Community Dental Health (2012) **29,** 90–94
Received 10 April 2010; Accepted 16 October 2011

doi:10.1922/CDH_2685Nagarajan05

Perception of oral health related quality of life (OHQoL-UK) among periodontal risk patients before and after periodontal therapy

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Objective*:* To assess the oral health related quality of life among periodontal risk patients before and after periodontal therapy. ***Method:*** The study population consisted of 183 patients reporting to the outpatient department of periodontics, who were grouped into low, moderate and high risk patients based on the periodontal risk assessment model. The patients were asked to complete the OHQoL-UK 16 questionnaire before and after periodontal therapy. The change in the patient perception of quality of life before and after treatment was assessed. ***Results:*** Periodontitis had a considerable negative impact on the quality of life of patients in the high risk group in comparison to low and moderate risk groups ($p<0.001$). Treatment brought about an improvement in the OHQoL scores in the moderate and high risk group. ***Conclusion:*** This study shows that risk of periodontal disease is significantly related to oral health related quality of life and periodontal therapy improves the quality of life of patients.

Key words: *periodontal risk assessment, OHQoL-UK, periodontal treatment*

Introduction

Oral health is an integral part of general health. Hence, any disease affecting the mouth impacts on the quality of life of the patient. Periodontal disease is a public health problem worldwide. The aetiology of periodontal disease includes the interplay of several local, systemic, environmental and social risk factors. Hence knowledge of the various risk factors responsible for pathogenesis of disease is crucial for the prevention and treatment of periodontal disease (Chandra, 2007). While poor health or presence of disease may adversely affect a patient's quality of life, this is not inevitable. Indeed some with chronic disabling disorders perceive their quality of life as better than healthy individuals (Locker, 1988). Hence, measurement of the impact of oral disease on quality of life should be a part of evaluating oral health needs (Locker, 1988; Slade and Spencer, 1994).

The need to develop patient-based measures of oral health status was first recognised by Cohen and Jago (1976) who indicated the lack of data relating to psychosocial impact of oral health problems at that time. Since then several quality of life indicators have been developed to assess the impact of oral diseases, such as periodontal disease, on the quality of life of an individual.

Quality of life refers to a person or group's perceived physical and mental health over time. Dentists have often used health-related quality of life (HRQOL) to measure the effects of acute and chronic dental conditions in their patients to better understand how an illness interferes with a person's day-to-day life (Locker, 1988). Logically it can be assumed that the more severe the disease, the greater is its effect on the perceived quality of life and thus assessing the health-related quality of life in a disease with varying degrees of severity can help guide policies or interventions to improve their health. Intervention requires a clear understanding of prevalence and outcomes of disease, risk factors, and appropriate treatments for populations at risk. There is a spectrum of risk for adverse outcomes, ranging from high risk in those with the disease to "low risk" for those without the disease or its risk factors. The assessment of risk can be an easily measured entity, one that clinicians can readily test for in a patient and predict with high reliability the risk of future disease (Chandra, 2007). Because the probability of a particular hazard occurring, i.e. risk, is also influenced by the severity of the outcome when the hazard occurs; assessing risk also assesses the severity of the disease (Lang *et al.*, 2003).

The study uses a risk assessment model where information is gathered to assess the current risk for a patient towards tooth morbidity. The Periodontal Risk Assessment model used in this study to assesses the various risk factors responsible for periodontal disease takes into account both retrospective and current data and uses a simplified 0-5 scale (Chandra, 2007). A higher risk generally indicates higher chances of tooth loss and systemic complications that might arise because of existing periodontal disease (Chandra, 2007). While the association between the oral health related quality of life and periodontal disease has been investigated before (Ng and Leung., 2006, Ozcelik *et al.*, 2007), no attempts were made to quantify and as-

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sess the severity of disease thus obscuring the potential effect of periodontal treatment which is traditionally based on the severity of periodontal disease (Jowett *et al.*, 2009). Hence this study was undertaken to assess the oral health related quality of life among periodontitis patients with different risk profiles before and after periodontal treatment.

Method

Patients who have attended the Department of Periodontics, SVS Institute of Dental Sciences, Mahabubnagar District, India between January and March 2009 were invited to participate in the study. The patients were assessed for various risk factors of periodontal disease based on the periodontal risk assessment model (Chandra, 2007) and were grouped into low, moderate and high risk patients. The patients then completed the OHQoL-UK 16 item (McGrath and Bedi, 2001) to assess their oral health related quality of life. The questionnaire covered 4 domains; symptoms, physical aspects, psychological aspects and social aspects with responses coded: 1, very bad; 2, bad; 3, none; 4, good; and 5, very good. Summing responses from each of the 16 items therefore produced overall OHQoL-UK scores ranging from 16 (poor OHQoL) to 80 (excellent). Equal weights were given to each question since weighting does not improve the psychometric performance of the measure (McGrath and Bedi, 2002). The original 16-items had been translated into the local language, Telugu, revised for understanding and semantics by two independent dentists, and were then checked by back-translation into English by independent bilingual dentists.

All patients received initial periodontal therapy and depending on the severity of the disease, low risk patients received regular sessions of scaling and root planing throughout the follow-up period while some of the moderate risk and all high risk patients had underwent flap surgery; the remaining moderate risk patients were treated with aggressive non-surgical periodontal therapy coupled with local drug delivery placement when required. Any other dental treatments with the potential to impact periodontal disease if required were also instituted in all patients. General health counselling sessions including smoking cessation strategies and stress reduction classes were also held. After 6 months patients were reassessed for any change in their perception of OHQoL.

The periodontal risk assessment model used in this study is an expansion of the periodontal risk assessment (PRA) model (Lang and Tonetti, 2003; Lang *et al.*, 2003): a continuous multilevel risk assessment model that incorporates subjective tooth and site risk assessments and so categorises the patient into low, medium and high-risk categories according to the area enclosed in radar chart of these assessments. The risk assessment model incorporates 8 parameters: 1, percentage of sites with BOP; 2, number of sites with probing depth (PD) ≥5 mm; 3, number of teeth lost; 4, attachment loss (AL)/age ratio; 5, diabetic status; 6, smoking; 7, dental status – systemic factors interplay; and 8, other background characteristics**.** BOP, PD, tooth loss and AL/age ratio measure the cumulative periodontal status. Diabetic status and smoking are the risk factors, and stress and socio-economic factors are the risk determinants assessed in this new model. Stress was measured using the protocol suggested by Axtelius *et al.* (1998). All of these parameters are assessed on a 0-5 risk scale to balance the sensitivity of risk assessment with the time and expertise required to collect the required information (Chandra, 2007).

Data were analysed using SPSS v10.0 (SPSS, Chicago). Analysis comprised of descriptive statistics, the paired t-test for comparisons of OHQoL before and after scores and analyses of variance (ANOVA) for identifying differences in the scores between and within groups. Bonferroni multiple comparision correction adjusted alpha down to 0.003.

Results

A total of 191 patients out of 220 approached, agreed to participate in the study. Of these, 8 were lost to follow up hence the final sample size was 183, 111 males and 72 females. Table 1 shows the distribution of subjects based on various periodontal risk assessment factors among the three risk categories. The age distribution of patients was in the range of 18-55 years with most subjects being in the 35-44 year age group. Three-quarters showed 4 or more sites with bleeding on probing. The following categories contained the greatest numbers of subjects: no tooth loss, non-smokers, zero attachment loss/age ratio, pocket depth >5mm and white or high collar workers. A third were non-diabetic and just over half had minor dental problems. Roughly a third of subjects were in each of the risk groups for periodontal disease**.**

Assessment of the impact of the various OHQoL items among the three risk groups showed a negative impact in the high risk group for all the items when compared to the moderate and low risk groups. Perceptions of OHQoL post-treatment among the three risk groups showed substantial improvements for the items breath odour, speech, smiling, sleep, carefree manner, social life and finance, such that the statistically significant differences between the low and the higher risk groups seen before treatment were no longer apparent. Comparing OHQoL item total scores before and after treatment, a significant difference was noted for all items (Table 2).

Subject assessment of OHQoL scores in the three risk groups before and after treatment showed that the pre- and post-treatment scores were similar in the low risk group whereas the moderate and high risk groups showed an improvement after treatment (Table 3).

Discussion

Periodontal disease is an important public health problem which affects the physical, psychological, social and functional wellbeing of an individual. The present study used the periodontal risk assessment model (Chandra, 2007) to categorise the patients into three risk categories. The perceived oral health related quality of life (OHQoL) was worse for those in the higher risk groups and, following treatment, it improved for those in the moderate and high risk groups.

Table 1. Distribution of subjects based on various periodontal risk assessment factors among the three risk categories

Variable / Item	*Low n (%)*	*Moderate n (%)*	*High n (%)*	*Total*
Gender				
Male	44 (39)	30 (28)	37 (33)	111
Female	25 (35)	16 (22)	31 (43)	72
Age				
18-24	9 (40)	7 (30)	7 (30)	23
25-34	23 (32)	31 (43)	18 (25)	72
35-44	18 (32)	10 (2)	26 (46)	56
45-55	14 (44)	10 (31)	8 (25)	32
Bleeding on probing (% sites with bleeding on probing)				
≤4%	42 (89)	5 (11)	0	47
>4% and ≤9%	26 (52)	15 (30)	9 (18)	50
>9% and ≤16%	0	25 (63)	15 (37)	40
>16% and ≤25%	0	17 (55)	14 (45)	31
>25%	0	1 (7)	14 (93)	15
Pocket depth >5mm (number of sites)				
0 sites	2 (22)	4 (45)	3 (33)	9
1-2 sites	50 (68)	18 (25)	5 (7)	73
3-4 sites	16 (62)	6 (23)	4 (15)	26
5-6 sites	0	16 (89)	2 (11)	18
7-8 sites	0	17 (68)	8 (32)	25
≥9 sites	0	2 (6)	30 (94)	32
Tooth loss				
0	57 (70)	15 (19)	9 (11)	81
1-2	10 (42)	11 (46)	3 (12)	24
3-4	1 (5)	10 (45)	11 (50)	22
5-6	0	15 (71)	6 (29)	21
7-8	0	10 (56)	8 (44)	18
≥9	0	2 (13)	13 (87)	15
Smoking (by number of cigarettes/day)				
Non-smoker	43 (88)	5 (10)	1 (2)	49
Former smoker	22 (100)	0	0	22
<10 cigarettes/day	3 (9)	23 (70)	7 (21)	33
10-19 cigarettes/day	0	17 (81)	4 (19)	21
20 cigarettes/day	0	17 (68)	8 (32)	25
>20 cigarettes/day	0	1 (3)	32 (97)	33
Attachment loss/Age ratio				
0	60 (100)	0	0	60
≤0.25	7 (21)	18 (55)	8 (24)	33
0.26-0.5	1 (3)	19 (68)	8 (29)	28
0.51-0.75	0	11 (69)	5 (31)	16
0.76-1	0	14 (78)	4 (22)	18
>1	0	1 (4)	27 (96)	28
Diabetic status				
<102mg/dl	6 (100)	0	0	64
102-109mg/dl	4 (80)	1 (20)	0	5
110-117mg/dl	0	27 (64)	15 (36)	42
118-125mg/dl	0	16 (73)	6 (27)	22
126-133mg/dl	0	16 (84)	3 (16)	19
≥134mg/dl	0	3 (10)	28 (90)	31
Local systemic factors interplay				
Healthy	35 (88)	4 (10)	1 (2)	40
Healthy, minor dental problems	30 (32)	44 (26)	21 (22)	95
Dental problems affecting the periodontium	3 (60)	2 (40)	0	5
General health factors affecting the progression of dental diseases	0	5 (56)	4 (44)	9
Severe periodontal problems with associated systemic disease	0	8 (80)	2 (20)	10
Severe periodontal problems, systemic disease & increased tooth mobility	0	0	24 (100)	24
Socio economic status				
Upper high collar	2 (100)	0	0	2
High collar	59 (75)	10 (13)	9 (12)	78
White collar	3 (5)	32 (53)	25 (42)	60
Blue collar	4 (18)	10 (46)	8 (36)	22
Temporary	0	11 (58)	8 (42)	19
Unemployed	0	0	2 (100)	2
Stress				
No stress	38 (52)	19 (26)	16 (22)	73
Mild stress	18 (33)	26 (48)	10 (19)	54
Moderate stress	5 (19)	8 (31)	13 (50)	26
Traumatic episode in past 7 years	3 (21)	6 (43)	5 (36)	14
Traumatic episode in past year	3 (43)	0	4 (57)	7
Highly stressed	1 (11)	4 (44)	4 (44)	9

Table 2: OHQoL item scores before and after periodontal therapy among the three risk groups.

Variable	*Low mean (sd)*	*Moderate mean (sd)*	*Severe mean (sd)*	*F-value*	*p-value*	*Total*	*t-value*	*p-value*
Comfort								
Before	3.5 (0.7)	2.6 (0.7)	1.7 (0.4)	93.98	**0.001**	2.7 (0.9)	-13.15	**0.001**
After	3.8 (0.8)	3.7 (0.9)	2.9 (1.0)	14.46	**0.001**	3.5 (1.0)		
Breath odour								
Before	3.1 (1.3)	1.9 (0.4)	1.3 (0.4)	59.63	**0.001**	2.2 (1.1)	-14.69	**0.001**
After	4.0 (0.6)	3.8 (0.7)	3.9 (1)	0.48	**0.618**	3.9 (0.8)		
Eating								
Before	3.7 (0.6)	2.2 (1)	1.5 (0.6)	131.3	**0.001**	3.4 (1.2)	-11.5	**0.001**
After	3.7 (0.6)	4 (3)	3 (1.2)	13.55	**0.001**	3.6 (1.0)		
Appearance								
Before	3.8 (0.7)	2.4 (0.5)	1.9 (0.8)	105.39	**0.001**	2.8 (1.0)	-5.30	**0.001**
After	3.7 (0.7)	3.1 (0.9)	3.3 (1.1)	8.84	**0.001**	3.4 (0.9)		
General health								
Before	3.9 (0.7)	2.1 (0.7)	1.6 (0.6)	176.27	**0.001**	2.6 (1.2)	-6.06	**0.001**
After	3.6 (0.8)	3 (0)	2.5 (0.5)	49.08	**0.001**	3.1 (0.7)		
Speech								
Before	3.3 (0.6)	2.5 (0.6)	1.6 (0.7)	92.02	**0.001**	2.6 (0.9)	-9.12	**0.001**
After	3.4 (0.6)	3.5 (0.8)	3.4 (0.5)	0.23	**0.788**	3.4 (0.7)		
Smiling								
Before	3.8 (0.5)	2.3 (0.4)	2 (0.6)	177.14	**<0.001**	2.7 (1.0)	-7.13	**0.001**
After	3.6 (0.7)	3.4 (0.7)	3.5 (1.1)	1.01	0.366	3.5 (0.8)		
Sleep								
Before	3.4 (0.6)	2.6 (0.6)	1.8 (0.6)	79.34	**<0.001**	2.7 (0.9)	-5.40	**0.001**
After	3.3 (0.5)	3.1 (0.6)	3.2 (1.1)	0.96	0.383	3.2 (0.8)		
Confidence								
Before	3.7 (0.8)	2.4 (0.6)	1.9 (0.6)	96.57	**0.001**	2.7 (1.0)	-5.95	**0.001**
After	3.5 (0.7)	3.1 (0.5)	3.1 (0.9)	6.01	0.003	3.3 (0.7)		
Mood								
Before	3.6 (0.6)	2.2 (0.5)	1.5 (0.5)	223.31	**0.001**	2.5 (1.0)	-6.18	**0.001**
After	3.4 (0.6)	3.4 (0.9)	2.7 (1.1)	12.58	**0.001**	3.2 (0.9)		
Carefree manner								
Before	3.9 (0.8)	2.4 (0.7)	2.1 (0.7)	97.79	**0.001**	2.9 (1.1)	-4.76	**0.001**
After	3.6 (0.8)	3.2 (0.7)	3.2 (0.6)	4.31	**0.015**	3.4 (0.7)		
Personality								
Before	3.5 (0.8)	2.2 (0.7)	1.6 (0.7)	84.35	**0.001**	2.5 (1.0)	-6.47	**0.001**
After	3.1 (0.3)	3.2 (0.6)	3 (0)	5.72	**0.004**	3.1 (0.4)		
Work								
Before	3.5 (0.7)	2.7 (0.4)	2.2 (0.7)	54.21	**0.001**	2.9 (0.8)	-7.99	**0.001**
After	3.7 (0.7)	3.3 (0.6)	3.2 (0.4)	12.22	**0.001**	3.4 (0.7)		
Social life								
Before	3.8 (0.8)	1.9 (0.5)	1.5 (0.6)	201.70	**0.001**	2.5 (1.2)	-8.42	**0.001**
After	3.8 (0.8)	3.4 (0.6)	3.4 (1.1)	3.38	0.036	3.6 (0.9)		
Finance								
Before	3.4 (0.6)	2.2 (0.6)	1.6 (0.5)	103.88	**0.001**	2.5 (1.0)	-8.23	**0.001**
After	3.3 (0.6)	3 (0.8)	3.3 (0.6)	2.64	0.075	3.2 (0.7)		
Romance								
Before	3.3 (0.7)	2.2 (0.7)	1.9 (0.8)	55.88	**0.002**	2.5 (0.9)	-9.77	**0.001**
After	3.5 (0.7)	3.6 (0.7)	3.1 (0.6)	6.69	**0.001**	3.4 (0.7)		
Total								
Before	57.7 (4.4)	37.4 (6.1)	31.5 (6.1)	377.18	**0.001**	43.3 (12.6)	-10.53	**0.001**
After	57.7 (8.0)	54.5 (5.3)	51 (7.3)	11.20	**0.001**	54.9 (7.4)		

Analysis using the ANOVA and Paired t-test

Table 3. Comparison of OHQoL Scores in the three periodontal risk groups before and after treatment

Risk category	*OHQoL score*	*mean (sd)*	*t*	*p*
Low	Before	57.7 (4.4)	0.04	0.967
	After	57.7 (8.0)		
Moderate	Before	37.4 (6.1)	-6.11	**0.001**
	After	54.5 (5.3)		
High	Before	31.5 (6.1)	-10.95	**0.001**
	After	51.0 (7.3)		

Analysis using the Paired t-test.

The finding that increased risk of periodontal disease had an increasingly negative impact on the quality of life confirms the findings of other studies (Lopes *et al.*, 2009; Ng and Leung, 2006).

Periodontal therapy brought about an improvement in OHQoL scores showing that the patients perceived improvements during post-therapy counselling sessions. This is similar to the Needleman and colleagues' (2004) finding that the patients in a maintenance phase scored higher quality of life than untreated patients. Other studies also showed that treatment of periodontal disease in patients brought about an improvement in scores (Jowett *et al.,* 2009; Ozcelik *et al.*, 2007).

The overall results of the present study demonstrated the poor quality of life among patients at high risk of periodontal disease. Therapy brought an improvement in the quality of life scores supporting the rationale for the therapy and counselling sessions. A limitation of the study was considering only periodontal disease so these findings cannot be generalised to patients with other oral diseases such as dental caries, malocclusion or trauma which also might have an impact on patients' quality of life. While a standard periodontal treatment regimen was chosen as the control intervention, factors as such, the Hawthorne, placebo and response shift effects cannot be excluded. No analysis of scores by age, gender and socio-economic groups was made and these may constitute further research.

Within the limitations of the study, it can be concluded that risk of periodontal disease had a negative impact on the quality of life of patients and therapy brought about an improvement in perceived quality of life for those in the moderate and higher risk groups. That patients perceived an improvement, might recommend such therapy.

References

Axtelius, B., Soderfeldt, B., Nilsson, A., Edwardsson, S. and Attström, R. (1998): Therapy resistant periodontitis. Psychosocial characteristics. *Journal of Clinical Periodontology* **25**, 482-491.

Chandra, R.V. (2007): Evaluation of a novel periodontal risk assessment model in patients presenting for dental care. *Oral Health and Preventive Dentistry* **5**, 39-48.

Cohen, L.K. and Jago, J.D (1976): Towards formulation of socio-dental indicators. *International Journal of Health Services* **6**, 681-698.

Jowett, A.L., Orr, M.T., Rawlinson, A. and Robinson, P.G (2009): Psychosocial impact of periodontal disease and its treatment with 24-h root surface debridement. *Journal of Clinical Periodontology* **36**, 413-418.

Lang, N.P., Bragger, U., Salvi, G. and Tonetti, M.S. (2003): Supportive periodontal therapy. In: *Clinical Periodontology and implant dentistry.* Lindhe, J. and Karring, T. pp.781-805. New Delhi: Blackwell-Munksgaard.

Lang, N.P. and Tonetti, M.S. (2003): Periodontal risk assessment (PRA) for patients in supportive periodontal therapy (SPT). *Oral Health and Preventive Dentistry* **1**, 7-16.

Locker, D. (1988): Measuring oral health: a conceptual framework. *Community Dental Health* **5**, 3-18.

Lopes, M.W.F., Gusmão, E.S., Alves, R.V. and Cimões, R. (2009): The impact of chronic periodontitis on quality of life in Brazilian subjects. *Acta Stomatologica Croatia* **43**, 89-98.

McGrath, C. and Bedi, R. (2002): Impact of oral health on quality of life in Britain: population based norming of the UK oral health related quality of life measure. *British Dental Journal* **193**, 521–524.

McGrath, C. and Bedi, R. (2001): An evaluation of a new measure of oral health related quality of life--OHQoL-UK (W). *Community Dental Health* **18**, 138-43.

Needleman, I., McGrath, C., Floyd, P. and Biddle, A. (2004): Impact of oral health on the life quality of periodontal patients. *Journal of Clinical Periodontology* **31**, 454–457.

Ng, S.K. and Leung, W.K. (2006): Oral health-related quality of life and periodontal status. *Community Dentistry and Oral Epidemiology* **34**, 114-122.

Ozcelik, O., Haytac, M.C. and Seydaoglu, G. (2007): Immediate post-operative effects of different periodontal treatment modalities on oral health-related quality of life: a randomized clinical trial. *Journal of Clinical Periodontology* **34**, 788-796.

Slade, G.D. and Spencer, A.J. (1994): Development and evaluation of the Oral Health Impact Profile. *Community Dental Health*. **11**, 3-11.