Association between Periodontal Status and Oral Health Related Quality of Life - A Cross Sectional Study

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Abstract: *This study aimed to assess the association between periodontal status and oral health - related quality of life (OHRQoL) among Indian population. A cross - sectional analytic study was conducted on patients visiting a dental center for one year. Clinical attachment loss (CAL) was recorded, and the Oral Health Impact Profile questionnaire was used to assess OHRQoL. Participants were divided into groups based on the severity of periodontitis. Descriptive and analytical statistics were used to analyze the data, including Pearson's correlation and ANOVA tests. A total of 465 males and 582 females participated in the study, with a mean age of 38.49 years. The mean clinical attachment loss increased with the severity of periodontitis. Females were more affected than males, with 64.6% of patients with periodontitis being females. The questionnaire responses showed a significant negative correlation between OHRQoL and periodontal disease severity. Patients with severe periodontitis had a poorer OHRQoL than those with mild or no periodontitis. This study highlights the need for better understanding of patients' perceptions of the effects of periodontal disease on their daily lives, as well as the importance of proper planning, evaluation, and treatment to increase their quality of life.*

Keywords: Oral Health Related Quality of Life, Periodontitis, Cross sectional Study

1. Introduction

Chronic periodontitis is a major oral health problem affecting more than half the population in India. According to epidemiological data on periodontal diseases in India, the prevalence of periodontitis ranges from 57% to 79.9% in the age groups of 12 - 15, 35 - 44, and 65 - 74 years[1]. Periodontal disease is caused by the interaction between various agents, hosts, and environmental factors. A bidirectional link between periodontal disease and various systemic conditions like cardiovascular disease, diabetes, osteoporosis, respiratory diseases, and adverse pregnancy outcomes has been established by various studies[2]. Recent years have witnessed enormous growth in understanding the etiology, prevention, and treatment of periodontal diseases. The traditional research approach in this field has always been from the operators' perspective. Clinical parameters mainly used for measuring periodontal diseases are bleeding on probing, probing pocket depth, and clinical attachment level. Various symptoms experienced by the patient, like redness of gums, loosening of teeth, persistent bad breath, eating difficulties, pain, and loose teeth, are often left unrecorded. These symptoms can have a negative impact on a person's quality of life[3, 4, 5]. This is an area that requires in - depth exploration. Proper planning, evaluation, and treatment can be assured if patient perception regarding the effects of periodontal disease on oral health and daily lives is better understood.

Diverse working environments and exposure to physical and mental stress can affect health - related quality of life. Oral health status can lead to changes in lifestyle and, at times, be a reason for significant psychological stress[6, 7, 8]. There is a need to assess the same to gauge the necessities of our people and the actions required to harness the best from our dental services to increase the quality of life of our citizens. Hence this study was conducted to assess the association between periodontal status and oral health - related quality of life among Indian population.

2. Material and Methods

The study protocol was reviewed and approved by an independent institutional ethical committee. A cross - sectional analytic study was conducted among the patients visiting our dental centre for a period of one year. Subjects who had at least 20 remaining teeth were included in the study. Patients who had undergone periodontal therapy in the past 6 months, tobacco users, patients undergoing active orthodontic therapy, and individuals who were unable to answer the questionnaire were excluded from the study. Participants were explained the purpose of the study, and an informed consent was obtained.

Two trained and calibrated examiners performed clinical examinations to record clinical attachment loss (CAL). The Oral Health Impact Profile questionnaire was used to assess oral health - related quality of life[3]. It consisted of 14 questions, whose responses were given on a Likert - type scale ranging from 0 to 4. The questionnaire measured the quality of life in seven domains related to oral health. The summed score for all 14 items provides the total OHIP score of an individual. A high score indicates a poor oral health - related quality of life.

A pilot study was conducted to find out the feasibility of the study, for training and calibration of the investigator, and to check the test - retest reliability of the questionnaire. The questionnaire was translated into the local language prior to the pilot study, and a back translation was done by an independent translator. A pilot study assessed the feasibility of the study procedures, flow of questions, and clarity of wording to the respondent. The pilot study was carried out with a convenient sample of 25 subjects. Examiners were trained and calibrated to ensure consistent interpretation. Intra - examiner reliability and inter - examiner reliability were found to be 0.92 and 0.86, respectively.

The clinical examination was carried out on a dental chair under artificial light using a mouth mirror and PCP UNC - 15 probe. Current recommendations and standards given by the Center for Disease Control were followed for infection control. Periodontal probing was done at six points on each remaining tooth to evaluate CAL. Participants were divided into the following groups: healthy periodontium (no CAL), mild periodontitis (CAL 1 - 2 mm), moderate periodontitis (CAL 3 - 4 mm), and severe periodontitis (CAL >5 mm) based on the 1999 AAP classification[9].

Statistical Analysis: Descriptive statistics and analytical statistics were computed for the study. The data was entered into MS Excel and recoded back into SPSS Version 22.0 after data cleaning. Pearson's correlation and Anova tests, along with Turkey post hock tests, were used to determine whether there were any significant differences between the groups with 95% confidence intervals.

3. Results

A total of 465 males and 582 females in the age range of 16 to 71 years took part in the study. The mean age of the study group was 38.49 yrs. +/ - 9.894 (Table 1). Mean age of periodontally healthy individuals was 34.31yrs+/ - 9.519, those with mild periodontitis was 44.27yrs+/ - 7.774, moderate periodontitis was 44.44 yrs+/ - 6.268 and those

with severe periodontitis was 45.26 yrs+/ - 6.947. Among the patients with periodontitis, 35.4% were males and 64.6% were females.

The mean clinical attachment loss in mild periodontitis patients was 1.68 +/ - 0.468, moderate periodontitis patients had 3.50 +/ - 0.50, and severe periodontitis patients had 5.79 +/ - 2.93.

Response to Questionnaire OHIP - 14 S (Table 2): 49.8% of participants never experienced any worsening of taste due to oral problems, while 28.5% often had such difficulties. 43.1% of participants never had any trouble pronouncing words, while 24.2% often faced such situations. 34.4% of participants never experienced any pain due to oral problems, while 27.7% sometimes experienced pain. 47.9% did not feel any discomfort while eating, and 34.6% often felt eating uncomfortable. Oral problems were sometimes a factor negatively affecting relaxation for 27.3% of the patients. 13.6% of patients often felt embarrassed because of their teeth, while 1.1% always felt embarrassed. 19.5% of participants were sometimes self - conscious while 53.8% were always self - conscious. 26.6 were sometimes tensed because of their oral problems, while 1.1% were always tensed. 21.2% often felt their diet was unsatisfactory. 1.9% were always irritable with others, 18.1% seldom expressed irritation, and 49.5% were never irritable. 52 percent did not find oral problems interfering with their jobs; 19.4% sometimes experienced the same; and 0.9% always faced the difficulty. 19% of participants often were not satisfied in life due to oral problems, and 20% felt they were functionally unable.

The mean Oral Health Impact Profile score was 15.79 (Table 3). The OHIP score of healthy participants was 3.29; mild periodontitis patients were 31.14; moderate periodontitis patients were 33.90; and those with severe periodontitis had an OHIP score of 36.96 (Table 4).

A statistically significant positive correlation was found between periodontitis and OHQOL (Table 5). ANOVA was used to compare OHIP scores between the four groups. A significant difference was found between the groups (Table 6). Post hoc tests showed a significant difference between all the groups. The highest mean difference of 33.67 was between the healthy group and the patients with severe periodontitis. The least mean difference of 2.76 was between those with mild and moderate periodontitis (Table 7).

4. Discussion

This study was conducted among the patients visiting our dental centre to find the impact of periodontitis on OHQoL. Because of their stressful physical and mental environments, the population is more vulnerable to oral diseases, particularly periodontal diseases. Loss of attachment was used as the marker for periodontitis[10]. OHIP 14 was used to measure OHQoL. The majority of participants were females. Among the patients who were not periodontally healthy, a majority presented with moderate periodontitis. Periodontal disease was measured using probing pocket depth and clinical attachment levels. In addition to this, patient's perspectives of the disease or "true endpoints" were used.

These subjective measures reflect how the disease affects the patients' daily lives.1047 participants in the age range of 16 to 71 years participated in the present study.59% of the study participants were free of periodontitis, 11.4% had mild periodontitis, 20.8% had moderate periodontitis, and 8.8% had severe periodontitis (Graph 1). In contrast, Grewal et al. found that 87% of participants were free of periodontitis and 13.6% had shallow or deep periodontal pockets[11]. In a study conducted by Ajmal Y et al., 13% of participants had mild periodontitis and 11.8% had moderate or advanced periodontitis[12]. The present study found that periodontitis was more prevalent in females compared to males (Graph 2). This is in agreement with the study done by Iqbal et al., where the prevalence in males was 48.6%[13].

In the present study, among the different domains of OHIP, physical discomfort was the most reported one, followed by functional limitation, and the least affected domain was social disability (Graph 3). As the severity of periodontitis increases, there is an increased loss of the supporting structures of the teeth, and patients may experience drifting, mobility, and loss of teeth, affecting their quality of life. There was a statistically significant difference in all the domains of OHIP as well as in the overall OHIP between the mild, moderate, and severe periodontitis patients (Table 6 and 7). It was noted that as the severity of periodontitis increased, the oral health quality of life decreased, which is indicated by the high OHIP scores. This is in agreement with the study conducted by Jansson et al., where the mean OHIP - 14 score was 3.91 +/ - 5.39 for patients with mild periodontitis, 3.81 +/ - 5.29 for moderate periodontitis and 8.47 +/ - 10.38 for the severe periodontitis group[5]. This is because when attachment loss increases, patients become more aware of the periodontal condition, which makes them more psychologically and socially compromised as their

aesthetics also get affected. This is in contrast to the study by Dannan A. and Joumaa A., who could not find any direct relationship between clinical findings of periodontitis and daily activities being affected[14].

A strong positive correlation between periodontitis and OHQoL was found in this study group. This is in agreement with the findings of Needleman et al.1[5]. The current study did not assess systemic risk factors for periodontitis or oral health quality of life. The study was conducted at a single hospital. This limits the generalizability of the study to all military personnel.

5. Conclusion

The present study concludes that there is a significant difference in OHIP score among the healthy, mild, moderate, and severe periodontitis groups. The quality of life decreases as the severity of periodontitis increases. The correlation between OHIP and periodontitis was found to be statistically significant. There was a significant difference in the oral health impact profile in all four groups for all the individual domains as well as for overall OHIP. Oral health - related quality of life was negatively correlated with periodontitis.

Table 1: Distribution of participants according to age

Periodontitis	Mean	N	Std. Deviation
Absent	34.31	618	9.519
Mild	44.27	119	7.774
Moderate	44.33	218	6.268
Severe	45.26	92	6.947
Total	38.49	1047	9.894

Table 2: Distribution of OHIP - 14S individual items response

	Never	Seldom	Sometimes	Often	Always
Functional Limitation					
Worsened taste	521 (49.8)	110 (10.5)	98 (9.4)	298 (28.5)	20 (1.9)
Trouble pronouncing words	451 (43.1)	199 (19)	105 (10)	253 (24.2)	39 (3.7)
Physical discomfort					
Painful aching	360 (34.4)	99 (9.5)	290 (27.7)	274 (26.2)	24 (2.3)
Uncomfortable to eat	501 (47.9)	115 (11)	39 (3.7)	362 (34.6)	30 (2.9)
Psychological disability					
Difficult to relax	522 (49.9)	118 (11.3)	286 (27.3)	109 (10.4)	12 (1.1)
Been embarrassed	513 (49)	186 (17.8)	184 (17.6)	142 (13.6)	22 (2.1)
Psychological discomfort					
Been self conscious	460 (43.9)	154 (14.7)	204 (19.5)	189 (18.1)	40 (3.8)
Felt tensed	525 (50.1)	128 (12.2)	279 (26.6)	104 (9.9)	11 (1.1)
Physical disability					
Unsatisfactory diet	541 (51.7)	71 (6.8)	199 (19)	222 (21.2)	14 (1.3)
Interruption of meals	559	141	210	137	
Social disability					
Irritable with others	518 (49.5)	190 (18.1)	164 (15.7)	155 (14.8)	20 (1.9)
Difficulty in doing jobs	544 (52)	140 (13.4)	203 (19.4)	151 (14.4)	9 (0.9)
Handicapped					
Least satisfied in life	546 (52.1)	100 (9.6)	177 (16.9)	199 (19)	25 (2.4)
Functional inability	533 (50.9)	145 (13.8)	209 (20)	146 (13.9)	14 (1.3)

Table 3: Mean scores and internal consistency for OHIP - 14S and individual subscales

	Mean +/ - S. D.	Range
Functional limitation	2.48 +/ - 2.54	0 - 8
Physical discomfort	2.86 +/ - 2.46	0 - 8
Psychological disability	2.03 +/ - 2.166	0 - 8
Psychological discomfort	2.22+/ - 2.31	0 - 8
Physical disability	2.06 +/ - 2.26	0 - 8
Social disability	2.003 +/ - 2.19	0 - 8
Handicap	2.10 +/ - 2.33	0 - 8
OHIP	15.79 +/ - 15.26	0 - 56

Table 4: Mean OHIP scores according to severity of periodontitis

	Healthy	Mild periodontitis	Moderate periodontitis	Severe periodontitis
Functional limitation	.5097	4.6639	5.4771	5.8696
Physical discomfort	.9822	5.4034	5.6284	5.6413
Psychological disability	.4029	4.0336	4.3899	4.8587
Psychological discomfort	.4434	4.5462	4.6835	5.3804
Physical disability	.3220	4.1597	4.6147	5.0326
Social disability	.3528	3.9160	4.4037	4.9348
Handicap	.2783	4.4202	4.7110	5.2500
OHIP	3.2913	31.1429	33.9083	36.9674

Table 5: Correlation between OHQoL and Periodontitis

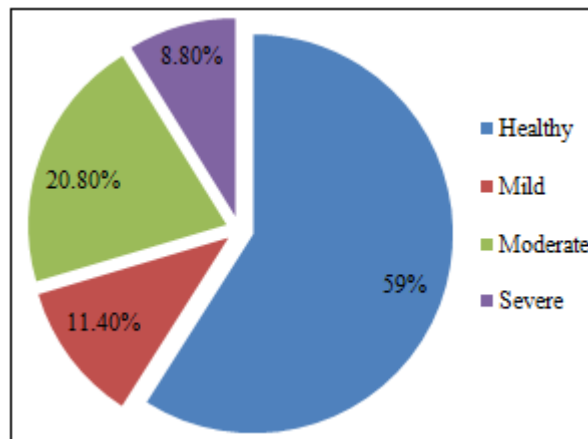|		Periodontitis	OHQoL
Periodontitis	Pearson Correlation	1	.926[**]
	Sig. (2 - tailed)		.000
	N	1047	1047
**. Correlation is significant at the 0.01 level (2 - tailed).			

**Table 6:** Comparison of OHQoL scores between study subjects

		Sum of Squares	df	F	Sig.
OHQoL	Between Groups	237415.98	3	12814.61	.000
	Within Groups	6441.21	1043		
	Total	243857.19	1046		

Table 7: Post hoc tests

Dependent Variable	Periodontitis		Mean Difference	Sig
OHQoL	Mild	Absent	27.85	.000
		Moderate	- 2.76	.000
		Severe	- 5.82	.000
	Moderate	Absent	30.61	.000
		Mild	2.76	.000
		Severe	- 3.05	.000
	Severe	Absent	33.67	.000
		Mild	5.82	.000
		Moderate	3.05	.000

Graph 1: Distribution of participants according to periodontal status
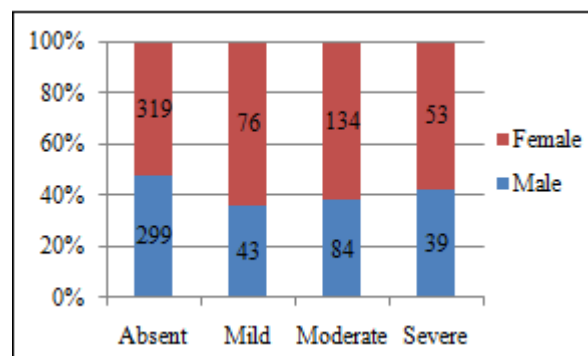
Graph 2: Distribution of participants according to gender
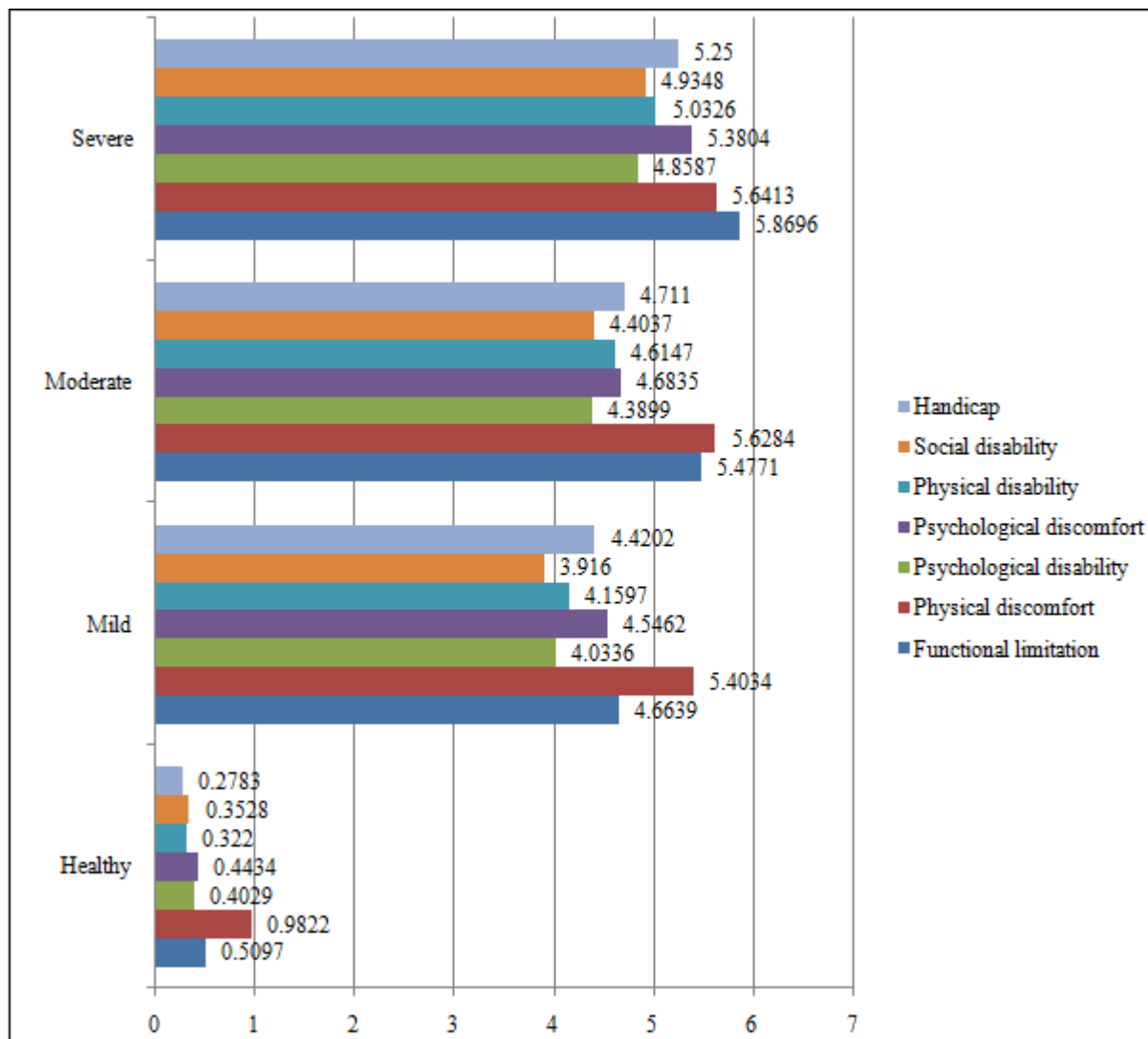
Graph 3: Mean OHIP scores according to severity of periodontitis

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