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Original Article

Psychological Distress and its Relation with Periodontitis among Patients Attending Outpatient Department in Moradabad – A Cross-Sectional Study

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Abstract

Purpose: The purpose of the study was to assess whether adolescents with periodontitis presented with higher scores for non-psychotic psychosocial disorders than control subjects without periodontitis.

Materials and Methods: A case–control study (*n* = 135) was performed using the 28-item Spanish version of the general health questionnaire (GHQ). The inclusion criterion for being a case was a clinical attachment level ≥3 mm in at least two teeth. Multiple logistic regression analyses were used to assess the association between periodontitis and psychosocial distress.

Results: The response rate was high and 81.8% of the participants answered all the items of the questionnaire. Similarly, the internal consistency of the instrument was high (Cronbach's alpha = 0.91). The results of multiple logistic regression analyses, adjusted for age and gender, suggested an association between case status and higher total scoring for psychosocial distress (odds ratio = 1.79). Among the four subdomains of the GHQ, the dimensions "somatic symptoms" and "severe depression" appeared positively associated with periodontal case status, albeit not significantly.

Conclusion: The findings of this study suggest that the association between periodontitis and psychosocial distress dimensions can be documented early in life. This calls for awareness on the part of health-care providers attending adolescents.

Key words: Coping, Depression, Periodontitis, Psychological distress, Stress

INTRODUCTION

Periodontitis is a disease affecting the supporting tissue of the teeth, that is, alveolar bone periodontal ligament and cement. Locally, the presence of predominantly Gram-negative biofilms triggers an inflammatory reaction of the bodies that result in the destruction of these tissues and eventually in tooth loss. Recent research reports document that the unfavorable outcome of periodontitis has a significant impact on the quality of life of adults and adolescents experiencing destruction of these tooth-supporting tissues.[1-3]

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The relationship between periodontitis and several dimensions of psychosocial distress such as stress,[4-10] depression,[4,5,9,11] anxiety,[4,6,8,9] life events,[11,12] and poor coping reactions[11] has attracted considerable attention from several groups of researchers during the past three decades. The list of plausible biological explanations for the observed association is long and includes psychologically induced modulation of the immune system, leading to increased blood levels of adrenocorticotropic hormones,[4,8,11,13] alteration of crevicular cytokine levels,[8,11,13] depressed polymorphonuclear leukocyte chemotaxis and phagocytosis,[8] reduced proliferation of lymphocytes,[5,10] changes in blood circulation and healing,[14] modifications of the salivary flow and its

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components,[9,11] and endocrine changes leading to immunosuppression.[7,10,11] The immunological modulation experienced as a consequence of stress, depression, anxiety and/or life events may partially explain the occurrence of psychological distress influences the behaviour of the subject towards less protective and riskier oral health related behaviour.[4,11]

Usually, the need to treat destructive periodontal diseases is based on observations made by dental professionals who suggest treatment, followed by reports of loss of clinical attachment or increased depth of probing pocket. Periodontal diagnosis is less often the result of individuals seeking care because of self-perceived periodontal problems. Nevertheless, it remains unclear if such professional observations of signs of periodontal damage are having an effect on the patient or to what degree.

Furthermore, most studies have focused on adult populations and only little attention has been devoted to the potential role of psychosocial distress in occurrence of periodontitis among the young. If the association is positive, it could have implications for the identification of a hitherto overlooked group of adolescents with undiscovered dental needs.

Aim of Study

The aims of this study were psychological distress is a general term that is used to describe unpleasant feeling or emotion that impact your level of functioning.

1. To assess the weather subject with periodontitis present with higher scores for non-psychotic psychological distress the control subject in a well-defined adolescent population
2. To investigate whether the dimensions "somatic symptoms," "anxiety and insomnia," "social dysfunction," and "severe depression" are associated with case status.

Objectives of Study

The aim of this research is to assess psychological distress and it's relation with periodontitis among patients attending outpatient department (OPD) of Teerthanker Mahaveer Dental College and Research Centre, Moradabad.

The objectives of this study are as follows:

1. To assess the psychological distress using 28-items Spanish version of the general health questionnaire (GHQ)
2. To measure pockets of more than 3 mm with the help of CPITN index
3. To assess impact of psychosocial distress (GHQ) on periodontitis
4. To recommended preventive measures.

MATERIALS AND METHODS

A case–control study was conducted among the patients attending OPD of Teerthanker Mahaveer Dental College and Research Centre, Moradabad, Uttar Pradesh, India, for a period of 2 months from September 2019 to November 2019. The participants were divided into two groups, cases and controls which comprise 135 subjects each.

Verbal informed consent was obtained, and the questionnaires were given at the individual level. Before commence of the study, an ethical clearance was obtained from the Institutional Ethical Committee of Teerthanker Mahaveer Dental College and Research Centre, Moradabad.

Sample Size Estimation

The sample size (n) was determined using the following formula:

$$n = \frac{Z^2 \times P \times q}{d^2}$$

Confidence interval=95%.
Relative precession=5%.
Z=Standardized normal deviate (Z value).
p=Proportion or prevalence of interest = 20%.
q=1- p (100-20 = 80).
d=clinically expected variation (5%).

Allowable error was 5% taken, keeping 95% confidence interval and 80% power of the study and 20%.

Prevalence of periodontitis, the sample size was determined to be:

$$n = \frac{(1.96)^2 \times (20) \times (80)}{5^2} = 245.86$$

=245

The sample size calculated was 245 using the above formula, but considering the dropouts, a total of 270 (n = 270) participants were selected; keeping in mind, dropout rate sample size is increase by 10.0%. A total of 135 participants were divided into cases and controls based on fulfilling the inclusion ad exclusion criterion.

Inclusion Criteria

1. All the patients attending OPD of Teerthanker Mahaveer Dental College and Research Centre who give the inform consent will be included in the study

2. The case definition adopted assigned case status to all subject presenting with the pathological pockets of ≥3 mm in at least two teeth recorded during the screening phase.

Exclusion Criteria

1. Physically challenged patients are not included in this study
2. Patients undergoing orthodontic treatment
3. Patients who had underwent any periodontal procedure for the past 6 months.

All participants took part in the study voluntarily and no incentives were used for the respondents. The questionnaire was adapted from pre-tested and pre-validated questionnaires from the previous studies, which was used to collect sociodemographic details. The following instruments are used plane mouth mirror, CPITN-C probe, tweezers, kidney trays, cotton holders, Korsolex, disposable mouth masks, disposable gloves, towels, soap, CPITN pro forma, and GHQ-28 questionnaire.[14-16]

The psychological distress 28-items Spanish version of the GHQ will be use. This was then converted into English vernacular language. The CPITN index was used to record periodontal status. In the study, the Likert scoring procedure (1, 2, 3, and 4) is applied and the total scale score ranges from **2**8 to **11**2 (1 – not at all, 2 – no more than usual, 3 – rather more than usual, and 4 – much more than usual). There are four subscales of the questionnaire, namely, somatic symptoms (item 1–7), anxiety/insomnia (8–14), social dysfunction (15–21), and severe depression (22–28).

The Likert scale used for final calculation was:
29–56: Feeling in need of a good tonic.
57–84: Run down.
85–112: Feeling ill.

Statistical Analysis

In the next stage, the distributed and completed questionnaires were collected and CPITN index was obtained and data were entered into MS Excel sheet (Windows 2007). Statistical analysis of the data was done using the Statistical Package for the Social Sciences (SPSS 20.0) using t-test to determine mean significant difference between the different variables, $P < 0.05$ and 95% confidence interval consider statistically significant.

RESULTS

A total of 330 questionnaires were distributed, among which 270 participants responded to the questionnaire. The overall response rate was 81.8% (270/330).

In Table 1, the present study was conducted among 270 participants out of whom 51 and 71 were female, respectively, in case and controls and 84 and 64 were male in case and controls, respectively. There was no significant difference in sex distribution of patients according to year of study.

In Table 2, the mean age of the respondents was 36.96 (±12.25) for cases and 33.71 (±10.07) for the controls. There was no significant difference in age distribution of patients according to year of study.

In Table 3, maximum responses of GHQ lie between 40 and 100. If you divide these into groups: 40–60, 61–80, and 81–100 with responses in cases 58, 72, and 5 and responses of controls are 89, 44, and 2, respectively. The Chi-square value came as 6.72. There was p-value came to be significant ($P = 0.03$) in distribution of GHQ score among the study subjects distribution of patients according to year of study.

In Table 4, the mean corruption perceptions index (CPI) score distribution score among the study subjects was recorded and it came to be 2.38 in cases and 1.26 in control. There results were highly significant and *t*-test value came as 6.72 in mean CPI score distribution of patients according to year of study. There was *P*-value came to be 0.01.

In Table 5, the mean GHQ score among the study subjects was recorded and it came to be 61.93 ± 10.27 in cases and 56.53± 9.30 in control. There results were highly significant

Table 1: Gender distribution of the study population

Group	Male		Female	
	n	%	*n*	%
Case	84	62.2	51	37.8
Control	64	47.4	71	52.6

Table 2: Age distribution of the study population

Group	Mean	SD
Case	36.96	12.25
Control	33.71	10.74

SD: Standard deviation

Table 3: Distribution of general health questionnaire score among the study subjects

Group	Case		Control	
	n	%	*n*	%
40–60	58	42.96	89	65.93
61–80	72	53.33	44	32.59
81–100	5	3.7	2	1.48
Chi-square		6.72		
P-value		0.03*		

*Statistically significant

Table 4: Corruption perceptions index score distribution among the study subjects

Group	Mean		SD
Case			
CPI 16/17	2.73		0.51
CPI11	1.55		0.75
CPI 26/27	2.71		0.68
CPI 46/47	2.72		0.76
CPI 31	2.02		0.82
CPI 36/37	2.57		0.78
Mean	2.38		0.73
Control			
CPI 16/17	1.84		0.38
CPI 11	1.11		0.58
CPI 26/27	1.04		0.44
CPI 46/47	1.23		0.53
CPI 31	0.99		0.67
CPI 36/37	1.36		0.74
Mean	1.26		0.56
t-test		9.11	
P value		<0.01*	

*Statistically significant. CPI: Corruption perceptions index, SD: Standard deviation

Table 5: Mean general health questionnaire score among the study subjects

Group	Mean		SD
Case	61.93		10.27
Control	56.53		9.30
t-test		8.91	
P-value		<0.01*	

*Statistically significant, SD: Standard deviation

(<0.01) and *t*-test value came as 8.91 in mean GHQ score distribution among the study subject.

In Table 6, the subdomain scores for "somatic symptoms," "anxiety and insomnia," "social dysfunction," and "severe depression" were similar for cases and controls.

In Table 7, the results of multiple logistic regression models adjusted for age and gender can be found. These analyses demonstrated a positive association between cases status and higher values for total GHQ score (odds ratio [OR] = 1.36, 95% confidence interval) and a positive but not significant association between the subdomains "somatic symptoms" (OR = 1.44) and "severe depression" (OR = 1.18) and case status.

DISCUSSION

To the best of our knowledge, this study represents the first attempt by a young adolescent study population to investigate the association between periodontitis and non-psychosocial distress. The results of several studies conducted among adults have suggested the existence of a positive association[1,4-7,12,17,18] between measures of psychosocial distress and measures of periodontitis. A close inspection of the literature shows that some of the positive finding may be explained by the

Table 6: General health questionnaire score and its subdomains

Subdomains	Case		Control	
	Mean	SD	Mean	SD
Somatic symptoms	18.7	4.7	17.6	4.1
Anxiety and insomnia	16.8	3.96	16.9	4.05
Social dysfunction	14.87	3.17	13.84	3.24
Severe depression	11.56	3.76	11.54	3.65

SD: Standard deviation

Table 7: Regression analysis for total general health questionnaire score, its subdomains in relation to periodontitis

Subdomains	Reference	Moderate score	High score
General health questionnaire score	Low score	1.36	1.79
Somatic symptoms	Low score	1.44	1.41
Anxiety and insomnia	Low score	1.02	1.38
Social dysfunction	Low score	0.89	1.29
Severe depression	Low score	1.18	1.65

choice of parameter to assess periodontitis, for example, the use of probing depth as a measure of periodontitis.[6,12,17] Probing depth can be considerably influenced by poor oral hygiene, thus tending to represent the status of the gingival condition more than the presence of periodontal destruction. A look at the studies in which the investigators have employed "harder" measurements of periodontitis, for example, clinical attachment loss or bone loss, suggests a different picture, as only four studies support an association between periodontitis and anxiety/depression,[19] financially related stress,[19] or job-related stress,[5,7] whereas three studies could not confirm an association between periodontitis and anxiety,[6,9,12] depression,[6,11] stress,[6,9] psychiatric symptoms,[6] or negative life events by Castro *et al.* It should also be kept in mind that most of the evidence supporting the association originates from cross-sectional studies,[4,5] in which the temporal sequence of exposure and outcome cannot be disentangled.

The findings of our study suggest that psychosocial distress may be associated with periodontitis in young subjects. While the associations were not statistically significant, a clear dose–response gradient was found such that subjects scoring higher (1.38) and highest (1.79) were more likely to be a case than were subjects with lower totally GHQ scores [Table 7]. Moreover, the analyses showed that the subdomains "severe depression" and "somatic symptoms" were the main contributing dimensions underpinning the trend for an association between case status and psychosocial distress, as measured using the total GHQ score.

Two major plausible mechanisms may be suggested to explain the observed trend for an association between periodontitis and psychosocial distress. First, the nervous

and the immune systems work in interdependence, and an extensive body of literature suggests that distress may have indirect impacts on the immune function,[9,19,20] whereby the risk of periodontitis is increased. On the other hand, the association could also be mediated by psychosocial stress inducing behavioral changes, for example, by inducing or increasing smoking or by leading to deteriorated oral hygiene practices, which, in turn, are deleterious to periodontal health. Although our study is among the largest on the topic of the relationship between psychosocial distress and periodontitis,[4-6,10-12,21] this calculation shows that either much stronger association (higher estimates) is needed or the study groups need to be much larger.

According to Lopez *et al.,* they find out the finding of this study that the association between periodontitis and dimension of psychosocial distress can be documented in life. Too much of our knowledge, this research is the first attempt to investigate the association in a study population between periodontitis and non-psychotic psychosocial distress. The findings of our study suggest the psychosocial distress associated with periodontitis. The associations were statistically significant.

The most important limitation of this study is its cross-sectional design. Bias cannot be ruled out because information was collected from self-administered questionnaires. In this study, periodontal status was estimated by means of CPITN measurements. The CPITN is considered a "screening procedure for identifying actual and potential problems posed by periodontal disease both in the community and by the individual." Recent data on the bias resulting from examinations using a subset of sites (CPITN measurements) instead of full mouth recordings are scarce. Therefore, it is not clear whether a partial recording method leads to under- or overestimation of an actual periodontal status.[21]

CONCLUSION

The findings of this study suggest that the association between periodontitis and psychosocial distress dimensions can be documented early in life. This calls for awareness on the part of health-care providers attending adolescents. The evidence from the study conducted among adults suggests a significant interrelationship between periodontitis and dimensions of psychosocial distress. This warrants the awareness of health-care providers attending adults.

The results of the present study showed psychosocial stress to be related to lifestyle and lifestyle to levels of remaining periodontal support. The link between psychosocial stress and maintenance of periodontal health was supported in the present study.

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