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The Association Between Psychological Disorders and Periodontitis

Somaye Ansari Moghadam,[1] Omid Masjedi,[2] Sirous Risbaf Fakour,[3,*] and Alireza Ansari Moghaddam[4]

[1]Periodontology Department, Oral and Dental Disease Research Center, Zahedan University of Medical Sciences, Zahedan, IR Iran
[2]General Dentist, Tehran, IR Iran
[3]Oral and Maxillofacial Surgery Department, Oral and Dental Disease Research Center, Zahedan University of Medical Sciences, Zahedan, IR Iran
[4]Health Promotion Research Center, Zahedan, IR Iran

[*]*Corresponding author*: Sirous Risbaf Fakour, Oral and Maxillofacial Surgery Department, Oral and Dental Disease Research Center, Zahedan University of Medical Sciences, Zahedan, IR Iran. Tel: +98-9155406178, Fax: +98-5433414003, E-mail: c_risbaf@yahoo.com

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Abstract

Background: Although a correlation between anxiety states, stress, and the occurrence of periodontal disorders has been reported, more research on other psychological symptoms seems to be necessary.
Objectives: To evaluate the association between psychological disorders and periodontitis.
Patients and Methods: In a case-control study, 40 patients with chronic periodontitis and 40 healthy individuals, all between 20 to 40 years old and able to read and write, participated. Clinical examinations were performed by a single examiner. Psychological assessment was done using the SCL-90-R questionnaire. This study was performed in 2011 in Zahedan, Iran. The comparison between groups was performed using the Mann-Whitney U test.
Results: There was a significant difference between the study groups in the mean scores on 9 psychological disorders. The mean score of the global severity index in periodontitis patients was higher than in healthy people, and this difference was significant. After grouping the individuals into four age groups (20 - 25, 26 - 30, 31 - 35, and 36 - 40 years old), the results showed that the mean scores of psychological disorders were significantly different between the study groups and three of these age groups (20 - 25, 31 - 35, and 36 - 40).
Conclusions: This study can be used as a guide for further studies, especially longitudinal studies. It would also be worthwhile to do more studies in different age groups, because research in this area is limited.

Keywords: Periodontal Diseases, Stress, Anxiety, Depression, Mental Disorders

1. Background

Periodontitis has several etiological factors, among which dental plaque that harbors specific periodontal pathogens is the primary etiology. Chronic stress negatively affects immune response efficacy, which in turn causes an imbalance between host and parasites and leads to periodontal break-down (1). However, studies show that psychosocial variables can also be risk factors for periodontitis (1-4).

Currently, stress and depression affect many people. Moreover, the immune response is affected by emotional states, and behavioral factors may lead to a health imbalance favoring the onset of periodontal disease (3). Hugoson et al. reported the association between severe periodontal disease and a poor ability to cope with stress. This relationship was explained as an appropriate brain-neuroendocrine response to plaque–induced inflammation in the gingival connective tissue (4). To date, most studies on the relationship between periodontal disease and psychosocial factors have focused mainly on stress and depression (5-9).

2. Objectives

In the present study, we evaluated the relationship between periodontitis and 9 different types of psychological disorders.

3. Patients and Methods

In a cross-sectional study, 80 literate individuals referred to the periodontics department of Zahedan school of dentistry (Eastern Iran) in 2011 were included in the study. All the participants had a similar level of education (high school diploma).

After a periodontal examination using a mirror and a Williams probe with 1 mm accuracy, a periodontal chart was prepared for each patient. Next, 40 patients with severe chronic periodontitis and 40 clinically healthy individuals between 20 and 40 years old were selected. The healthy individuals did not have any sign of inflammation on the gingiva, had an evidence of plaque score of less than 20%, and didn't have bleeding on probing. The criteria for severe chronic periodontitis were: slow rate of disease progression and clinical attachment loss $\geq$ 5 mm in at least

two teeth. Patients with aggressive forms of periodontitis were excluded from the study.

Informed consent was obtained from the participants, and the patients with periodontitis received necessary treatments. Then, the subjects were given a set of psychosocial questionnaires which were completed in a private setting in the clinic. Professional staff were available to answer any questions regarding the questionnaire. The participants were assured that their answers would be kept strictly confidential, to help encourage complete and truthful self-reporting.

To evaluate a broad range of psychological problems and symptoms, we used the symptom checklist-90-revised (SCL-90-R) questionnaire (10). It consists of 90 items and takes 15 - 20 minutes to administer, yielding nine scores along primary symptom dimensions. Many studies have shown the reliability, validity, and utility of this questionnaire (2, 10, 11). Psychological and somatic symptom patterns assessed by SCL-90-R questionnaire include the following 9 symptom dimensions: anxiety (10 items), depression (13 items), hostility (6 items), somatization (12 items), phobic anxiety (7 items), psychotism (10 items), obsessive compulsive disorder (10 items), interpersonal sensitivity (9 items), paranoid ideas (6 items), and additional questions (7 items) (2).

3.1. Statistical Analysis

All statistical analyses were performed using the SPSS software, version 19, then described by means and standard deviations. The comparison between groups was performed using a Mann-Whitney U test.

4. Results

A total of 80 individuals (37 men and 43 women) participated in this study. The findings showed that there was a significant statistical difference between the two groups in the average scores on 9 dimensional aspects (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideas, and psychotism) ($P < 0.001$, Table 1). In other words, patients with severe chronic periodontitis had more evident psychological disorders than healthy people.

Results also indicated that the mean score for GSI was higher in patients than in healthy people, and this difference was statistically significant ($P < 0.001$) (Table 2).

All the psychological symptoms were statistically different between the study groups after gender analysis (Table 3).

We next distributed the participants into four age groups: 20 - 25 years old (group 1), 26 - 30 years old (group 2), 31 - 35 years old (group 3), and 36 - 40 years old (group 4). Using a Mann-Whitney U test, we found that in group 1, chronic periodontitis patients had more psychological symptoms than healthy individuals, and in group 2, the anxiety, somatization, depression, and hostility dimensions were not statistically different between patients and healthy participants, but the other dimensions were more evident in patients. Furthermore, in group 3 the interpersonal sensitivity dimension was not different between groups , but other dimensions were more evident in the chronic periodontitis group, and in group 4, somatization and hostility didn't show a statistically significant difference between study groups, but the other psychological symptoms were more evident in patients (Table 4).

Table 1. Mean Scores and Standard Deviations for 9 Psychological Dimensions in Study Groups

Study Groups Psychological Dimension	Patients	Healthy Individuals	P Value[a]
Anxiety	0.81 ± 0.64	0.17 ± 0.27	< 0.001
Somatization	0.62 ± 0.50	0.22 ± 0.33	< 0.001
Obsessive-compulsive	0.71 ± 0.50	0.18 ± 0.34	< 0.001
Depression	0.96 ± 0.58	0.27 ± 0.30	< 0.001
Hostility	0.61 ± 0.43	0.22 ± 0.25	< 0.001
Phobic anxiety	0.72 ± 0.50	0.15 ± 0.28	< 0.001
Paranoid ideas	0.75 ± 0.61	0.16 ± 0.28	< 0.001
Psychotism	0.66 ± 0.48	0.11 ± 0.22	< 0.001
Interpersonal sensitivity	0.84 ± 0.57	0.22 ± 0.27	< 0.001

[a]Mann-Whitney Test.

Table 2. Mean Scores and Standard Deviations of GSI Index in Study Groups[a]

Study Groups	Healthy Individuals	Patients	P Value[b]
Sex			
Men	60.7 ± 40.3	18.6 ± 16.5	< 0.001
Women	88.1 ± 41.4	24.6 ± 33.25	< 0.001
Age group, y			
20 - 25	63.9 ± 35.2	15.7 ± 14.8	< 0.001
26 - 30	77.4 ± 44.8	32.2 ± 41.6	0.03
31 - 35	99.3 ± 38.6	20.1 ± 21.5	0.004
36 - 40	82.00 ± 49.1	20.8 ± 23.1	0.002
Total	77.1 ± 42.6	21.4 ± 25.6	< 0.001

[a]Values are expressed as mean ± SD.
[b]Mann-Whitney Test.

Table 3. Mean Scores and Standard Deviations of 9 Psychological Dimensions in Study Groups, by Gender[a]

Psychological Dimension	Gender	Patients	Healthy Individuals	P Value[b]
Anxiety	Women	0.95 ± 0.60	0.22 ± 0.36	< 0.001
	Men	0.59 ± 0.65	0.13 ± 0.15	0.002
Somatization	Women	0.72 ± .52	0.26 ± 0.44	0.001
	Men	0.49 ± 0.45	0.18 ± 0.18	0.002
Obsessive compulsive	Women	0.74 ± 0.52	0.23 ± 0.43	< 0.001
	Men	0.66 ± 0.48	0.13 ± 0.23	< 0.001
Depression	Women	1.07 ± 0.57	0.31 ± .33	< 0.001
	Men	0.78 ± 0.56	0.24 ± 0.27	< 0.001
Hostility	Women	0.71 ± 0.43	0.23 ± 0.31	< 0.001
	Men	0.46 ± 0.40	0.21 ± 0.17	0.03
Phobic Anxiety	Women	0.82 ± 0.43	0.18 ± 0.39	< 0.001
	Men	0.56 ± 0.56	0.12 ± 0.18	0.001
Paranoid Ideas	Women	0.82 ± 0.44	0.24 ± 0.34	< 0.001
	Men	0.56 ± 0.50	0.09 ± 0.19	< 0.001
Psychotism	Women	0.79 ± 0.44	0.13 ± 0.26	< 0.001
	Men	0.47 ± 0.49	0.09 ± 0.18	0.001
Interpersonal Sensitivity	Women	0.99 ± 0.54	0.25 ± 0.35	<0.001
	Men	0.63 ± 0.56	0.19 ± 0.18	0.001

[a] Values are expressed as mean ± SD.
[b] Mann-Whitney Test.

5. Discussion

In the present study we examined the relationship between 9 different psychological items and periodontitis. We found that all the measured psychological factors were more evident in chronic periodontitis patients than in healthy people, results that partly supported previous studies (4, 8, 9). Screening for only 9 disorders may have limited our results, but more in-depth studies on individual symptoms, with the assistance of psychologists, could produce more reliable results. In the present study, when we analyzed each symptom separately, we found a statistically significant association between psychological factors and periodontal disease. Also, when considering all nine psychological signs with GSI scores, people with severe chronic periodontitis had a significantly higher level of psychological disorders than healthy participants.

From a psychological point of view, the results were in accordance with Castro (3) and Solis (7). whose studies showed significant differences in anxiety and depression scores between periodontal patient and control groups. The relationship between psychological symptoms and periodontitis was not related to gender. This finding is in accordance with Johansen (8), who also showed depression could compromise periodontal health. Also, our results are in accordance to Mannem (12), who showed chronic periodontitis was associated with psychological stress. Zhao's study (13) also showed a periodontal healing delay in rats. Stress results in periodontal healing delays, and the cause may be a down expression of bFGF in PDL.

Overall, periodontal disease has a long-term health outcome, and therefore it is likely that a chronic pattern of adverse psychological effects is required to affect and promote a measurable disease. Since our results are derived from a case-control study, they need to be complemented by further studies, particularly longitudinal ones, to confirm the findings. However, the result of this study may be used as a guide to decide on which measurements to include in longitudinal studies, especially for the 31 - 35 years old group, because this group has more psychologically significant symptoms. Another shortcoming of our article is that our results are based on questionnaires, so future studies should add psychologist consultations to the questionnaire data for better results.

Table 4. Mean Scores and Standard Deviations of 9 Psychological Dimensions of Study Groups, According to Age Distribution[a]

Psychologic Dimension		Age Group, y			
		36 - 40	31 - 35	26 - 30	20 - 25
Anxiety	Patients	0.87 ± 0.69	1.00±0.68	0.83 ± 0.65	0.66 ± 0.60
	Healthy Group	0.12 ± 0.20	0.14 ± 0.17	0.26 ± 0.42	0.16 ± 0.26
	P value[b]	0.001	0.004	0.07	0.01
Somatization	Patients	0.72 ± 0.63	0.87 ± 0.41	0.74 ± 0.49	0.39 ± 0.30
	Healthy Group	0.30 ± 0.44	0.21 ± 0.25	0.31 ± 0.49	0.12 ± 0.10
	P value	0.06	0.007	0.07	0.002
Obsessive Compulsive	Patients	0.65 ± 0.55	0.98 ± 0.64	0.68 ± 0.42	0.68 ± 0.45
	Healthy Group	0.16 ± 0.29	0.14 ± 0.29	0.32 ± 0.58	0.11 ± 0.15
	P value	0.008	0.004	0.04	<0.001
Depression	Patients	1.12 ± 0.60	1.43 ± 0.32	0.58 ± 0.37	0.79 ± 0.56
	Healthy Group	0.27 ± 0.28	0.27 ± 0.34	038 ± 0.37	0.20 ± 0.23
	P value	0.002	0.002	0.22	0.001
Hostility	Patients	0.54 ± 0.46	0.77 ± 0.45	0.69 ± 0.63	0.59 ± 0.32
	Healthy Group	0.23 ± 0.22	0.22 ± 0.19	0.28 ± 0.38	0.17 ± 0.19
	P value	0.07	0.03	0.18	0.001
Phobic Anxiety	Patients	0.72 ± 0.48	1.09 ± 0.47	0.90 ± 0.57	0.50 ± 0.44
	Healthy Group	0.12 ± 0.14	0.12 ± 0.19	0.32 ± 0.57	0.06 ± 0.09
	P value	0.002	0.002	0.05	0.001
Paranoid Ideas	Patients	0.85 ± 0.70	0.73 ± 0.53	0.75 ± 0.63	0.65 ± 0.56
	Healthy Group	0.19 ± 0.26	0.09 ± 0.28	0.20 ± 0.38	0.15 ± 0.24
	P value	0.008	0.004	0.05	0.001
Psychotism	Patients	0.61 ± 0.48	0.76 ± 0.60	0.88 ± 0.62	0.59 ± 0.40
	Healthy Group	0.07 ± 0.17	0.04 ± 0.13	0.21 ± 0.35	0.10 ± 0.18
	P value	0.002	0.004	0.02	<0.001
Interpersonal Sensitivity	Patients	0.94 ± 0.62	0.87 ± 0.74	0.83 ± 0.43	0.74 ± 0.54
	Healthy Group	0.17 ± 0.21	0.19 ± 0.19	0.35 ± 0.39	0.18 ± 0.26
	P value	0.001	0.15	0.03	0.001

[a]Values are expressed as mean ± SD.
[b]Mann-Whitney Test.

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Footnotes

Authors' Contribution: Somaye Ansari Moghadam: designing the research and writing the article; Omid Masjedi: collecting the data; Sirous Risbaf Fakour: editing the article and corresponding author; Alireza Ansari Moghadam: statistical analysis.

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