

Impact of Periodontal Health Status as Assessed by Modified Community Periodontal Index on Oral Health Related Quality of Life - A Hospital Based Cross Sectional Study

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Abstract

Background: Health care delivery systems across the world consider health as a state of complete physical, social and mental wellbeing and not merely the absence of disease or infirmity. Health related quality of life (HRQoL) is conceived as a human notion that is a reflection of the degree of satisfaction found in one's family and social life. Periodontal diseases, second most prevalent of all oral diseases, cause a wide range of clinical signs and symptoms, some of which can have a considerable impact on oral health related quality of life (QoL).

Method: This hospital based cross-sectional study was conducted in 324 subjects with periodontal diseases to assess the influence of periodontal status and the impact of severity of periodontitis on OHRQoL. Impact of periodontal disease on quality of life was assessed using the Oral Health Impact Profile Questionnaire 14(OHIP-14). Periodontal health status was assessed using modified Community Periodontal Index. In order to assess the impact of severity of periodontal disease on OHRQoL, the study subjects were categorized into two groups (No/Mild periodontitis group and Moderate/Severe periodontitis group).

Results: Subjects with moderate/severe periodontitis had a negative influence on their OHRQoL when compared with no/mild periodontitis group. Subjects with moderate/severe periodontitis had significant difficulty in pronouncing words, poor taste sensation, become self-conscious, felt tensed, diet became unsatisfactory, felt difficult to relax, embarrassed, irritable, felt life less satisfying and unable to function (Questions a, b, e, f, g, i, j, k, l, m and n). These results, being a patient related outcome measure, clearly denote the response of the subjects with the signs and symptoms of periodontal disease to their OHRQoL.

Conclusion: Presence of moderate and severe periodontitis, had a significant impact on the quality of life.

Keywords: Quality of Life; Periodontitis; Modified Community Periodontal Index; Oral Health Impact Profile

Introduction

Health care delivery systems across the world consider health as a state of complete physical, social and mental wellbeing and not merely the absence of disease or infirmity. Complete physical, social and mental wellbeing are the essential part of health related quality of life (HRQoL) and it is conceived as a human notion that is a reflection of the degree of satisfaction found in one's family and social life [1,2].

Oral health has a direct influence on the quality of life. Clinical measurements of the effects of oral diseases have been widely described, but subjective parameters on the psychosocial aspects of the mouth and teeth need to be more thoroughly investigated [1,3-5]. For this, a variety of patient-centred outcome measures termed 'oral health-related quality of life measures' (OHQoL) have been developed. OHRQoL is a multidimensional construct that reflects comfort while eating, sleeping, and engaging in social interaction, with oral health [6]. Oral Health Impact Profile 14 questionnaire (OHIP-14) is considered as one of the distinct versions of oral health related quality of life construct. The OHIP-14 consists of self-reported measurements of the adverse impacts of oral conditions on daily life [11].

Among oral diseases, periodontal diseases cause a wide range of clinical signs and symptoms, some of which can have a considerable impact on quality of life (QoL) as described by Sam KS, *et al.* [7] and Bernabe E [3] in their studies done in British adults. Locker, *et al.* and Batra, *et al.* [5] conducted studies in another population and showed that periodontal disease can affect quality of life negatively. Araujo, *et al.* [8] later found that these negative effects are even related to severity of periodontitis. This understanding of the link between periodontal disease and QoL became helpful for planning periodontal care and treatment effectively, as this perception addresses the need and concerns of patients adequately. To the best of our knowledge, there is scarcity of data in literature regarding the impact of periodontal health status on quality of life. This study was conducted to assess the impact of periodontal health status on oral health related quality of life among patients attending outpatient division of Department of Periodontics, Government Dental College, Kozhikode. The severity of periodontitis and its impact on oral health related quality of life were also evaluated.

Methodology

This cross-sectional study was carried out among patients attending the outpatient division of The Department of Periodontics. The duration of the study was six months from January 2018 to June 2018. Ethical clearance (IEC no: 119/2017/DCC, Dated: 31-10-2017) was obtained from the institutional ethics committee, Government Dental College, Kozhikode. Consecutive sampling was used to select the study subjects.

The sample size was calculated by:

$$\text{Sample size (n)} = \frac{(Z_{\alpha} + Z_{\beta})^2 \cdot SD^2 \cdot X \cdot 2}{d^2}$$

Where, Z_{α} (Alpha error 5%) = 1.96. Z_{β} (Power of the study 80%) = 0.84 SD (Standard Deviation of mean OHIP score¹²) = 15.98, d (effect size) = 7

$$= \frac{(1.96 + 0.84)^2 \times 15.98^2 \times 2}{7^2} = 81 \text{ in each group [8]}$$

And this study comprised of four groups and the total sample size was 324.

324 patients with periodontal disease (gingivitis or periodontitis) were selected. Study subjects were classified in to four groups based on clinical attachment loss (CAL): gingivitis group (no CAL), mild periodontitis group (CAL 1 - 2 mm), moderate periodontitis group (CAL 3 - 4 mm) and severe chronic periodontitis group (CAL > 5 mm mm) [9,10].

Patients of age more than 15 years and those who were willing to participate in the study were included in the sample. Unco-operative patients and medically compromised persons were excluded. Informed consent from patients was obtained prior to the start of the study. Subjects included in the study were interviewed to record the sociodemographic and personal data. Socioeconomic status was assessed by Kuppuswamy socioeconomic status classification. Periodontal health status was assessed using modified Community Periodontal Index (Figure 1). Based on modified CPI, subjects were allocated the respective groups (gingivitis group, mild periodontitis group, moderate periodontitis group and severe chronic periodontitis group.). Impact of the disease on quality of life in each study group was assessed using the Oral Health Impact Profile Questionnaire14 (OHIP-14) [11] (Figure 2). In order to assess the impact of severity of periodontal disease on OHRQoL, the study subjects were again categorized into two groups (those with gingivitis and mild periodontitis were pooled together in to No/Mild periodontitis group and those with moderate periodontitis and severe periodontitis were pooled together in to Moderate/Severe periodontitis group). All data were collected by calibrated examiners from Department of Periodontics and Public Health Dentistry using a standard mouth mirror, WHO Periodontal Examination probe under adequate natural light/artificial illumination.

Modified CPI Index Scoring criteria (2013)	
Bleeding Scores:	
0.	Absence of condition
1.	Presence of condition
9.	Tooth excluded sextant
X	Tooth not present
Pocket Registration Scores:	
0.	Absence of condition
1.	Pocket 4-5 mm
2.	Pocket 6 mm or more
9.	Tooth excluded sextant
X	Tooth not present
Loss of attachment score:	
Score	Criteria
0.	Loss of attachment 0-3 mm
1.	Loss of attachment 4-5 mm (CEJ within the black band)
2.	Loss of attachment 6-8 mm (CEJ b/w upper limit of the black band and the 8.5 mm ring)
3.	Loss of attachment 9-12 mm (CEJ between the 8.5 mm and 11.5 mm rings)
4.	Loss of attachment 12 mm or more (CEJ beyond the 11.5 mm rings)
X	Excluded segment (less than 2 teeth)
9	Not recorded (CEJ neither visible nor detected)

Figure 1: Modified community periodontal index scoring criteria.

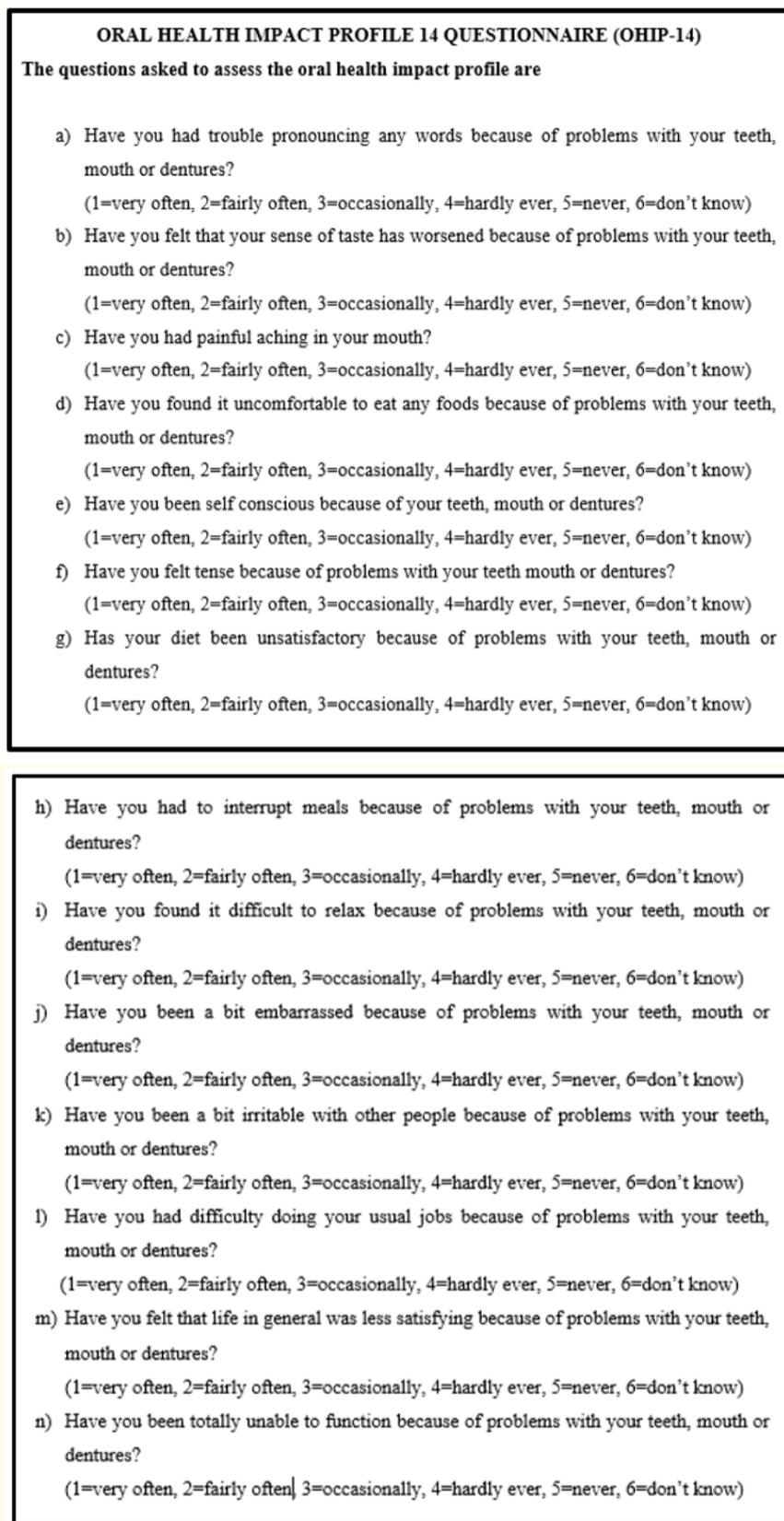


Figure 2: Oral health impact profile 14 (OHIP -14) questionnaire [11].

Statistical analysis

Statistical analysis was done using SPSS version 17.0. For qualitative data chi-square test and for quantitative data t-test and ANOVA were used. In order to assess the impact of severity of periodontitis on quality of life, Pearson Chi square analysis was done to compare responses to the 14 questions in OHIP questionnaire made by subjects in the two groups (Group I No/Mild periodontitis group and Group II moderate/severe periodontitis group). Positive responses for each questions were compared with the corresponding negative responses. P-value < 0.05 is considered to be statistically significant. Power of the study was set at 80%.

Results

In this study, the distribution of females and males were 50.9% and 49.1% respectively (Figure 3). Among them, 23.4% were lower middle class, 51.2% upper lower class, 17.3% upper middle class and 4.4% in the upper class. Thus, majority of the study subjects represented upper middle, upper lower and lower middle class (Figure 4). In this study, 94.7% of study subjects used tooth brush and tooth paste for oral hygiene practices. Among them, 62.3% performed oral hygiene practice twice a day (Figure 5). Percentage of subjects with bleeding on probing were 80.1, pockets > 4 mm were 36.5, clinical attachment loss < 3 mm were 68.4, clinical attachment loss > 4 mm were 25.4 and clinical attachment loss \geq 6 mm were 6.1 (Table 1). Among the subjects, 68.4% had no/mild periodontitis, 25.4% had moderate and 6.1% had severe periodontitis (Figure 6 and table 2). The impact of severity of periodontitis on OHRQoL between group I (no/mild periodontitis) and group II (moderate and severe periodontitis), was statistically significant to OHIP questions a, b, e, f, g, i, j, k, l, m and n (Table 3). It showed that subjects with moderate and severe periodontitis (group II) had significant difficulty in those parameters addressed by the questions a, b, e, f, g, i, j, k, l, m and n.

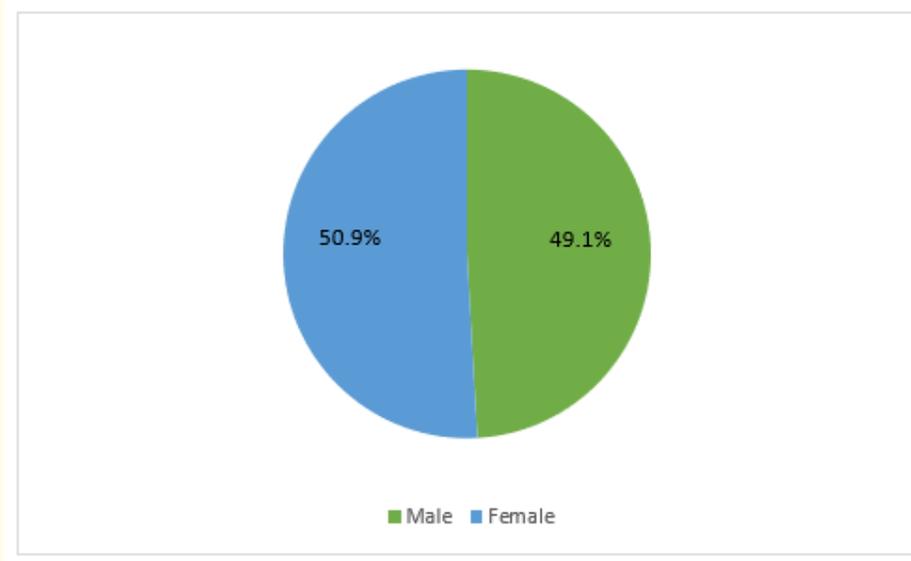


Figure 3: Gender wise distribution of the study subjects.

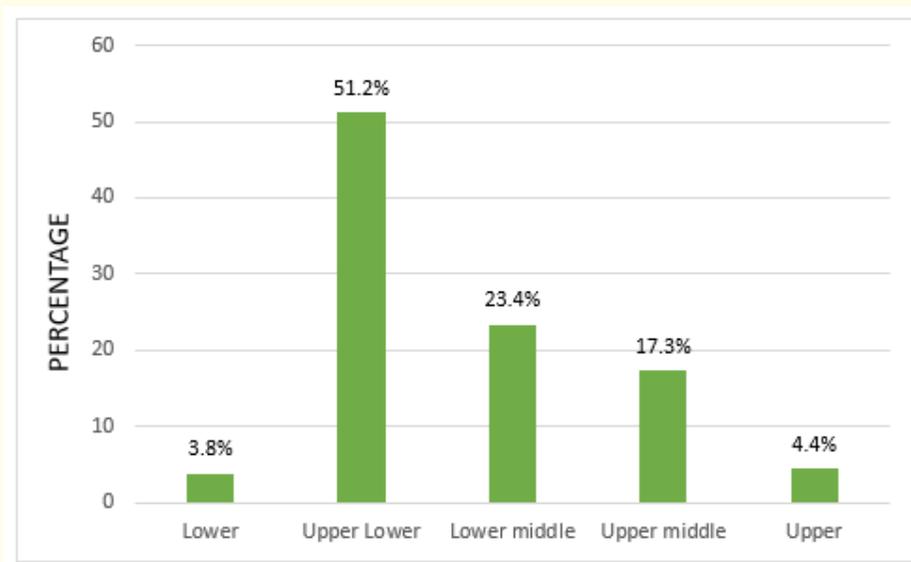


Figure 4: Distribution of study subjects according to socioeconomic status.

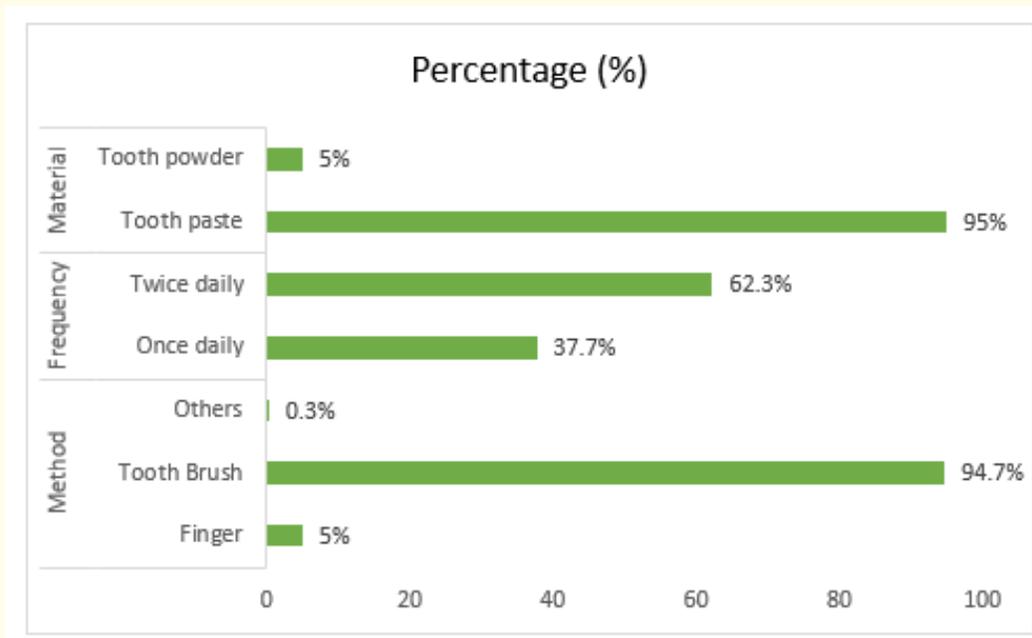


Figure 5: Distribution of percentage of study subjects based on oral hygiene practices.

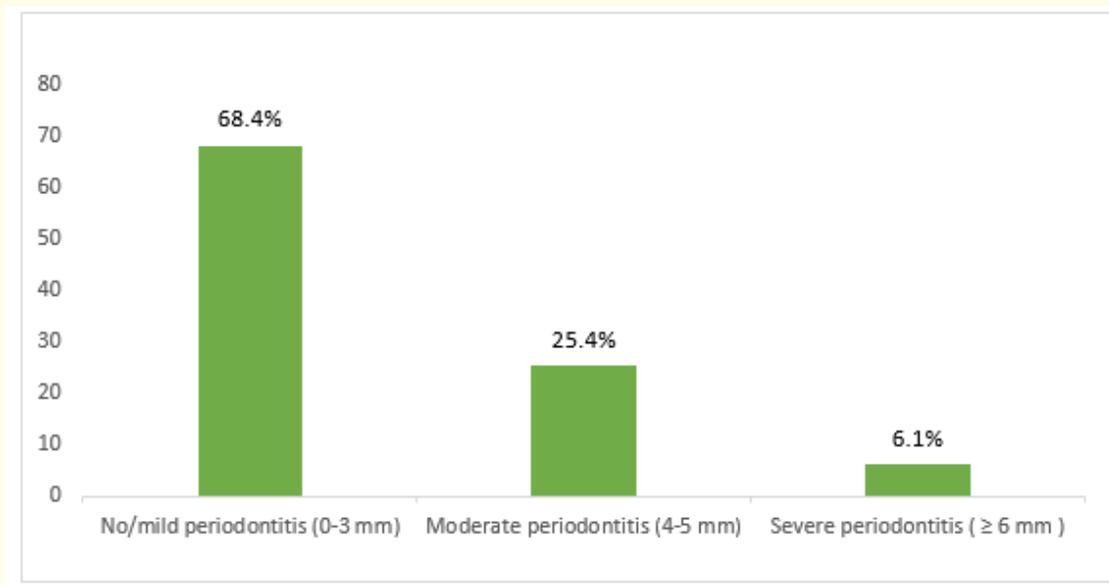


Figure 6: Distribution of percentage of study subjects based on clinical attachment level.

No	Variables	Distribution - Frequency (%)	n
1.	Bleeding Scores	Absence of condition 68 (19.9)	n = 342
		Presence of condition 274 (80.1)	
2.	Pocket Registration Scores	Absence of condition 217 (63.5)	n = 342
		Pocket 4 - 5 mm 102 (29.8)	
		Pocket 6 mm or more 23 (6.7)	
3	Clinical Attachment Level	Loss of attachment (0 - 3 mm) 234 (68.4)	n = 342
		Loss of attachment (4 - 5 mm) 87 (25.4)	
		Loss of attachment (≥ 6 mm) 21 (6.1)	

Table 1: Distribution of periodontal health status among study subjects according to modified CPI index. n = Total number of subjects.

Periodontal disease severity	Proportion
No/Mild (CAL 0 - 3 mm)	68.4%
Moderate (CAL 4 - 5 mm)	25.4%
Severe (CAL ≥ 6 mm)	6.1%

Table 2: Proportion of periodontal disease severity among the study subjects.

Periodontal Health status		No/Mild peri-odontitis	Moderate/Severe periodontitis	X ² value	Level of significance
Question	Response				
a	Positive	28(12%)	28(25.9%)	10.517	.001*
	Negative	206(88%)	80(74.1%)		
b	Positive	48 (20.5%)	39(36.1%)	9.479	.002*
	Negative	186(79.5%)	69(63.9%)		
c	Positive	122 (52.2 %)	63 (58.9%)	1.143	.285
	Negative	112 (47.8%)	45 (42%)		
d	Positive	98 (41.9%)	55 (51%)	2.446	.118
	Negative	136 (58.1%)	53 (49%)		
e	Positive	80 (34.1%)	52 (48.2%)	6.076	.014*
	Negative	154 (65.9%)	56 (51.8%)		
f	Positive	50 (21.4%)	34 (36%)	8.344	.004*
	Negative	184 (78.6%)	69 (64%)		
g	Positive	48 (20.5%)	45 (42.1%)	16.702	.000*
	Negative	186 (79.5%)	63 (57.9%)		
h	Positive	59 (25.2%)	34 (31.5%)	1.466	.226
	Negative	175 (74.8%)	74 (68.5%)		

i	Positive	23 (9.9%)	24 (22.6%)	9.574	.002*
	Negative	211 (90.1%)	84 (77.8%)		
j	Positive	32 (13.7%)	36 (33.4%)	17.926	.000*
	Negative	201 (86.3%)	72 (66.6%)		
k	Positive	15 (6.5%)	23 (21.3%)	16.579	.000*
	Negative	219 (93.5%)	85 (78.7%)		
l	Positive	21 (9%)	18 (16.7%)	4.328	.037*
	Negative	213 (91%)	90 (83.3%)		
m	Positive	12 (5.2%)	21 (19.5%)	17.372	.000*
	Negative	222 (94.8%)	87 (80.5%)		
n	Positive	16 (6.8%)	16 (15.2%)	5.544	.019*
	Negative	218 (93.2%)	92 (85.1%)		

Table 3: Association of periodontal health status with OHIP.
 X^2 value= Chi square value; * $p < .05$.

Discussion

In this cross-sectional study, majority of the subjects came under upper lower class and lower and upper middle class of socioeconomic status and there was no significant difference in the gender distribution. Most of them were using tooth brush and tooth paste for oral hygiene practices which shows that there is a good level of awareness on oral hygiene among these subjects. Even though more than 95% of subjects were using toothbrush and toothpaste, majority had signs of gingival inflammation. This can be attributed to the faulty tooth brushing method which needs to be addressed properly. These findings are in consistent with previous studies in a different population [7,8].

Previous studies [1,2,8,11] have shown that oral health has a direct influence on the quality of life. Among oral diseases, periodontal diseases cause a wide range of clinical signs and symptoms, some of which can have a considerable impact on quality of life (QoL). Sam KS., *et al.* [7] found an association between OHRQoL and periodontal disease. In agreement with previous studies [1,2,8,11] present study showed that presence of gingival bleeding, pocket formation and clinical attachment loss had a significant negative impact on QoL. Clinical attachment level is the gold standard in expressing the burden of severity of periodontitis. In this study subjects with moderate and severe periodontitis had significant difficulty in pronouncing words, poor taste sensation, become self-conscious, felt tensed, diet became unsatisfactory, felt difficult to relax, embarrassed, irritable, felt life less satisfying and unable to function (Questions a, b, e, f, g, i, j, k, l, m and n) as compared with no/mild periodontitis group ($p < 0.05$). This result, being a patient related outcome measure, clearly denote the response of the subjects with the signs and symptoms of periodontal disease to their QoL. Increase in the severity of periodontitis not only compromise the longevity of the tooth involved but also negatively influence the function of entire dentition. In this study, subjects with moderate/severe periodontitis had a negative influence on their quality of life when compared with no/mild periodontitis group. These findings showed an association between the severity of periodontitis and OHRQoL which is in consistent with the report of by Locker., *et al.* [1], Batra., *et al.* [5] and Araujo., *et al.* [8]. In a systematic review [12] including thirty four studies, twenty five demonstrated that periodontal disease was associated with a negative impact on OHRQoL. They also opined that severe periodontitis exerted significant negative impact on measures related to function and aesthetics. Another systematic review [13] involving thirty eight studies, twenty eight reported a negative association between periodontal disease and OHRQoL, while eight studies highlighted a dose response relationship between extent and severity of periodontitis and OHRQoL [10]. The results of present study were in line with the above mentioned systematic reviews.

Even though this was a hospital based study with small sample size, the results emphasise the need for an effective strategy in prevention and treatment of periodontal diseases as its presence had a significant effect on the OHRQoL of patients apart from other clinical sequel of the disease.

Conclusion

Within the limitation of this study, it was found that presence of moderate and severe periodontitis, had a significant impact on the quality of life. More studies with larger samples involving multiple geographic locations are needed to precisely determine the impact of periodontal status on OHRQoL.

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