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 Saudi Population

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ABSTRACT

Introduction: Most commonly, the quality of life (QoL) measure used for evaluating the influence of oral diseases on individuals is Oral Health Impact Profile-14 (OHIP-14). Knowledge regarding particular illness in a population will help us to implement a new policy or modify the existing health policies and also help us to plan and deliver better preventive and treatment to the population.

Aim: The purpose of the present research was to assess the impact of periodontal diseases in Saudi population.

Materials and methods: A hospital-based cross-sectional study was carried out among with 400 adult subjects using the OHIP-14 structured questionnaire, which is an effective yardstick for oral conditions and their purported management need. Oral examinations were performed by single dental professionals. Data were subjected to the statistical analysis with a significance level set at $p < 0.05$.

Results: This study comprised 400 adults (216 men and 184 women) with a mean $\pm$ SD OHIP-14 score of 13.92 ± 8.21 . Among the seven domains, physical disability, psychological disability, and handicap subscales of OHIP-14 showed a significant difference in periodontal severity ($p = 0.01$). The average psychological disability subscale mean scores were significantly higher among mild periodontitis as compared to its moderate and severe counterparts. Whereas the handicap subscale mean scores were significantly higher for subjects with moderate periodontitis as compared to chronic gingivitis subjects ($p = 0.01$).

Conclusion: The periodontal disease definitely has negative influence on QoL of the subjects among the Saudi population.

Keywords: Oral health impact profile-14, Periodontal disease, Quality of life.

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INTRODUCTION

An extensive variety of clinical features were publicized by periodontal diseases, which have a definite influence on quality of life (QoL) measure.^{1,2} Oral health-related quality of life (OHRQoL), which indicates easiness while sleeping, speaking, smiling, socializing, self-esteem, and gratification, is a multidimensional construct.^{1,3}

The measuring tool should embrace context-, culture-, and environment-specific qualities.⁴⁻⁶ This has shaped the requirement to cross-culturally acclimatize these measures specifically in the global village where association in medical and dental research is greatly motivated.^{4,5,7} Many studies reveal that periodontal illnesses have a damaging impact on the QoL of affected subjects.⁸⁻¹⁴ Reports show that among the subjects with severe periodontitis, the negative effects had a greater impact than healthy individuals. Along with the capability to eat, express, and socially interact, periodontitis can affect relationships and day-to-day functions.⁸⁻¹³ It can also alter the subjects' smiling pattern and smile-related QoL.¹⁵ In order to certify the preparation and assessment of periodontal care and management appropriately, a healthier understanding of the impacts of periodontal illness and its management along with the association between oral health and QoL, patients' needs, and concerns is essential.^{16,17} Subjects show positive behavior on general health and QoL when they have comprehensive knowledge about oral illnesses on teeth and adjacent tissues.^{1,18}

Though the Oral health impact profile-14 (OHIP-14), which was first established in Australia¹⁹ to quantify OHRQoL in relation to various oral diseases, has been authenticated in other regional

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languages such as the United States,²⁰ Scotland,²¹ and Canada,^{22,23} very meagre research aimed to measure the impact of oral diseases on QoL among Saudi population. Hence, the current research aimed to assess impact of periodontal diseases on QoL among Saudi population.

MATERIALS AND METHODS

The cross-sectional research involved subjects who were referred to Riyadh Elm University (REU). A total of 400 individuals, aged 18 years or older with minimum of 15 teeth, were selected through systematic random sampling over the 6-month period from July 2018 to December 2018. Subjects were selected randomly from

the REU outpatient department who fulfilled the selection criteria using convenience sampling as this method is quick, inexpensive, and convenient and the researcher can select the sample elements according to their convenient accessibility and proximity utilizing the inclusion and exclusion criteria.

Saudi subjects with minimum 15 intact teeth, no history of periodontal treatment for last 6 months, and >18 years of age were included in the present research. The criteria for exclusion were the following: any person who refused to participate or to sign the consent, systemic diseases or currently on medication which affect the periodontal tissues, history of alcoholism, pregnant or lactating mothers, patients with a mental or psychological disorder, and any subjects who will not match the inclusion criteria. Using the G-power sample size calculator, 95% power, the required sample size for the present research was 386. The data were collected from 432 individuals. Thirty-two incomplete questionnaire was excluded from the analysis and we used 400 samples for final analysis.

Data Collection

After the approval of this study by REU, a written consent was attained from all the participants. With the help of an organized questionnaire, individual interviews were held in order to accumulate the baseline statistics from every subject. The questionnaire involved relevant characteristics such as sex, age, marital status, education, total family income, self-reported history of the medical problem, the frequency of brushing, the frequency of dental visit, and periodontal treatments in last 6 months.

Instrument

To calculate the influence of periodontal diseases on QoL, OHIP-14 was used. The OHIP-14, which has 14 scales to embrace the seven dimensions to measure the QoL, is a self-administered questionnaire. The seven dimensions are physical functioning, physical pain, physiological disability, physical disability, psychological disability, social disability and handicap. Every dimension was measured using two questions. The participants were asked to report the frequency of adverse experiences in relation to these dimensions within the last 12 months. Using the five-point Likert scale of 0 to 4, each scale was expressed as: never; hardly ever; occasionally; fairly often; very often. All the responses to the items were collected. If the responses were fairly often or very often (≥ 3 on the five-point Likert scale), the response was considered as present. The percentage of individual answers being fairly often or very often on every item of OHIP-14 was measured.¹⁹ By summing all the scores, the entire OHIP-14 score was obtained and thus stretched from 0 to 56 points.^{1,19,24} The original English version of the OHIP-14 questionnaire was translated. Two experienced bilingual English teachers from Kings Saud University who were fluent in English (and for whom Arabic was their native language) autonomously translated the questionnaire from English to Arabic.²⁵ The resulting version was then translated back to English by a professional translator, who was blind to the original English questionnaire, to reduce the translational bias. The theoretical homogeneity between the English and back-translated versions of OHIP-14 was affirmed by an expert committee of three specialists in periodontics and public health. Pilot research with 30 subjects was tested with the Arabic version to evaluate the validity (and content) within the target population. The generality of the apparatus was verified by questioning about complications in understanding the items. All changes that were necessary

to progress the fluency of the OHIP-14 and methodological modifications were performed during pilot testing.

Psychometric Properties

Psychometric properties, validity, and reliability of the Arabic description of the OHIP-14 were verified. A pilot study data of 40 subjects were subjected to test-retest reliability, item internal reliability, and item discriminant validity and scale validity. All these tests showed satisfactory results with acceptable Cronbach's α values (≥ 0.70).²⁶

Clinical Examination

A professionally registered dentist examined all the participants for the periodontal status. The plaque and gingival status of six index teeth was gauged using the Loe and Silness plaque²⁷ and the Silness and Loe gingival index (GI) respectively; probing pocket depth (PPD) clinical attachment loss, and gingival recession (GR) were assessed at only three sites per tooth, the mid-buccal, mesiobuccal and distobuccal sites, as labeled in other epidemiological research.^{27,28} The six selected index teeth were the maxillary right first molar, the maxillary left central incisor, the maxillary left first premolar, the mandibular left first molar, the mandibular right central incisor, and the mandibular right first premolar. The total burden of periodontitis was assessed using the definition of the illness as developed by the Center for Disease Control-American Academy of Periodontology (CDC-AAP).²⁹ The CDC-AAP case definition of periodontitis was based on events of PPD and clinical attachment level (CAL) at interproximal sites; the degree of severity was also considered.^{29,30} Severe periodontitis was defined as having two or more interproximal sites with ≥ 6 mm CAL (not on the same tooth) and one or more interproximal site(s) with ≥ 5 mm PD. Moderate periodontitis was defined as two or more interproximal sites with ≥ 4 mm clinical CAL (not on the same tooth) or two or more interproximal sites with ≥ 5 mm PD, also not on the same tooth. Mild periodontitis was defined as ≥ 2 interproximal sites with ≥ 3 mm CAL and ≥ 2 interproximal sites with ≥ 4 mm PD (not on the same tooth) or one site with PD ≥ 5 mm. Total periodontitis was the sum of severe, moderate, and mild periodontitis. The WHO criteria were used to measure decayed, missing, and filled teeth.³¹ Severity of chronic periodontitis was classified as mild (attachment loss of 1–2 mm), moderate (attachment loss of 3–4 mm), and severe (attachment loss of 5 mm or more).³² The clinical examinations were performed by a carefully trained clinical expert, 20 days before the commencement of the study. Intraexaminer reliability for the PPD and CAL scores was analyzed and weighed by double recordings in 40 subjects. A 7-day gap was placed between the repeat recordings after the first clinical examination. The intraexaminer reproducibility was 0.80 for mean PPD scores and 0.96 for mean CAL scores, indicating very good agreement.

Statistical Analysis

The MS Excel 2010 Statistical Package for Social Sciences (SPSS, version 20, Chicago, IL, USA) was used for data handling and data analysis. The descriptive statistics were defined using frequency distribution for discrete and mean and standard deviation³³ for continuous variables. The Chi-square test was used for categorical variables. One way ANOVA for PI, GI, CAL and PDL scores and the multivariate analyzes was performed for different variables of

OHIP-14 subscales among periodontal disease groups. A *p* value less than or equal to 0.05 was considered statistically significant.

RESULTS

Participant Characteristics

This study comprised 400 adults (216 men and 184 women) aged between 18 years and 60 years, with a mean of 28.7 (10.9) years. Table 1 shows relevant baseline characteristics of study population. Most of them were single and had completed their graduation.

Oral Hygiene and Periodontal Status

Of the 400 patients, 64% had chronic gingivitis, 22% had mild periodontitis, 10% had moderate periodontitis, and 4% had severe periodontitis. Table 2 explains about oral hygiene and periodontal status of participants among various age groups. Advancing age

Table 1: Sociodemographic, clinical, and other relevant characteristics of participants

Variable		<i>n</i>	(%)
Sex	Male	216	54
	Female	184	46
Age	Less than 30	201	50.2
	30–40	87	21.8
	More than 40	112	28
Marital status	Single	220	55
	Married	169	42.3
Education	Primary	35	8.8
	Intermediate	38	9.5
	Secondary	79	19.8
	University	248	62
Family income	<5,000	64	16
	5,000–10,000	145	36.3
	10,000–15,000	85	21.3
	>15,000	106	26.5
Smoking	Yes	126	31.5
	No	274	68.5
Medical problem	Yes	54	13.5
	No	346	86.5
Frequency of toothbrushing	0	79	19.8
	Once	220	55
	More than once	64	16
	3	37	9.2
Frequency of dental visit	Regular	112	28
	Irregular	182	45.5
	For pain	106	26.5
History of periodontal treatment	Yes	181	45.3
	No	219	54.8

Table 2: Oral hygiene and periodontal status of participants by age

Variables	<30		30–40		>40		Total		<i>p</i> value
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
PI	1.62	0.37	1.69	0.37	1.69	0.38	1.6589	0.37792	0.98
GI	1.76	0.34	1.81	0.31	1.81	0.33	1.787	0.3358	0.92
PPD	2.16	0.22	2.41	0.37	2.67	0.38	2.3615	0.38168	0.001*
CAL	1.87	0.48	2	0.45	2	0.58	1.941	0.50987	0.39

One way ANOVA test, *post hoc*: Bonferroni

**p* value ≤ 0.05 was statistically significant

showed increased severity and extent of periodontal diseases among the population.

Impact of Periodontal Diseases on QoL

Table 3 shows the distribution of responses to OHIP items for all subjects. Fairly often/very often was reported on one or more items of OHIP-14 by patients with gingivitis (11.38%), mild periodontitis (17.61), moderate periodontitis (16.07%), and about the same amount as of gingivitis of those with severe periodontitis (11.16%). The mean OHIP-14 score is 13.92 ± 8.21 . Physical pain and psychological disability were the most frequently reported complaints among the participants (Table 4). Only physical disability, psychological disability, and handicap subscales showed a significant difference in periodontal severity. The average OHIP-14 score failed to reach the level of significance among various periodontal severities.

In the present research, results showed higher or equal mean score among chronic gingivitis subjects compared to that of periodontal subjects.

Among patients with chronic gingivitis, subscales like physical disability, psychological disability, and handicap score showed significantly less values than that of mild periodontitis. And the average score of psychological disability subscale shows a statistically significant higher level among mild periodontitis compared to its moderate and severe counterparts. The average score on the handicap scale for patients with moderate periodontitis was significantly higher than that for patients with chronic gingivitis.

DISCUSSION

The QoL has been progressively recognized as a valid, suitable, and substantial gauge that measures the service needed and intervention results in modern-day public health investigation and practice. Health-related QoL is the amalgamation of objective and subjective evaluations that are needed for gauging effectiveness, preventive strategies, and to measure efforts for preventing disabling chronic diseases.^{14,34} Patient's perspective assessment and evaluation have emerged as a substantial research area.³⁵ This has led to conducting more and more research on the patient-centered oral health status, which provided effective evidence to develop and modify the health policies.^{14,36}

This study encompasses 256 subjects with chronic gingivitis, 88 with mild chronic periodontitis, 40 with moderate chronic periodontitis, and 16 with severe chronic periodontitis. A validated OHIP-14 questionnaire was used to assess the impact of periodontal disease on QoL. It is the most reliable, sensitive even to minor changes, and has proven adequate cross-cultural consistency.^{19,23,37,38} And also this measuring tool has been used by most of the researches for gauging the antagonistic effect of oral conditions on comfort or well-being.^{11,14,39} The other efficient instrument to measure periodontal disease and QoL is the OHQoL-UK, which is parallel to that of OHIP-14. The OHQoL-UK measures both negative and positive aspects of the relationship

Table 3: Distribution of responses to individual OHIP items

		Never		Hardly ever		Occasionally		Fairly often		Very often	
		N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Functional limitation	Trouble pronouncing words	295	73.8	41	10.2	48	12	8	2	8	2
	Worsened sense of taste	242	60.5	51	12.8	91	22.8	16	4	0	0
Physical pain	Painful aching	143	35.8	125	31.3	59	14.8	49	12.3	24	6
	Uncomfortable to eat	123	30.8	92	23	79	19.8	90	22.5	16	4
Psychological discomfort	Self-conscious	278	69.5	73	18.3	33	8.3	16	4	0	0
	Felt nervous	158	39.5	35	8.8	110	27.5	73	18.3	24	6
Physical disability	Diet has been unsatisfactory	266	66.5	62	15.5	32	8	32	8	8	2
	Interrupted meals	150	37.5	89	22.3	113	28.2	32	8	16	4
Psychological disability	Difficult to relax	150	37.5	81	20.3	113	28.2	40	10	16	4
	Embarrassment	165	41.3	72	18	88	22	24	6	51	12.8
Social disability	Irritable with other people	163	40.8	82	20.5	80	20	42	10.5	33	8.3
	Difficulty doing usual jobs	197	49.3	114	28.5	40	10	23	5.8	17	4.3
Handicap	Less satisfaction	247	61.8	47	11.8	49	12.3	16	4	41	10.3
	Unable to function	242	60.5	78	19.5	56	14	24	6	0	0

Table 4: Multivariate analysis of differences in OHIP-14 subscales by periodontal disease severity

	Chronic gingivitis (A)		Mild periodontitis (B)		Moderate periodontitis (C)		Severe periodontitis (D)		Significant pairs
	Mean	SDZ	Mean	SD	Mean	SD	Mean	SD	
OHIP-1 (functional limitation)	1.555	0.92	1.67	1.005	1.695	0.885	1.405	0.84	None
OHIP-2 (physical pain)	2.235	1.165	2.535	1.355	2.4	1.19	2.56	1.45	None
OHIP-3 (psychological discomfort)	1.855	1.015	2.12	1.09	2.145	1.15	1.775	1.535	None
OHIP-4 (physical disability)	1.8	1	2.1	1.24	2.12	1.22	1.825	1.185	A vs B
OHIP-5 (psychological disability)	2.2	1.285	2.355	1.195	2.175	1.29	1.75	1.055	A vs B, B vs C, B vs D
OHIP-6 (social disability)	2.13	1.64	2.27	1.2	2.12	1.315	1.775	1.195	None
OHIP-7 (handicap)	1.655	1.025	2.095	1.205	1.92	1.285	1.465	0.905	A vs B, A vs C
OHIP-14	13.43	8.05	15.145	8.29	14.575	8.335	12.555	8.165	None

OHIP-14, oral health impact profile-14

Adjusted for age, sex, years of education, medical illnesses, smoking status, and family income

between oral health and QoL, which is not essential for the present research.^{1,12,13} Hence, OHIP-14 was used in the present research to measure the impact of periodontal diseases on QoL among Saudi population. The mean OHIP-14 score in the present research (13.92) recommends a reasonably greater influence of the oral health status on QoL of subjects. This may be attributed to patient's dental disease status, which required their appearance in the first instance. A well-structured population-based survey can provide a clear picture than a hospital-based study. Parallel research in Shanghai population showed a high mean OHIP score (10.8) among subjects with oral mucosal illness.^{5,40} Some research among pregnant women and the elderly also showed high mean OHIP-14 score.^{5,22,41} The OHIP-14 measure was translated into Arabic language and presented to be valid and reliable.

The reliability (internal) and validity (discriminate) were pleasing for all subscales. Generally, chronic gingivitis and mild periodontal disease had an undesirable influence on QoL, but it did not show any statistical difference between disease progressions. This outcome is an antagonist to that stated by Ng and Leung.¹⁴ Mild impact of periodontal diseases on patient QoL was seen for physical disability and psychological disability and handicap domain. This is in agreement to the findings reported by various researches

where they have stated that the impact of periodontal disease on physical and psychological disability domains and also using the OHQoL-UK measure.^{12-14,42}

The influence of oral health on the QoL of the subjects in the present research was significant; 27% (108/400) denotes that their oral health status had a certain effect on their QoL in one or other supplementary ways (i.e., especially scores of "fairly often" or "very often" in OHIP-14 subscales). The QoL plays a major role in perusing an effective oral health status among the population. The oral health status is highly dependent on QoL as it gets altered the feeling (psychological disability) (by making the food taste bad), which causes physical disability (by disturbing meals). These findings invite attention to the fact that the periodontal conditions impact day-to-day life activities and subsequently the overall QoL also.¹⁴

The present research also states that the severity of periodontal illness was not significantly related to functional limitation, physical pain, psychological discomfort, and social disability domains. In disparity, Ng and Leung¹⁴ and Araújo et al.³⁹ in their respective studies reported that oral health had a substantial influence on functional limitation and other subscales.

When chronic gingivitis is compared with chronic periodontitis (includes all type of periodontitis), an increased effect on QoL was

detected in the chronic periodontitis group among the majority of OHIP-14 domains. Subjects with mild periodontitis had maximum mean scores for majority of domains. This may be due to a small number of subjects included and measured among the severe periodontitis group and large groups were involved among chronic gingivitis and mild periodontitis groups. These findings are dissimilar and inconsistent with those of other researches^{1,43,44} where adequate samples were included in all subsections.

CONCLUSION

The periodontal illness had a definite destructive impact on QoL of the people, and this impact shows no less changes in the severity among the Saudi population, indicating no significant change observed in QoL among patients with mild gingivitis to that of severe periodontal destruction. These findings can significantly influence the development and modification of health policies and also for assessment, planning treatment of periodontitis, and subsequent assessment of periodontal care.

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