, total avoidance, performance avoidance, and socially related avoidance were higher in the AP and CP groups compared to the PH group and higher in the AP group than in the CP and G group (p: 0001). In the G group, the performance-related avoidance level was significantly higher than in the PH group (p: 0.001). Adjusted P values calculated for age are the same with these results, except Liebowitz total score, total anxiety, socially related anxiety, total avoidance, and performance avoidance were higher in the CP group compared to the G group (p<0.05).

DISCUSSION

In this study, the possible effects of periodontal disease on social anxiety level were investigated. Although previous studies have explored levels of social anxiety in patients with diseases such as acne, halitosis, and strabismus, to the best of our knowledge no study has evaluated the social anxiety frequency and related disability in patients with periodontal diseases.^{13, 14, 23} The present study is the first to evaluate of the effects of periodontal diseases on social anxiety.

When we evaluated the groups’ demographic data, we found no significant differences in terms of sex. Individuals younger than 30 years of age were common in the AP group, which agrees with previous reports.¹⁸

In terms of education level, we found that the education level of the individuals in the PH and G groups was high whereas patients in the CP and AP groups were more commonly educated to the secondary or high school level. These results support the claim that education level increases the power of the individuals to engage in self-care.²⁴ In terms of the monthly income, the healthy group contained higher monthly income individuals than the other groups. This suggests that a higher income may confer advantages to individuals in developing oral care habits and gaining access to oral and dental health services. When we examined dental visits and education level, we found that the highest level reaching 100 % was observed in the healthy group, similar to the results for monthly income. These results are consistent with studies reporting that oral hygiene habits and regular dental visits increase with increasing education levels.²⁵

No significant differences were observed among the groups in cigarette smoking rates. Although studies investigating the effects of smoking on periodontal disease suggest that cigarette smoking increases the risk of periodontal disease.^{26,27} Our study results contradict these data. Possible explanations for these inconsistencies failure to account for risk factors other than smoking among the periodontal disease groups and the small number of individuals included in the study.

The LSAS is considered the gold standard for determining the level of impact of a social anxiety disorder on individuals by the International Depression and Anxiety Association.²⁸ When we examined LSAS scores according to sex, we found that female patients showed significantly higher levels in all subgroups. These results are inconsistent with studies reporting that men have higher values based on scales such as dental anxiety,²⁹ although they are consistent with studies reporting that women have a greater tendency toward social anxiety disorders.^{23, 30} This can be explained by the more intense emotional state in women and sex-related perceptual differences. In addition, our study found an increase in the level of social anxiety in younger age groups. Zaitso *et al.*²³ observed higher anxiety scores in the middle age group when they classified age into three subgroups whereas other studies have shown higher levels in younger individuals, in accordance with the results of the current study.^{31, 32} The discrepancy with the work of Zaitso *et al.* may be due to methodological differences such as the high number of women in the middle age group. Decreased levels of anxiety with increased can be attributed to patients' reduced anxiety over their outward appearance and their skills for coping with societal problems as their age.³³ A positive relationship was found between education level and LSAS scores in the current study. Yolaç Yarpuz *et al.*³³ reported that social anxiety and education showed a negative correlation whereas Gültekin *et al.*³⁴ reported that the level of social anxiety in university students was considerably higher in accordance with the results of the present study. This suggests that individuals in a more

perfectionist social environment with increasing levels of education may be more anxious about possible problems. In our study, LSAS scores increased as monthly income decreased. Ergin *et al.*³⁵ reported that power to engage in self-care was low in individuals with low socioeconomic status. According to these results, the power of individuals to meet their needs and solve problems decreases as their income decreases.

When the complaints of the patients related to the symptoms of periodontal disease were evaluated by the anamnesis forms, it was observed that the patient complaints were higher in the AP and CP group. Some of the periodontal healthy individuals reported abscesses and mobility in their mouths. This may indicate that the patient's intra-oral perception is not always consistent with professional periodontal examination results. Symptoms of periodontal disease (gingival inflammation, tooth loss, toothache, halitosis, and so forth) are among the oral health issues that have negative effects on quality of life.⁴ In the current study, when LSAS sub-scores and patient complaints were compared, there was significant increase in LSAS sub scores in the presence of complaints that could cause feelings of physical deformities in the social environment such as halitosis, aesthetic problems, mobility, and abscesses. There were no significant results when LSAS scores were compared with some complaints that are health problems but are difficult for other people to perceive as a physical deformity such as gingival bleeding and tooth sensitivity. Ng *et al.*⁴ discussed the fact that symptoms of periodontal disease such as dental pain that can originate from gingival infection, dental mobility, halitosis, and dental abscess affect quality of life by causing physical disabilities. Zaitso *et al.*²³ did not observe a significant difference between the BOP index and low (-59) –or high (60-) LSAS scores in their study although a significant decrease in LSAS scores was observed after halitosis treatment. The results of the current study are consistent with the data in these previous reports.

In our study, for all subgroups of LSAS scores, values for the CP and AP groups were significantly higher than those for the S and G

groups (Total anxiety and socially related avoidance did not include these results, for G versus CP groups); and values for the AP group were higher than those for the CP group. The present study results imply that the CP and AP groups (periodontal disease groups), may perceive a deformity in physical appearance due to symptoms such as abscess, halitosis, and dental mobility as well as aesthetic problems related to tooth loss and localization changes in the teeth. This may result in limited avoidance and increased levels of anxiety in the social environment. In addition, reason of LSAS values for the AP group higher than those for the CP group may explained with more severe and rapid periodontal damage in AP. Previous studies have compared specific medical situations that affect physical appearance to high rates of social phobia. Bez *et al.*¹⁴ showed that LSAS scores of patients with acne vulgaris were higher than those of a control group without acne vulgaris. Zaitso *et al.*²³ emphasized the awareness of halitosis among patients with high LSAS scores compared to patients with low LSAS scores. Stein *et al.*³⁶ diagnosed social phobia in 75% of individuals who participated in their study on stuttering, whereas Gundel *et al.*³⁷ found that social phobia was common in patients with spasmodic torticollis. Schneier *et al.*³⁸ reported that social anxiety scores were high in two different studies conducted by Topcuoglu *et al.*³⁹ In our study, the high social anxiety scores in the presence of periodontal diseases, which show symptoms that patients may experience as a negative perception of their physical appearance, are consistent with previous reports.

Limitations of this study are: the LSAS scores before and after periodontal treatment weren't evaluated, and the possibility of social anxiety as a source of stress increasing which might affect the severity of periodontal disease wasn't assessed. Another limitation of current study is small sample size.

Further studies are needed with larger patient groups and with different design including periodontal treatment to evaluate the relationship between periodontal disease and social anxiety.

CONCLUSIONS

According to our results, chronic periodontitis and aggressive periodontitis may have negative effects on the psychological and emotional states of patients. Thus, periodontal treatment may have a positive effect on the emotional state of patients with social anxiety.

ACKNOWLEDGEMENTS

The authors report no conflicts of interest related to this study. The present study was self-funded by the authors.

CONFLICTS OF INTEREST

None

Periodontal Hastalıkların Sosyal Kaygı Düzeyi Üzerindeki Etkilerinin Değerlendirilmesi

ÖZ

Amaçlar: Bu çalışmanın amacı, periodontal hastalığa sahip bireylerde sosyal anksiyete düzeyini belirlemek, sosyal anksiyetenin sosyo-demografik veriler ve periodontal hastalığın klinik karakteristiği ile ilişkisini incelemektir. **Gereç ve Yöntemler:** 200 hastanın (109 erkek, 91 kadın) dâhil edildiği çalışma kesitsel olarak planlandı. Çalışma kapsamında hastaların sosyo-demografik verileri, klinik periodontal parametreler ve hasta şikâyetleri kaydedildi. Hastalar klinik periodontal indeks değerlerine göre kronik periodontitis (KP), agresif periodontitis (AP), gingivitis (G), ve periodontal sağlıklı (PS) olmak üzere 4 gruba ayrıldı. Hastaların sosyal anksiyete düzeyleri Liebowitz Sosyal Kaygı Ölçeği (LSKÖ) ile değerlendirildi. **Bulgular:** LSKÖ skorları ile yaş arasında negatif ilişki, eğitim seviyesi ile arasında pozitif ilişki saptanmıştır ($p<0,05$). Halitozis şikâyeti olan hastalarda Liebowitz total skor, total anksiyete, sosyal ilişkili anksiyete ve total kaçınma anlamlı derecede yüksek bulunmuştur ($p<0,05$). Estetik ve mobilite şikâyeti olan hastalarda LSKÖ skorları 7 alt grupta da anlamlı derecede yüksekti ($p<0,05$). Dişeti kanaması olan hastalarda total kaçınma ve performans kaçınma skorları anlamlı derecede yüksekti ($p<0,05$). Tüm LSKÖ skorlarının KP ve AP gruplarında PS ve G gruplarına, AP grubunda KP grubuna nazaran anlamlı düzeyde yüksek olduğu görülmüştür ($p<0,05$). Performans ilişkili kaçınma seviyesinin G grubunda, PH grubundan anlamlı seviyede yüksek olduğu saptanmıştır

($p < 0,05$). **Sonuçlar:** Periodontal hastalıklar, dental hastaların psikolojik ve duygularını üzerinde olumsuz etki gösterebilirler. **Anahtar Kelimeler:** Anksiyete, periodontal hastalıklar, sosyal fobi.

REFERENCES

1. Newman MG KP, Carranza FA. Carranza's Clinical Periodontology. California: Saunders Elsevier, 2019:55-190.
2. Brand HS, Gortzak RA, Abraham-Inpijn L. Anxiety and heart rate correlation prior to dental checkup. Int Dent J 1995;45:347-351.
3. Loe H, Anerud A, Boysen H, Morrison E. Natural history of periodontal disease in man. Rapid, moderate and no loss of attachment in Sri Lankan laborers 14 to 46 years of age. J Clin Periodontol 1986;13:431-445.
4. Ng SK, Leung WK. Oral health-related quality of life and periodontal status. Community Dent Oral Epidemiol 2006;34:114-122.
5. Cochran DL. Inflammation and bone loss in periodontal disease. J Periodontol 2008;79:1569-1576.
6. Bollen CM, Beikler T. Halitosis: the multidisciplinary approach. Int J Oral Sci 2012;4:55-63.
7. Needleman I, McGrath C, Floyd P, Biddle A. Impact of oral health on the life quality of periodontal patients. J Clin Periodontol 2004;31:454-457.
8. American Psychiatric Association Diagnostic and statistical manual of mental disorders. DC: American Psychiatric Association 1994.
9. Romm KL, Rossberg JI, Berg AO, Hansen CF, Andreassen OA, Melle I. Assessment of social anxiety in first episode psychosis using the Liebowitz Social Anxiety scale as a self-report measure. European psychiatry : J Assoc Eur Psychiatrists 2011;26:115-121.
10. Halperin S, Nathan P, Drummond P, Castle D. A cognitive-behavioural, group-based intervention for social anxiety in schizophrenia. Aust N Z Psychiatry 2000;34:809-813.
11. Wittchen HU, Fuetsch M, Sonntag H, Muller N, Liebowitz M. Disability and quality of life in pure and comorbid social phobia. Findings from a controlled study. European psychiatry : J Assoc Eur Psychiatrists 2000;15:46-58.
12. Oberlander EL, Schneier FR, Liebowitz MR. Physical disability and social phobia. J Clin Psychopharmacol 1994;14:136-143.
13. Bez Y, Coskun E, Erol K, Cingu K A, Eren Z, Toğcuoğlu V, Özertürk Y. Adult strabismus and social phobia: a case-controlled study. Journal of AAPOS : the official publication of the American Association for Pediatric Ophthalmology and Strabismus 2009;13:249-252.
14. Bez Y, Yesilova Y, Kaya MC, Sir A. High social phobia frequency and related disability in patients with acne vulgaris. Eur J Dermatol 2011;21:756-760.
15. Newman MG, Takei H, Klokkevold PR, Carranza FA. Carranza's Clinical Periodontology. California: Elsevier Health Sciences, 2019:303-365.
16. Sezer U, Erciyas K, Ustün K, Pehlivan Y, Şenyurt SZ, Aksoy N, Tarakçıoğlu M, Taysı S, Onat AM. Effect of chronic periodontitis on oxidative status in patients with rheumatoid arthritis. J Periodontol. 2013 Jun;84:785-792.
17. Flemmig TF. Periodontitis. Ann Periodontol 1999;4:32-38.
18. Armitage GC. Development of a classification system for periodontal diseases and conditions. Ann Periodontol 1999;4:1-6.
19. Parameter on aggressive periodontitis. American Academy of Periodontology. J Periodontol 2000;71:867-869.
20. Liebowitz MR. Social phobia. Mod Probl Pharmacopsychiatry 1987;22:141-173.
21. Heimberg RG, Horner KJ, Juster HR, Safren SA, Brown EJ, Scheier FR, Liebowitz MR: Psychometric properties of the Liebowitz Social Anxiety Scale. Psychol Med 1999;29:199-212.
22. Soykan C, Ozguven HD, Gencoz T. Liebowitz Social Anxiety Scale: the Turkish version. Psychological reports 2003;93:1059-1069.
23. Zaitis T, Ueno M, Shinada K, Wright FA, Kawaguchi Y. Social anxiety disorder in genuine halitosis patients. Health Qual Life Outcomes 2011;9:94.
24. Ergin A, Hatipoğlu C, Bozkurt Aİ, M Bostancı, BM Atak, S Kısaoğlu, S Parasız, H Kaygısız, A Çınarlık, E Karasu. Life satisfaction and self-care agency levels of the medical students and influencing factors. Pam Tıp Derg. 2011;4:144-151.
25. Ekanayake L, Dharmawardena D. Dental anxiety in patients seeking care at the University Dental Hospital in Sri Lanka. Community dental health 2003;20:112-116.
26. Salvi GE, Lawrence HP, Offenbacher S, Beck JD. Influence of risk factors on the pathogenesis of periodontitis. Periodontol 2000 1997;14:173-201.
27. Bergstrom J, Eliasson S, Dock J. A 10-year prospective study of tobacco smoking and periodontal health. J Periodontol 2000;71:1338-1347.
28. Ballenger JC, Davidson JR, Lecrubier Y, Nutt DJ, Bobes J, Beidel DC, Ono Y, Westenberg HG. Consensus statement on social anxiety disorder from the International Consensus Group on Depression and Anxiety. The J Clin Psychiatry 1998;59 Suppl 17:54-60.
29. Özdemir AK, Özdemir HD, Coşkun A, Taşveren S. Diş Hekimliği Fakültesinde protez kliniği ile diğer kliniklerde hasta anksiyetesinin araştırılması. Cumhuriyet Dent J 2012;15:297-306.
30. Turk CL, Heimberg RG, Orsillo SM, Holt CS, Gitow A, Street LL, Schneier FR, Liebowitz MR. An investigation of gender differences in social phobia. J Anxiety Disord 1998;12:209-223.

- 31.** Mannuzza S, Schneier FR, Chapman TF, Liebowitz MR, Klein DF, Fyer AJ. Generalized social phobia. Reliability and validity. *Arc Gen Psychiatry* 1995;52:230-237.
- 32.** Weinshenker NJ, Goldenberg I, Rogers MP, Goisman RM, Warshaw MG, Fierman EJ, Vasile RG, Keller MB. Profile of a large sample of patients with social phobia: comparison between generalized and specific social phobia. *Depression and anxiety* 1996;4:209-216.
- 33.** Yolac Yarpuz A, Demirci Saadet E, Erdi Sanli H, Devrimci Ozguven H. [Social anxiety level in acne vulgaris patients and its relationship to clinical variables]. *Turk psikiyatri dergisi = Turk J Psychiatry* 2008;19:29-37.
- 34.** Gultekin BK, Dereboy IF. The prevalence of social phobia, and its impact on quality of life, academic achievement, and identity formation in university students. *Turk Psikiyatri Derg* 2011;22:150-158.
- 35.** Ergin A, Hatipođlu C, Bozkurt Aİ, M Bostancı, BM Atak, S Kısaođlu, S Parasız, H Kaygısız, A Çınarlık, E Karasu. Tıp fakóltesi öđrencilerinin yaşam doyumu ve öz-bakım gücü düzeyleri ve etkileyen faktörler. *Pam Tıp Derg* 2011;4:144-151.
- 36.** Stein MB, Baird A, Walker JR. Social phobia in adults with stuttering. *Am J Psychiatry* 1996;153:278-280.
- 37.** Gundel H, Wolf A, Xidara V, Busch R, Ceballos-Baumann AO. Social phobia in spasmodic torticollis. *J N Neurosurg Psychiatry* 2001;71:499-504.
- 38.** Schneier FR, Barnes LF, Albert SM, Louis ED. Characteristics of social phobia among persons with essential tremor. *J Clin Psychiatry* 2001;62:367-372.
- 39.** Topcuoglu V, Bez Y, Sahin Bicer D, Dib H, Kuşçu MK, Yazgan C, Ince Günal D, Göktepe E. [Social phobia in essential tremor]. *Turk psikiyatri Derg* 2006;17:93-100.