ISSN 2220-3206 (online)

World Journal of *Psychiatry*

World J Psychiatry 2024 January 19; 14(1): 1-193

Published by Baishideng Publishing Group Inc

World Journal of Psychiatry

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Monthly Volume 14 Number 1 January 19, 2024

World Journal of Psychiatry

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RESPONSIBLE EDITORS FOR THIS ISSUE

NAME OF JOURNAL
World Journal of Psychiatry

ISSN
ISSN 2220-3206 (online)

LAUNCH DATE
December 31, 2011

FREQUENCY
Monthly

EDITORS-IN-CHIEF
Ting-Shao Zhu

EDITORIAL BOARD MEMBERS
https://www.wjgnet.com/2220-3206/editorialboard.htm

PUBLICATION DATE
January 19, 2024

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World J Psychiatry 2024 January 19; 14(1): 141-147

DOI: 10.5498/wjp.v14.i1.141

ISSN 2220-3206 (online)

ORIGINAL ARTICLE

Observational Study

Analysis of influencing factors of anxiety and depression in patients with periodontitis

Yao Kong

Specialty type: Psychiatry

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): B
Grade C (Good): C
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Coad J, New Zealand; Lorkiewicz P, Poland

Received: November 6, 2023
Peer-review started: November 6, 2023
First decision: November 16, 2023
Revised: November 17, 2023
Accepted: December 11, 2023
Article in press: December 11, 2023
Published online: January 19, 2024

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Abstract

BACKGROUND

Periodontitis is a chronic oral disease caused by pathogenic microorganisms that corrode tooth tissue, form periodontal pockets, absorb alveolar bone, and finally lead to tooth loss. During treatment, patients are prone to anxiety, tension, and other negative emotions, which affect their ability to face the disease and may also lead to aggravation of the original condition and affect oral health. Therefore, it is important to improve the negative psychology of patients with periodontitis to clarify the factors that may lead to negative psychological emotions.

AIM

To investigate the risk factors that may lead to anxiety and depression in patients with periodontitis.

METHODS

One hundred patients with periodontitis were selected between March 2022 and March 2023 at our hospital. All patients were assessed with the Zung Self-rating Depression Scale (SDS) (≥ 53 points indicate a depressive state) and Zung Self-rating Anxiety Scale (SAS) (≥ 50 points indicates an anxious state). In this study, patients who experienced anxiety or depression were included in the occurrence group and those without anxiety or depression were included in the non-occurrence group. The baseline data of the two groups were compared to explore the risk factors for anxiety and depression in patients with periodontitis.

RESULTS

A total of 100 patients with periodontitis were included in this study. According to the SDS, 38 patients (38.00%) developed depression, with an average SDS score of (68.52 ± 5.85) points. According to the SAS, 40 patients (40.00%) developed anxiety, and the average SAS score was (72.15 ± 4.15) points. In this study, 56 patients with anxiety or depression were included. Compared with the non-occurrence group, the occurrence group had higher ages (≥ 60 years), lower level

of hope (low level), educational level (high school or below), disease perception (poor), and sleep disorder (yes). The negative coping dimension scores of the simplified coping style questionnaire (SCSQ) and Dental Fear Scale (DFS) in the occurrence group were higher, whereas the score of the positive coping dimension of the SCSQ was significantly lower ($P < 0.05$). There were no significant differences in the other data between the groups ($P > 0.05$). The results of multiple logistics regression analysis showed that age (≥ 60 years), level of hope (low level), educational level (high school or below), disease perception (poor), sleep disorder (yes), high negative coping dimension scores of SCSQ, high score of DFS, and low positive coping dimension scores of SCSQ were all factors contributing to the anxiety and depression in patients with periodontitis (odds ratio > 1, $P < 0.05$).

CONCLUSION

Age, hope level, educational level, disease perception, sleep disorders, coping style, and dental fear were all associated with anxiety and depression in patients with periodontitis.

Key Words: Periodontitis; Anxiety; Depression; Mental state; Influencing factor

Core Tip: Patients with periodontitis experience a vicious cycle of depression and anxiety due to repeated diseases and a long treatment cycle, which leads to aggravation of the original condition and affects oral health. Therefore, it is important to identify the key factors that may affect anxiety and depression in patients with periodontitis to improve their prognosis.

Citation: Kong Y. Analysis of influencing factors of anxiety and depression in patients with periodontitis. *World J Psychiatry* 2024; 14(1): 141-147
URL: https://www.wjgnet.com/2220-3206/full/v14/i1/141.htm
DOI: https://dx.doi.org/10.5498/wjp.v14.i1.141

INTRODUCTION

Periodontitis is a chronic oral disease caused by the corrosion of dental tissues by pathogenic microorganisms that form periodontal pockets and are absorbed by the alveolar bone, eventually leading to tooth loss. Epidemiological studies have shown that the incidence of periodontitis is increasing and that the elderly account for a relatively high proportion of the population with periodontitis[1,2]. Anxiety and depression are adverse emotions such as tension and fear that occur in patients with periodontitis during treatment and are prevalent in patients of all ages, mainly manifested as fear and avoidance of dental treatment. The unpleasant emotional experience directly affects patients' ability to face diseases. In addition, adverse emotions can aggravate the stress reactions of patients, leading to the aggravation of their original condition and affecting their oral health. Increasingly aggravating oral diseases cause patients to fall into a vicious cycle of depression, anxiety, and avoidance. Therefore, it is important to clarify the current state of depression and anxiety in patients with periodontitis and the factors that may lead to adverse psychological emotions in patients[3-5]. To date, many clinical studies have mainly focused on the treatment of patients with periodontitis and anxiety and depression, whereas related studies on factors that may lead to anxiety and depression in patients with periodontitis are rare. In view of this, this study focused on observing the status of anxiety and depression in patients with periodontitis and analyzing the risk factors that may lead to anxiety and depression in these patients, in order to improve their negative psychology and overall health.

MATERIALS AND METHODS

General data

The subjects were selected from 100 patients with periodontitis who were admitted to our hospital between March 2022 and March 2023. All subjects met the following inclusion criteria: (1) Periodontitis was diagnosed by referring to the relevant diagnosis in the 2018 World New Classification of Periodontal and Peri-Implant Diseases and Conditions[6]; (2) Initial illness; and (3) The enrolled subjects and their families knew the purpose of the study and signed the consent form. Exclusion criteria were: (1) Comorbid with other diseases, such as immune system diseases and diabetes mellitus; (2) Comorbid with other oral diseases; (3) History of previous psychological illnesses, such as anxiety and depression; and (4) Poor compliance and trouble cooperating with the researchers. This study was performed after the approval of the medical ethics committee of our hospital.

Assessment criteria for anxiety and depression

The patients included in the study were assessed using the Zung Self-Rating Depression Scale (SDS)[7] and the Zung Self-rating Anxiety Scale (SAS)[8]. There are 20 items in the SDS, and each item was assigned a score of 1-4; a score of ≥ 53 indicated that the patient had depression. There are 20 items in the SAS, and each item was assigned a score of 1-4; a score of ≥ 50 indicated that the patient had anxiety. Patients who developed anxiety or depression were included in the occurrence group.

Baseline data collection

The baseline data of patients were collected, including sex, age and disease perception (evaluation by Brief Illness Perception Questionnaire[9]: The questionnaire included 8 items, with a scores of 0-10 for each item, and a total score of 80 points; 0-48 points indicated poor disease perception and 49-80 points indicated good disease perception), sleep disorder (Pittsburgh Sleep Quality Index[10]: 18 items including sleep latency, sleep time, sleep disorder, sleep quality, *etc.*, were scored according to 0-3 points, with a total score of 21 points; ≥ 7 points indicated sleep disorder and a higher score indicated more severe sleep disorder), the level of hope (Herth Hope Scale[11]; the scale included 12 items in three dimensions: taking active action, maintaining close relationship with others, and current and future positive attitude; each item was assigned according to a 1-4 score system, with a total score of 12-48 points; 12-23 points indicated low level, 24-35 points medium level, and ≥ 36 points high level), coping styles [simplified coping style questionnaire (SCSQ)[12], which included 20 items of positive response (1-12 items) and negative response (13-20 items), according to the 0-3 score system; the higher the score of negative coping dimension, the more negative the surface coping style, and the higher the score of positive coping dimension, the more positive the surface coping style], and dental fear [Dental Fear Scale (DFS) [13]; the 20 items in the scale were all scored according to the 5-grade method with full scores of 20-100 points; a higher score indicated that dental fear was more serious].

Statistical methods

SPSS25.0 software was used to analyze the data. Shapiro-Wilk normal distribution was used to test the normality of measurement data, and mean ± SD meant the measurement data conformed to the normal distribution. An independent sample t test was used for intergroup comparisons. n (%) represented the count data, and χ^2 test was used. Logistic regression analysis was used to test factors influencing anxiety and depression in patients with periodontitis. The significance level was set at $\alpha = 0.05$.

RESULTS

Analysis of depression and anxiety status in patients with periodontitis

Among the 100 patients with periodontitis included in the study, 38 cases (38.00%) developed depression according to the SDS; the average SDS score was (68.52 ± 5.85) points. According to the SAS, there were 40 patients with anxiety, the incidence rate was 40.00%, and the average SAS score was (72.15 ± 4.15) points. A total of 56 patients with anxiety or depression were included in the study.

Comparison of baseline data

Compared with the non-occurrence group, the age (≥ 60 years), hope level (low), education level (high school or below), disease perception (poor), and sleep disorder (yes) were higher in the occurrence group. The negative coping dimension score of the SCSQ and DFS score in the occurrence group were higher, the positive coping dimension score of the SCSQ was lower, and the difference was statistically significant ($P < 0.05$). There were no significant differences in the other data between the groups ($P > 0.05$) (Table 1).

Logistic regression analysis of anxiety and depression in patients with periodontitis

Whether patients with periodontitis had anxiety or depression was the dependent variable (1 = yes, 0 = no). The results of multiple logistics regression analysis showed that: age (≥ 60 years old), level of hope (low level), educational level (high school or below), disease perception (poor), sleep disorder (yes), high negative coping dimension scores of SCSQ, high score of DFS, and low positive coping dimension scores of SCSQ were all factors contributing to anxiety and depression in patients with periodontitis (odds ratio > 1, $P < 0.05$) (Tables 2 and 3).

DISCUSSION

Oral cavity-related diseases not only affect the function of oral organs, but also affect the whole-body health of patients and their psychological development. With the development of the "biological-psychological-social medicine" model in clinical medicine, clinical treatment is increasingly not only for the diagnosis and treatment of the disease itself, but also for holistic medical treatment[14-16].

The results of this study showed that among the 100 included patients with periodontitis, 38 (38.00%) developed depression according to the SDS score, and the average SDS score was (68.52 ± 5.85) points. According to the SAS, there were 40 patients with anxiety, and the incidence rate was 40.00%; the average score of the SAS was (72.15 ± 4.15) points,

Table 1 Comparison of baseline information

Factor		Occurrence group (*n* = 56)	Non-occurrence group (*n* = 44)	Statistical values	*P* value
Age, *n* (%)	≥ 60	38 (67.86)	12 (27.27)	16.234	< 0.001
	< 60	18 (32.14)	32 (72.73)		
Sex, *n* (%)	Male	28 (50.00)	25 (56.82)	0.460	0.500
	Female	28 (50.00)	19 (43.18)		
Hope level n, *n* (%)	Low level	40 (71.43)	12 (27.27)	19.247	< 0.001
	Medium and high level	16 (28.57)	32 (72.73)		
Educational level, *n* (%)	High school and below	45 (80.36)	15 (34.09)	21.977	< 0.001
	College and above	11 (19.64)	29 (65.91)		
Disease perception, *n* (%)	Be poor	40 (71.43)	10 (22.73)	23.377	< 0.001
	Good	16 (28.56)	34 (77.27)		
Sleep disorders, *n* (%)	Be	35 (62.50)	11 (25.00)	13.949	< 0.001
	No	21 (37.50)	33 (75.00)		
coping style (mean ± SD, points)	SCSQ negative coping dimension score	17.25 ± 1.52	8.25 ± 0.85	35.169	< 0.001
	SCSQ positive coping dimension score	15.12 ± 1.58	25.12 ± 2.05	27.556	< 0.001
Dental fear (DFS scale) (mean ± SD, points)		60.25 ± 5.25	30.12 ± 4.15	31.168	< 0.001

SCSQ: Simplified coping style questionnaire; DFS: Dental Fear Scale.

Table 2 Description of main independent variables

Independent variable	Variable declaration	Assignment condition
Age	Binary variable	0 ≤ 60 yr, 1 ≥ 60 yr
Hope level	Binary variable	0 = medium high level, 1 = low level
Education level	Binary variable	0 = high school and below, 1 = college and above
Disease perception	Binary variable	0 = poor, 1 = good
Sleep disorder	Binary variable	0 = yes, 1 = no
SCSQ negative coping dimension score	Continuous variable	-
SCSQ positive coping dimension score	Continuous variable	-
Dental fears	Continuous variable	-

SCSQ: Simplified coping style questionnaire.

indicating that anxiety and depression were common in patients with periodontitis. The related mechanisms of clinical anxiety and depressive negative emotions affecting periodontitis are relatively complex and mainly manifest in two aspects. The first is pituitary-adrenal axis dysfunction, neuroendocrine changes, and increased secretion of glucocorticoids in patients with periodontitis combined with anxiety and depression, as well as the inhibition of the immune response of the body and increased susceptibility of the body to pathogenic bacteria of periodontitis. Second, the life attitudes of patients with periodontitis and anxiety and depression are mainly pessimistic. Gingival swelling, bleeding, and even loss in patients with periodontitis are likely to increase their negative emotions, thus forming a vicious circle that is a negative factor for both negative emotions and disease control[17-19]. Therefore, it is necessary to explore factors that may lead to anxiety and depression in patients with periodontitis.

The results of this study showed that compared with the non-occurrence group, the occurrence group had relatively high ages (≥ 60 years old), hope level (low level), education level (high school or below), disease perception (poor), and sleep disorder (yes). The negative coping dimension score of the SCSQ and DFS score in the occurrence group were higher, while the score of positive coping dimension of the SCSQ was lower. The results of multiple logistics regression

Table 3 Logistic regression analysis of anxiety and depression in patients with periodontitis

Correlative factor	*β*	Standard error	*Wald*	*P* value	OR	95% confidence interval
Age	1.728	0.443	15.200	< 0.001	5.630	2.362-13.420
Hope level	1.897	0.450	17.810	< 0.001	6.667	2.762-16.090
Education level	2.062	0.463	19.958	< 0.001	7.909	3.192-19.595
Disease perception	2.140	0.466	21.114	< 0.001	8.500	3.412-21.177
Sleep disorder	1.609	0.444	13.122	< 0.001	5.000	2.093-11.944
SCSQ negative coping dimension score	0.886	0.179	24.424	< 0.001	2.427	1.707-3.449
SCSQ positive coping dimension score	0.956	0.222	18.489	< 0.001	2.601	1.683-4.022
Dental fears	0.267	0.054	24.152	< 0.001	1.306	1.174-1.452

OR: Odds ratio; SCSQ: Simplified coping style questionnaire.

analysis showed the influencing factors leading to anxiety and depression in patients with periodontitis were as follows: (1) Age: Elderly patients with periodontitis have a relatively low quality of life, and such patients bear a heavy burden of worry about the prognosis of the disease, that they will impose a burden on their children and loved ones and affect the quality of life of themselves and their families. Consequently, patients experience severe negative emotions related to anxiety and depression[20]; (2) Hope level: The lower the hope level, the more negative and pessimistic patients would be when facing the stressors, unable to face the disease squarely, unwilling or rejecting cooperative treatment, lacking confidence in disease recovery, feeling helpless when facing the disease, and trapped in negative emotions such as anxiety and depression for a long time, which are not conducive to disease diagnosis and treatment[21]; (3) Education level: For patients with low education level, the knowledge level is relatively low, the learning ability is not high, and the understanding of the disease cognition is not thorough. In addition, the erroneous understanding of the disease leads to the occurrence or even aggravation of anxiety and depression in patients[22]; (4) Disease perception: Patients with poor disease perception have no correct cognition of the occurrence, development, and prognosis of the disease and have incomplete disease understanding, which leads to patients not fully comprehending disease diagnosis and treatment and unable to make a reasonable judgment on the prognosis. Patients had a stronger sense of abnormal experiences of the disease and were excessively concerned about its negative effects. Consequently, anxiety and depression are more prominent in these patients[23]; (5) Sleep disorder: In patients with sleep disorder, the body immunity will decrease, the inflammatory pathways will be activated, and the inflammatory reaction will be aggravated. The increasingly aggravated inflammatory reaction leads to the aggravation of the psychological burden on patients and causes them to worry more about the treatment effect and development of the disease after treatment. In addition, negative emotions, such as anxiety and depression, act on the body and affect sleep quality, thus forming a negative cycle that is not conducive to the recovery of the patient's condition[24]; (6) Coping styles: There were two kinds of coping styles: negative and positive. A positive coping style can weaken the psychological burden and promote disease recovery, whereas a negative coping style strengthens the psychological burden and delays disease recovery. The reason that patients with periodontitis mostly adopted a negative coping style was related to persistent toothache and bad breath, which led to an inferiority complex. Second, fear of operating instruments during oral treatment, high treatment costs, and uncomfortable treatment experiences were also related. Moreover, anxiety and depression resulting from negative coping styles gradually increase and persist over time[25]; and (7) Dental fear: The treatment cycle of periodontitis is long, and during the treatment process, patients experience severe discomfort. Therefore, patients with periodontitis generally experience dental fear, which leads to poor compliance in patients receiving the diagnosis and treatment. Whether patients still have phenomena such as delayed treatment and a prolonged treatment cycle, which will cause unsatisfactory diagnosis and treatment effects, is more likely to aggravate patients' rejection psychology, and negative emotions of anxiety and depression are generated and gradually strengthened[26].

However, due to the limited number of samples included and the retrospective nature of this study, there are limitations with regard to the inclusion of relevant indicators, and the credibility of the study needs to be verified by expanding the sample size in the future.

CONCLUSION

In summary, age, hope level, education level, disease perception, sleep disorders, coping style, and dental fear were all associated with anxiety and depression in patients with periodontitis.

ARTICLE HIGHLIGHTS

Research background

Periodontitis is a chronic oral disease caused by pathogenic microorganisms that corrode tooth tissue, form periodontal pockets, absorb alveolar bone, and finally lead to tooth loss. During treatment, patients are prone to anxiety, tension, and other negative emotions, which affect their ability to face the disease and may also lead to aggravation of the original condition and affect oral health. Therefore, it is important to improve the negative psychology of patients with periodontitis to clarify the factors that may lead to negative psychological emotions.

Research motivation

To observe the status of anxiety and depression in patients with periodontitis and analyze the risk factors that may lead to anxiety and depression to improve the negative psychology of patients with periodontitis and the overall benefit level of patients.

Research objectives

Improve the negative psychology of patients with periodontitis and the overall benefit level for patients.

Research methods

Logistic regression analysis was used to analyze the data in this article.

Research results

The results of multiple logistics regression analysis showed that age (≥ 60 years), level of hope (low level), educational level (high school or below), disease perception (poor), sleep disorder (yes), high negative coping dimension scores of simplified coping style questionnaire (SCSQ), high score of Dental Fear Scale, and low positive coping dimension scores of SCSQ were all factors contributing to the anxiety and depression in patients with periodontitis.

Research conclusions

Age, hope level, educational level, disease perception, sleep disorders, coping style, and dental fear were all associated with anxiety and depression in patients with periodontitis.

Research perspectives

This study shows that age, hope level, education level, disease perception, sleep disorders, coping style, and dental fear can all lead to anxiety and depression in patients with periodontitis, and clinical treatment should consider formulating reasonable countermeasures against these factors.

FOOTNOTES

Author contributions: Kong Y designed the research study; Kong Y performed the research; Kong Y contributed new reagents and analytic tools; Kong Y analyzed the data and wrote the manuscript; all authors have read and approve the final manuscript.

Institutional review board statement: The study was reviewed and approved by the Xinxiang Central Hospital, The Fourth Clinical College of Xinxiang Medical University Institutional Review Board.

Informed consent statement: Patients were not required to give informed consent to the study because the analysis used anonymous clinical data that were obtained after each patient agreed to treatment by written consent.

Conflict-of-interest statement: Dr. Kong has nothing to disclose.

Data sharing statement: No additional data are available.

STROBE statement: The authors have read the STROBE Statement—checklist of items, and the manuscript was prepared and revised according to the STROBE Statement—checklist of items.

Country/Territory of origin: China

ORCID number: Yao Kong 0009-0002-6615-2376.

S-Editor: Lin C

L-Editor: A
P-Editor: Chen YX

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