Improvement of Oral Health Related Quality of Life in Periodontitis Patients after Non-Surgical Periodontal Therapy

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Abstract:
Objective: The objective of this study was to assess oral health related quality of life (OHQoL) of patients with chronic periodontitis by short-form oral health impact profile (OHIP-14) and its improvement after non-surgical periodontal therapy.
Methods: This study comprises of 50 dentate adults divided in two groups. The OHIP-14 was used to assess oral health-related quality of life. Periodontal disease was defined as having at least one proximal site with pocket depth ≥ 4 mm. Non-surgical periodontal therapy (scaling and root planing - SRP) was performed in study group patients.
Result: Patients with periodontal disease had worse OHIP – 14 score. During 4 weeks follow up after non-surgical periodontal therapy at an interval of 1 week, there was a significant improvement in OHIP – 14 scores ($p < 0.001$) in the study group.
Conclusion: Periodontal disease was associated with quality of life, which was rapidly ameliorated by non-surgical periodontal treatment.
Key words: Periodontal disease, periodontitis, quality of life.

Introduction:
      Oral diseases have an impact on daily living and quality of life with physical, social and psychological influences. Dentistry has typically focused on assessment of treatment

outcomes rather than patient's experience of their disease. The impact on quality of life of periodontal disease has received much less attention in comparison with other common oral conditions. A better understanding of the effects of periodontal disease from individuals' point of view is needed for the planning and evaluation of public health interventions and for allocation of resources.[1] Furthermore, this information can be used to demonstrate the burden of periodontal disease on the well-being of populations and to advocate for resources to improve access to oral health care services.[2,3]

Current evidence on the impact of periodontal disease on quality of life is mostly limited to clinical studies,[4,13] which restricts the ability to generalize findings to wider populations. On the other hand, the few population studies were confined to specific age groups or controlled for a limited number of covariates.[6,14-17] As socioeconomic position and demographic factors are closely related to both periodontal disease and quality of life, they may confound the association between periodontal disease and quality of life.[15,16]

Oral Health Impact Profile – 14 (OHIP-14)[18] is a well validated measure of OHQoL that detects dysfunction, discomfort and disability attributable to oral conditions based on WHO's "disease-impairment-disability-handicap" model. It may thus indicate the impact of periodontal disease on a patient's well being. OHIP-14 is the short form for the Oral Health Impact Profile.[18]

The clinical signs of early chronic periodontitis, including clinical attachment level, probing pocket depth and bleeding upon probing are largely invisible to the patients and thus chronic periodontitis is symptom-free in its early stage. As the disease progresses some patients report with pain, tooth drifting and mobility but most affected people underestimate the severity of disease and thus it is said as a 'silent' disease.

The aim of this study was to assess oral health related quality of life (OHQoL) of patients with chronic periodontitis and its improvement after non-surgical periodontal therapy, as there are very few reported studies in this aspect.

Material and Methods:
Study population:

Patients referred to the Department of Periodontics at JSS Dental College and Hospital, Mysore, India were screened and selected according to the inclusion and exclusion criteria. The study was conducted over the duration of 1 year.

The inclusion criterion for periodontitis patients was probing depth $\geq$ 4 mm in at least one proximal site on clinical examination.

Patients were excluded if they were below 20 years of age, wore a denture or an orthodontic appliance, had caries or other oral diseases, had partial anodontia, systemic diseases, were taking multiple medications or any adverse habits.

Eligible patients were invited to participate and written consent was obtained. Twenty-five patients each were recruited in both study group and control group. Ethical approval was gained from the ethical committee of J.S.S. Dental College and Hospital based on the Declaration of Helsinki.

Periodontal examination:

All participants received an oral examination by same examiner who assessed following clinical parameters at baseline and after 1st, 2nd, 3rd and 4th week.

1. Plaque Index (PI) (Loe, 1967)[19] and Gingival Index (GI) (Loe, 1967)[19]: both were measured on all teeth (except 3rd molar), scoring four surfaces of tooth.
2. Probing Pocket Depth (PPD): calibrated manual William's Periodontal Probe was used to measure from the gingival margin to the bottom of the periodontal sulcus or pocket, at four sites of tooth.

Tables 1: Comparison of clinical parameters at baseline between study and control group

	Group (n-25)	Mean	Std. Deviation	t	Significance (*p*)
Plaque Score	Study	2.44	0.44	0.24	0.8
	Control	2.41	0.38		
Gingival Score	Study	2.74	0.28	1.33	0.1
	Control	2.62	0.31		
Probing Pocket Depth	Study	5.75	0.95	0.06	0.9
	Control	5.73	0.90		

Independent Samples *t* test

Table 2: Comparison OHIP-14 in study and control group

	Groups	Mean	Std. Deviation	t	Significance (*p*)
Baseline	Study	41.08	6.80	-0.48	0.6
	Control	42.04	7.19		
1 week *	Study	27.68	6.93	-6.58	0.000
	Control	40.56	6.89		
2 weeks *	Study	17.36	4.99	-13.67	0.000
	Control	39.72	6.47		
3 weeks *	Study	9.44	2.32	-19.85	0.000
	Control	38.88	7.03		
4 weeks *	Study	5.60	1.50	-22.08	0.000
	Control	38.40	7.27		

Descriptive statistics and Independent Samples *t* test

* *p* < 0.001

Table 3: Comparison OHIP-14 in study and control group

	F value	Significance (*p*)
Change	473.34	0.000
Change between groups	316.69	0.000

Repeated measure ANOVA

* *p* < 0.001

Graph 1: Comparison of OHIP – 14 score between study and control groups
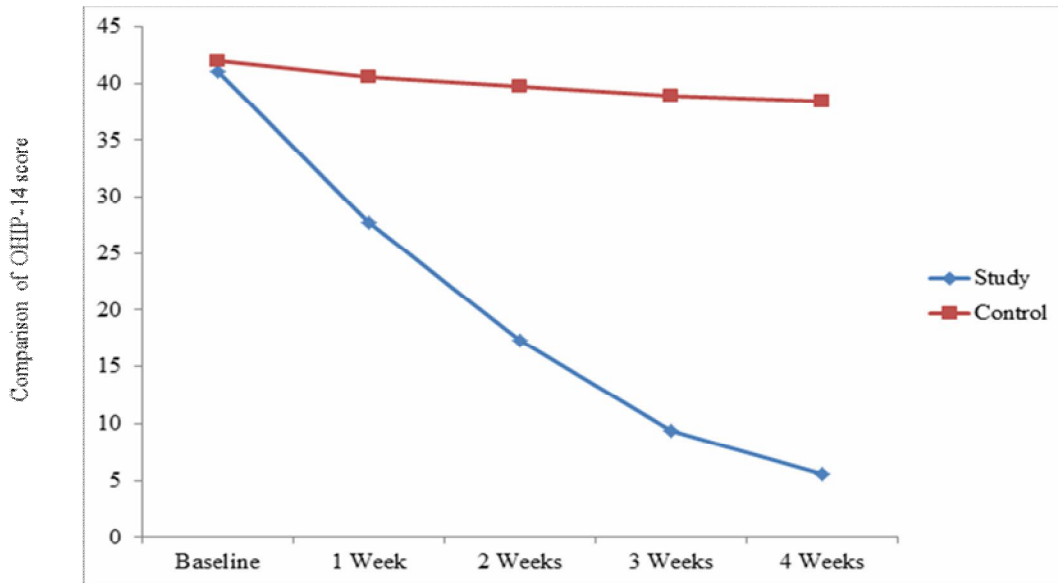
Intervention:

Data were collected through face to face interviews and dental examinations by same examiner. During interviews, participants provided information on their demographic characteristics (sex and age), educational attainment and OHQoL. Educational attainment was assessed as the highest level of qualification received (no qualifications, below degree level, and degree level and above). OHQoL was measured using the short-form oral health impact profile (OHIP-14), which contains 14 questions on the frequency of adverse impacts caused by oral conditions during the preceding 4 weeks. For example, subjects were asked, "How often during the past year have you had painful aching in your mouth because of problems with your teeth or mouth?" OHIP-14 items are grouped into seven dimensions: functional limitation (trouble pronouncing words and worsened taste), physical pain (aching in mouth and discomfort eating foods), psychological discomfort (feeling self-conscious and feeling tense), physical disability (interrupted meals and unsatisfactory diet), psychological disability (difficulty relaxing and embarrassment), social disability (irritability and difficulty in doing usual jobs) and handicap (life less satisfying and inability to function). Respondents were asked to rate each item on a 5-point ordinal scale coded 0 "never", 1 "hardly ever", 2 "occasionally", 3 "fairly often" and 4 "very often". The OHIP-14 score is the sum of responses and ranges from 0 to 56, with higher scores indicating poorer OHQoL.[18]

SRP was performed in patients of study group. They were prescribed 0.2% chlorhexidine rinse to be used twice daily for one week. Patients in control group were given only oral hygiene advice. OHIP- 14 was recorded at 1st, 2nd, 3rd and 4th weeks in patients of both the groups and their responses were recorded.

Statistical Analysis:

Analysis of baseline data for all clinical parameters between test and control group was done with Independent samples t test. Independent samples t test and repeated measure ANOVA was used for both groups over five durations for OHIP – 14. All analysis were performed using a statistical software program SPSS© - version 17 (Statistical Package for the Social Sciences).

Results:

There were 25 patients each recruited to both study and control group according to

inclusion and exclusion criteria. Mean age in the control group was 26 years (range 22-34 years) and in the study group was 29 years (range 22-40 years).

There was no significant difference in PI, GI and PPD scores at baseline between study and control group. (Table 1)

There was no significant difference in baseline OHIP – 14 scores between study and control group. Comparison between study and control groups at baseline showed a mean value of 41.08 ± 6.80 and 42.04 ± 7.19, respectively. The values were subjected to Independent Samples t test for comparison, indicating a non-significant difference between the groups (p=0.6). (Table 2)

Comparison between study and control groups at 1 week showed a mean value of 27.68 ± 6.93 and 40.56 ± 6.89, respectively. The values were subjected to Independent Samples t test for comparison, indicating a significant difference between the groups (p<0.001). (Table 2)

Comparison between study and control groups at 2 weeks showed a mean value of 17.36 ± 4.99 and 39.72 ± 6.47, respectively. The values were subjected to Independent Samples t test for comparison, indicating a significant difference between the groups (p<0.001). (Table 2)

Comparison between study and control groups at 3 weeks showed a mean value of 9.44 ± 2.32 and 38.88 ± 7.03, respectively. The values were subjected to Independent Samples t test for comparison, indicating a significant difference between the groups (p<0.001). (Table 2)

Comparison between study and control groups at 4 weeks showed a mean value of 5.6 ± 1.5 and 38.4 ± 7.27, respectively. The values were subjected to Independent Samples t test for comparison, indicating a significant difference between the groups (p<0.001). (Table 2)

When these data were subjected to repeated measures ANOVA, a statistically significant change irrespective of the groups was observed from baseline to 4 weeks. (p<0.001). When the change with respect study and control groups were verified, there was also significant change (p<0.001). (Table 3, Graph 1)

Discussion:

Now a day there has been increasing interest in how periodontal disease and its treatment affect the well-being of patients. A systematic review of non-surgical periodontal treatment has demonstrated its effectiveness in reducing clinical signs such as bleeding on probing and pocket depth[20], but only a limited number of publications[5,21] describe how periodontal care may address patients' experiences.

Recent data suggest that patients' quality of life were adversely affected by periodontal disease. Cross-sectional studies [7,14] have shown that the loss of clinical attachment can impact OHQoL, but the effect of treatment was not ascertained. Conversely, a substantial proportion of a patient group referred for periodontal treatment adversely affected their OHQoL.[5] However no control group was presented for comparison.

In this study, we divided patients in two groups. There was no significant difference in clinical parameters and OHIP-14 score between both the groups at baseline. In study group, patients were treated with SRP and 0.2 % chlorhexidine rinse was prescribed to be used twice daily for one week. Patients in control group were given only oral hygiene advice. In the study group, OHIP-14 was significantly reduced over the duration. Inter-group analysis also suggested statistical significant difference between both the groups over all duration.

Periodontal disease was independently associated with poor quality of life. This finding is comparable with that found in the Dunedin Multidisciplinary Health and Development Study when the cohort was at age 32 years (14% increase), which is the only previous study reporting estimates adjusted for untreated caries.[16] However, our findings are unique because we excluded patients with other oral conditions. As the association between periodontal disease and the OHIP-14 score decreased by up to 21% when dental caries, traumatic dental injuries (TDI) and tooth wear were considered simultaneously, previous reports may have overestimated the

magnitude of the association between periodontal disease and quality of life.

We also found evidence for a dose response association between the severity of periodontal disease and quality of life. There were gradual deteriorations in quality of life scores as the pocket depth and loss of attachment increased. This means that not only those with generalized forms of periodontal disease but also those with localized periodontal disease had poorer quality of life than those with no signs of the disease. This finding is consistent with a previous study where patients with multiple teeth with periodontal pockets reported worse quality of life than those with few and no periodontal pockets.[7]

Taken together, our findings suggest that periodontal disease may significantly affect the quality of life of individuals. Through inflammation and destruction of the periodontal tissues, periodontal disease causes a wide range of clinical signs and symptoms, such as bleeding, tooth mobility, receding gums, bad breadth and toothache, which may have a considerable impact on daily life.[5,7,14]

We also found that periodontal therapy improves the quality of life of periodontal patients which has also been demonstrated recently by some clinical trials.[10,21-23] Patients referred for treatment of periodontal disease have worse OHQoL than disease-free patients. This impact was partly, and rapidly, ameliorated by non-surgical periodontal treatment. These data confirm contemporary findings that periodontal disease is not "silent" and indicate that conventional non-surgical treatment can be effective from patients' perspectives.[10] It is difficult to imagine that complete resolution of the disease has occurred within this time and so the benefit may be due to the patient's acknowledgement of improved oral hygiene, oral freshness or a positive placebo effect due to intensive attention by the therapist.

By contrast, both surgical periodontal treatment[21] and surgical tooth extraction resulted in worsening in patient's OHQoL during the first few days after the treatment, presumably due to post-operative trauma. It is surprising, but reassuring, that even acute and intensive non-surgical treatment does not have these adverse effects. Instead, these findings demonstrate that it is possible to tailor a treatment plan to minimize impacts on patient's well-being. However, further studies are required to better understand the type and quality of periodontal treatment that generate the greatest improvement in quality of life.

Limitation of study:

The major limitation of this study was the small sample size. Another possible limitation is that the role of psychological and perceptual factors was provided from self-reports, as patients may be inconsistent in expressing their personal views about their health.

Conclusion:

In summary, non-surgical periodontal treatment is known to have a positive quantitative clinical response. These data show that there are also subjective benefits to the patients and also provides further evidence that periodontal disease adversely affects OHQoL as treatment of the condition had a beneficial effect.

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