

Effect of Severity of Chronic Periodontitis on Oral Health-Related Quality of Life

Ashkan SALARI^a, Fereshteh Naser ALAVI^b

^aDental Sciences Research Center, Department of Periodontics, School of Dentistry, Guilan University of Medical Sciences, Rasht, Iran

^bDepartment of Operative Dentistry, School of Dentistry, Guilan University of Medical Sciences, Rasht, Iran



ABSTRACT

Objective: There is a paucity of studies on the relationship between the severity and type of periodontal disease and oral health related-quality of life (OHRQoL). The present study aimed to evaluate OHRQoL in patients with chronic periodontitis of different severity levels.

Materials and methods: In the present cross-sectional/analytical study, 200 patients with chronic periodontitis completed the OHIP-14 questionnaire. Factors such as age, gender, and chronic periodontitis severity (mild, moderate, severe) were evaluated. One-way ANOVA was used to analyze the relationship between chronic periodontitis severity and OHRQoL using SPSS 20.

Results: There were significant differences in questions regarding the practical and functional domains between the two groups with mild and moderate-severe chronic periodontitis. The severity of chronic periodontitis was not significantly related to OHRQoL considering the scores of the 14 questions of the questionnaire. Variables such as gender and age did not significantly affect the OHRQoL under the effect of chronic periodontitis severity.

Conclusion: Overall, the severity of chronic periodontitis did not significantly affect the OHRQoL in the present study.

Keywords: questionnaires, oral hygiene, quality of life, chronic periodontitis, oral health.

INTRODUCTION

Dental caries and periodontal diseases are among the most important problems of the orodental structures. Periodontal diseases significantly affect patients' daily lives due to the widespread symptoms and signs

associated with these diseases (1). The prevalence of periodontal diseases is very high, with approximately 10-15% of adults being affected by it (2). Gingivitis is the most common periodontal condition, in which gingival tissues become inflamed due to poor orodental hygiene, resulting in pain, gingival bleeding, and tooth

Address for correspondence:

Ashkan Salari, Assistant Professor

Department of Periodontics, School of Dentistry, Guilan University of Medical Science, Lacan Road, Gas Square, Rasht, Iran

Tel.: +98 013 3348416

Email: drashkan_salary@yahoo.com

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mobility. In the absence of proper treatment, gingivitis progresses to periodontitis in susceptible individuals. Periodontitis affects the tooth-supporting structures and produces a spectrum of inflammatory manifestations that might lead to progressive tissue destruction and loss of attachments, bone, and teeth (3). Physiologically, periodontitis is an inflammatory response to microbial aggregates in the dental plaque. Two manifestations of periodontitis include chronic periodontitis and aggressive periodontitis (4).

During the treatment of periodontal diseases, objective surveys such as improvements in gingivitis or attachment gain provide important data on the disease status due to treatment; however, these parameters do not show the effects of treatments on patients. Recently, ever-increasing attention has been directed toward the effect of probiotics on patients' daily lives, resulting in changes in the basic patterns of attitudes and from a clinical-oriented attitude to a patient-oriented attitude. In addition, it has been suggested that non-Iranian measurements of OHRQoL should be considered one of the chief parameters to evaluate periodontal diseases and the quality of periodontal treatment (5-7). Patients with periodontitis have a poor perception of orodental health and a lower quality of life than healthy individuals (8, 9). Therefore, periodontitis is not a silent problem concerning the quality of life despite previous assumptions, and it is important for the community members to be aware of orodental health (10, 11). It has been demonstrated that periodontitis leads to tooth mobility and tooth loss and adversely affects mastication, food tearing, and speech. Besides, it can adversely affect smile esthetics due to gingival recession, adversely affecting self-confidence and social relations (12).

Furthermore, periodontitis is associated with systemic conditions such as cardiovascular diseases and diabetes, and can even cause premature birth or low-birth-weight children in pregnant women (8). The World Health Organization (WHO) has reported that health assessments involve the evaluation of an individual's physical, mental, and emotional health rather than simply the absence of disease (11). In the evaluation of QoL, general and oral health are crucial factors. Therefore, determining the effect of oral health on the QoL is a critical component of the evaluation of individual needs (13). OHRQoL com-

prehensively shows the quality of orodental health, and OHIP (Oral Health Impact Profile) is used as a tool to determine the effect of orodental health or the payments' quality of life. This tool evaluates the effect of periodontal disease on the OHRQoL in different communities (14-16). In this context, the WHO has designed OHIP-14 and OHIP-19; OHIP-14 is a more accurate and more efficient tool to promote health-care and orodental health than OHIP-49. Some studies have investigated the relationship between periodontal diseases and QoL, suggesting that the loss of clinical attachment adversely affects the quality of life (17, 18).

Although some studies have evaluated the relationship between periodontitis and OHRQoL, there is a paucity of studies on the effect of chronic periodontitis severity on OHRQoL. Therefore, the present study aimed to evaluate the effect of chronic periodontitis severity on the OHRQoL in systemically healthy subjects in an Iranian population. □

MATERIALS AND METHODS

The protocol of the present study was approved by the Ethics Committee of Guilan University of Medical Sciences under the code IR.GUMS.REC.1398.165165. Subjects were selected using an easy consecutive sampling method from the patients referring to the Department of Periodontics, Faculty of Dentistry, Guilan University of Medical Sciences. Inclusion criteria were as follows: absence of any systemic condition based on the subject's self-report, clinical attachment loss, no antibiotic and periodontal treatment in the past six months, and an acceptable level of emotional and mental health. Subjects aged <18, pregnant women, lactating women, patients with rampant and active dental caries, and those with oral diseases were excluded. Two hundred patients underwent periodontal examinations by a periodontist and assigned to two groups in terms of periodontitis severity: mild with a CAL of <3 mm and moderate-severe with a CAL of ≥ 3 mm (19, 20).

Patients were asked to complete the questionnaire. Each subjects' scores on the parameters of QoL were calculated and compared with others. The questionnaire consisted of 14 questions in seven domains as follows: practical and functional limitations (questions 1 and 2), physi-

cal pain (questions 3 and 4), psychological discomfort and suffering (questions 5 and 6), physical inability (questions 7 and 8), psychological inability (questions 9 and 10), social inability (questions 11 and 12), and social loss (questions 13 and 14). Patients were asked to provide answers on a scale from 0 to 4, with 0 for never, 1 for seldom, 2 for sometimes, 3 for mostly, and 4 for always. Patients were given 5-7 minutes to complete the questionnaire but were allowed as much time as they needed to answer the questions. Since each question had four choices, scores ranged from 0 to 4. One-way ANOVA was used to analyze the relationship between the severity of chronic periodontitis and OHRQoL using SPSS 20. Statistical significance was set at $P < 0.05$. □

RESULTS

Subjects included in the present study consisted of 98 females and 101 males ($n = 200$)

with a mean age of 40.81 ± 3.32 . They were assigned to groups according to the severity of chronic periodontitis: mild ($n = 105, 32.5\%$) and moderate-severe ($n = 95, 47.5\%$). Based on Table 1, age and gender variables did not have a significant relationship with the severity of chronic periodontitis ($P > 0.05$).

Table 2 shows the means and standard deviations of the scores of the responses to the OHRQoL questionnaire in terms of the domains in patients with chronic periodontitis. The highest score was related to physical pain, with the lowest related to practical and functional limitations.

Table 3 presents the separate evaluation of the 14 questions in the two groups. The practical and functional limitations in patients with moderate-severe chronic periodontitis were significantly higher than in those with mild disease. Evaluation of the remaining questions did not reveal any significant differences between the two groups.

TABLE 1. Analysis of chronic periodontitis severity based on age and gender

Variable	Categories	Mild	Moderate-Severe	P-value
		N (%)	N (%)	
gender	Male	53 (50.47%)	49 (51.57%)	0.42
	Female	52 (49.5%)	46 (48.42%)	
Age	≤ 40	70 (51.5%)	33 (67.97%)	0.242
	>40	35 (48.5%)	62 (32.01%)	

TABLE 2. Mean values of seven domains related to OHQoL in patients with chronic periodontitis

Domains	Mean ± SD
Function limitation	3.26±1.05
Physical pain	6.51±1.26
Psychological discomfort	5.22±1.55
Physical disability	5.17±1.10
Psychological disability	5.66±1.35
Social disability	4.84±1.31
Social Handicap	4.65±1.16

The overall score of the 14 questions in the moderate-severe chronic periodontitis group was higher than that the mild chronic periodontitis group, but the difference was not significant (Table 4).

TABLE 3. Results of analysis of chronic periodontitis severity according to OHIP-14 items

	Domains	Answers	Mild N (%)	Moderate-Severe N (%)	P-value
1) Have you had problems saying any words because of problems with your teeth, mouth, or gingiva?	Functional limitation	Never	62 (59%)	38 (40%)	0.001*
		Rarely	43 (41%)	40 (42.1%)	
2) Have you noticed that food tastes worse because of problems with your teeth, mouth, or gingiva?	Functional limitation	Sometimes	0 (0%)	14 (14.7%)	0.001*
		Frequently	0 (0%)	3 (3.2%)	
		Always	0 (0%)	0 (0%)	
3) Have you had pain in your mouth or teeth?	Physical pain	Never	6 (6.7%)	15 (15.8%)	0.25
		Rarely	18 (17.1%)	11 (11.6%)	
		Sometimes	21 (20%)	25 (26.3%)	
		Frequently	33 (31.4%)	19 (20%)	
		Always	26 (24.8%)	25 (26.3%)	
4) Have you felt uncomfortable when eating particular foods because of problems with your teeth, mouth, or gingiva?	Physical pain	Never	0 (0%)	8 (8.4%)	0.55
		Rarely	29 (27.6%)	12 (12.6%)	
		Sometimes	49 (46.7%)	42 (44.2%)	
		Frequently	27 (25.7%)	15 (15.9%)	
		Always	0 (0%)	18 (18.9%)	
5) Have you been worried because of problems with your teeth, mouth, or gingiva?	Psychological discomfort	Never	0 (0%)	6 (6.3%)	0.30
		Rarely	22 (20.9%)	35 (36.6%)	
		Sometimes	61 (58.2%)	26 (27.4%)	
		Frequently	22 (20.9%)	21 (22.1%)	
		Always	0 (0%)	7 (7.4%)	
6) Have you felt stressed because of problems with your teeth, mouth, or gingiva?	Psychological discomfort	Never	27 (25.7%)	24 (25.3%)	0.24
		Rarely	37 (35.2%)	46 (24.4%)	
		Sometimes	17 (16.2%)	13 (13.7%)	
		Frequently	23 (21.9%)	7 (7.4%)	
		Always	1 (1%)	5 (5.3%)	
7) Has your eating been compromised by problems with your teeth, mouth, or gingiva?	Physical disability	Never	5 (4.8%)	7 (7.4%)	0.36
		Rarely	27 (25.7%)	23 (24.2%)	
		Sometimes	57 (54.3%)	47 (49.4%)	
		Frequently	16 (15.2%)	7 (7.4%)	
		Always	0 (0%)	11 (11.6%)	
8) Have you had to stop a meal because of problems with your teeth, mouth, or gingiva?	Physical disability	Never	4 (3.8%)	11 (11.6%)	0.58
		Rarely	68 (64.8%)	52 (54.7%)	
		Sometimes	28 (26.6%)	24 (25.3%)	
		Frequently	5 (4.8%)	8 (8.4%)	
		Always	0 (0%)	0 (0%)	

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9) Have you had difficulty relaxing because of problems with your teeth, mouth, or gingiva?	Psychological disability	Never	8 (7.6%)	5 (5.3%)	0.092
		Rarely	27 (25.7%)	21 (22.1%)	
		Sometimes	53 (50.5%)	40 (42.1%)	
		Frequently	12 (11.4%)	25 (26.3%)	
		Always	5 (4.8%)	4 (4.2%)	
10) Have you felt embarrassed because of problems with your teeth, mouth, or gingiva?	Psychological disability	Never	7 (6.7%)	11 (11.6%)	0.62
		Rarely	30 (28.6%)	28 (29.5%)	
		Sometimes	53 (50.5%)	35 (36.8%)	
		Frequently	15 (14.3%)	12 (12.6%)	
		Always	0 (0%)	9 (9.5%)	
11) Have you mistreated others because of problems with your teeth, mouth, or gingiva?	Social disability	Never	23 (21.9%)	24 (25.3%)	0.32
		Rarely	36 (34.2%)	41 (43.2%)	
		Sometimes	24 (22.9%)	14 (14.7%)	
		Frequently	21 (20%)	11 (11.6%)	
		Always	1 (1%)	5 (5.3%)	
12) Have you had difficulties carrying out your daily routine because of problems with your teeth, mouth, or gingiva?	Social disability	Never	7 (6.7%)	9 (9.5%)	0.37
		Rarely	44 (41.9%)	41 (43.2%)	
		Sometimes	46 (43.8%)	40 (42.1%)	
		Frequently	8 (7.6%)	5 (5.2%)	
		Always	0 (0%)	0 (0%)	
13) Have you felt that life in general has become worse because of problems with your teeth, mouth, or gingiva?	Social handicap	Never	5 (4.8%)	7 (7.4%)	0.56
		Rarely	27 (25.6%)	26 (27.4%)	
		Sometimes	56 (53.3%)	44 (46.4%)	
		Frequently	17 (16.3%)	7 (7.4%)	
		Always	0 (0%)	11 (11.4%)	
14) Have you felt completely incapable of performing your daily activities because of problems with your teeth, mouth, or gingiva?	Social handicap	Never	51 (48.6%)	34 (35.8%)	0.09
		Rarely	41 (39%)	37 (38.9%)	
		Sometimes	11 (10.5%)	17 (17.9%)	
		Frequently	2 (1.9%)	7 (7.4%)	
		Always	0 (0%)	0 (0%)	

TABLE 4. Overall scoring of OHIP-14 according to chronic periodontitis severity

Severity	Mean±SD	P-value
Mild	20.8±4.8	0.559
Moderate-Severe	21.8±5.2	

DISCUSSION

Some chronic diseases such as periodontitis might affect patients' daily life due to the myriad of symptoms and signs they produce. In the discussion on the quality of life, general health

and oral health are two significant factors. Therefore, determining the effect of oral health status on QoL is an important component of the evaluation of individual health requirements.

Recently, great attention has been directed toward the effect of periodontitis on patients'

daily lives. Periodontitis is usually associated with some parameters such as increased probing depth, gingival attachment loss, gingival redness, gingival bleeding during toothbrushing, and halitosis, which are not always recorded in the patient file. However, these symptoms and signs are closely related to the disease because they might significantly decrease the OHRQoL.

The availability of tools for psychological evaluations has led to studies on the effect of oral health on the quality of life. OHRQoL is one of these tools which was used in the present study due to its favorable sensitivity and validity for oral health-related research. It is a proper tool to show the self-perception of an individual's feelings about his/her oral health and can evaluate unfavorable aspects of the relationship between oral health and QoL.

In the present study, there was no significant relationship between chronic periodontitis and OHRQoL in terms of age and gender variables, which was consistent with studies conducted by Meusel *et al* (19), Llanos *et al* (20), and Palma *et al* (21). In two separate studies, Alessio *et al* (22) and Ng & Leung (18) reported significant relationships between chronic periodontitis and age and gender, with more severe periodontitis in males and patients with more than 41 years. Such a difference in the results of studies might be attributed to patients' socioeconomic status and differences in sample sizes. Another finding of the present study was that in the seven domains of the OHRQoL, the highest mean score was related to the domain of physical pain, followed by psychological inability, suffering and discomfort, physical inability, social inability, social loss, and functional limitation domains. In a study by Al Habashneh *et al* (9) using the Arabic version of OHIP-14, the highest and lowest mean scores were related to the physical limitation and functional limitation domains, respectively, which was consistent with our findings.

In the present study, in the seven domains of OHIP-14 questions, the severity of chronic periodontitis significantly affected two questions in the functional limitation domain; in this context, speech disturbance and a disturbance in food taste perception in the moderate-severe group was higher than the mild group, consistent with studies by Araujo *et al* (23) and Ng & Leung (18). Severe generalized chronic periodontitis is associated with tooth mobility and even tooth loss,

which might adversely affect pronunciation and word utterance. In addition, purulent exudation or gingival bleeding from deep periodontal pockets in patients with more severe chronic periodontitis might negatively affect the taste perception of the patient's food. In the study by Meusel *et al* (19), speech disturbance and word utterance were more severe in the functional limitation domain in the severe chronic periodontitis group; however, food taste perception was not significantly affected by chronic periodontitis. The differences in the results of these studies might be attributed to differences in patient allocation in that studies to mild-moderate and severe groups. In the study by Al Habashneh *et al* (9), there was no significant relationship between the severity of chronic periodontitis and the two questions in the functional limitation domain, which might be attributed to differences in patient's group allocation; the patients in the study above were evaluated in four groups; chronic gingivitis, mild chronic periodontitis, moderate chronic periodontitis, and severe chronic periodontitis.

In the present study there were no significant relationships between the severity of chronic periodontitis and questions in other domains. In the study by Meusel *et al* (19), there were significant differences between the severe chronic periodontitis group and the mild-moderate group regarding the question on a pause in eating in the physical inability domain and the question on a feeling of shame in the psychological inability domain. Such a discrepancy in the results might be attributed to differences in group allocation, socioeconomic status, and sample size between these two studies.

In the present study, based on the overall score of the 14 questions on the questionnaire, chronic periodontitis did not significantly affect the OHRQoL. In the study by Al Habashneh *et al* (9), moderate or severe chronic periodontitis adversely affected the quality of life. In the study by Meusel *et al* (19), OHRQoL was affected by the severity of chronic periodontitis. The discrepancy in the results between these studies might be attributed to the difference in group allocation and the smaller sample size.

Self-perception of health or disease status has been considered one of the most important aspects of the clinical evaluation of individuals' health or disease. A combination of self-percep-

tion and clinical and radiographic examinations significantly helps diagnose chronic periodontitis and prepare a comprehensive treatment plan to improve oral health. It is suggested that similar studies should be carried out for evaluations before and after non-surgical and surgical periodontal therapy in separate groups with different severities of chronic periodontitis with larger sample sizes. □

CONCLUSION

Based on the results of the present study, age and gender variables did not significantly affect the relationship between chronic periodontitis and the quality of life. The severity of chronic periodontitis did not significantly affect OHRQoL.

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REFERENCES

- Saito A, Ota K, Hosaka Y, et al. Potential impact of surgical periodontal therapy on oral health-related quality of life in patients with periodontitis: a pilot study. *J Clin Periodontol* 2011; 38:1115-21.
- Frencken JE, Sharma P, Stenhouse L, et al. Global epidemiology of dental caries and severe periodontitis—a comprehensive review. *J Clin Periodontol* 2017;44:s94-s105.
- Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. *Nat Rev Dis Primers* 2017;3:17038. doi: 10.1038/nrdp.2017.38.
- Chapple IL, Bouchard P, Cagetti MG, et al. Interaction of lifestyle, behavior or systemic disease with dental caries and periodontal diseases: consensus report of group 2 of the joint EFP/ORCA workshop on the boundaries between caries and periodontal diseases. *J Clin Periodontol* 2017;44:S39-S51.
- Tsakos G, Bernabe E, D'Aiuto F, Pikhart H, Tonetti M, Sheiham A, et al. Assessing the minimally important difference in the oral impact on daily performances index in patients treated for periodontitis. *J Clin Periodontol* 2010;37:903-909.
- O'Dowd LK, Durham J, McCrecken GI, Preshaw PM. Patients' experiences of the impact of periodontal disease. *J Clin Periodontol* 2010;37:334-339.
- Hujoel PP. Endpoints in periodontal trials: the need for an evidence-based research approach. *Periodontol* 2000 2004;36:196-204.
- Needleman I, McGrath C, Floyd P, Biddle A. Impact of oral health on the life quality of periodontal patients. *J Clin Periodontol* 2004;31:454-457.
- Al Habashneh R, Khader YS, Salameh S. Use of the Arabic version of Oral Health Impact Profile-14 to evaluate the impact of periodontal disease on oral health-related quality of life among Jordanian adults. *J Oral Sci* 2012;54:113-120.
- Borges TDF, Regalo SC, Taba Jr M, et al. Changes in masticatory performance and quality of life in individuals with chronic periodontitis. *J Periodontol* 2013;84:325-331.
- Cunha-Cruz J, Hujoel PP, Kressin NR. Oral health related quality of life of periodontal patients. *J Periodontol Res* 2007;42:169-176.
- Oppermann RV, Haas AN, Rosing CK, Susin C. Epidemiology of periodontal diseases in adults from Latin America. *Periodontol* 2000 2015;1:13-33.
- Aslund M, Pjetursson BE, Lang NP. Measuring oral health-related quality of life using OHQoL-GE in periodontal patients presenting at the university of Berne, Switzerland. *Oral Health Prev Dent* 2008;6:191-197.
- Oliveira BH, Nadanovsky P. Psychometric properties of the Brazilian version of the oral health impact profile-short form. *Community Dent Oral Epidemiol* 2005;33:307-314.
- Daly B, Newton T, Batchelor P, Jones K. Oral health care needs and oral health-related quality of life(OHIP-14) in homeless people. *Community Dent Oral Epidemiol* 2010;38:136-144.
- Antoniazzi RP, Zanatta FB, Ardenghi TM, Feldens CA. The use of crack and other illicit drugs impacts and health-related quality of life in Brazilians. *Oral Dis* 2018;3:482-488.
- Nagarajan S, Chandra RV. Perception of oral health related quality of life (OHQoL-UK) among periodontal risk patients before and after periodontal therapy. *Community Dent Health* 2012;29:90-94.
- Ng SKS, Leung WK. Oral health-related quality of life and periodontal status. *Community Dent Oral Epidemiol* 2006;34:114-122.
- Meusel DRDZ, Ramacciato JC, Motta RHL, et al. Impact of the severity of chronic periodontal disease on quality of life. *J Oral Sci* 2015;57:87-94.
- Llanos AH, Silva CGB, Ichimura KT, et al. Impact of aggressive periodontitis and chronic periodontitis on oral health-related quality of life. *Brez Oral Res* 2018;32:e006.
- Palma PV, Caetano PL, Leite IC. Impact of periodontal diseases on health-related quality of life of users of the Brazilian unified health system. *Int J Dent* 2013;2013:150357.
- Alessio IM, Roza JI, Zanatta FB. Evaluation of the periodontal disease's impact on the quality of life through the OHIP-14. *Perionews* 2012;6:181-188.
- Araujo AC, Gusmao ES, Batista JE, Cimoos R. Impact of periodontal disease on quality of life. *Quintessence Int* 2010;41:e111-e118.