

Periodontal disease status and treatment need among a Kurdish population in Sulaimani - Iraq as assessed by CPITN index

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Background and Objective: This study identifies the prevalence and severity of periodontal diseases in a given population of Sulaimani using the Community Periodontal Index of Treatment Needs (CPITN) and attempts to find the relation of CPITN with age, sex, location, visit to dentist, tooth brushing, use of mouth wash and interdental aids, systemic disease, smoking status and missing teeth.

Methods: Periodontal examinations were performed using CPITN, plaque index (PI) and bleeding index (BI). Other data including location, visit to dentist, tooth brushing, use of mouth wash and interdental aids, presence of systemic diseases, smoking status and missing teeth were also collected. The data were subjected to logistic regression to find a relation between periodontal status and other variables.

Results: Among the 1354 subjects examined, 43.6% were male and the majority of these (80.9%) were from urban areas. The mean PI and BI were 0.64 ± 0.24 and 0.39 ± 0.28 , respectively. Calculus was the most prevalent highest score amongst examined subjects (62.2%), followed by shallow pocket (22.2%) and bleeding (9%). Among the sextants, lower central sextants were found to have the highest percentage of calculus. The highest percentages of shallow and deep pockets were found at upper left (14%, 2.5%, respectively) and upper right (11.4%, 3.2%, respectively) sextants. Logistic regression analysis showed that age, sex, frequency of brushing and smoking significantly correlated with CPITN scores.

Conclusion: Prevalence and severity of periodontal diseases are high in the examined population and age, sex, brushing and smoking were shown to have an impact on periodontal condition.

Keywords: Periodontal diseases, Epidemiology, CPITN, Kurdish population.

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Introduction

Periodontal diseases are a group of diseases that affect supporting structures of the teeth and are considered as a main cause of tooth loss in adults worldwide. Although they share similar aetiologies, different natural courses, prognoses and responses to conventional therapy have been reported.¹ The Community Periodontal Index of Treatment Needs (CPITN) is supported by both the World Dental Federation (FDI) and World Health Organization (WHO) as epidemiological screening criteria to determine periodontal treatment needs in a population. The CPITN has been used

widely to plan for health services; furthermore, the data retrieved from it provide a base to determine the needs of the overall population in terms of the requirements for specific types of treatment and the clinical personnel involved in periodontal care.² A series of global epidemiological studies of periodontal disease have indicated that probing pocket depth (PPD) and clinical attachment loss improved in the United Kingdom and the United States between 1988 and 2004. However, the prevalence of periodontal disease increased in other countries over the same period. These countries include

Germany and Hungary, in which the prevalence of scores 3 and 4 increased among adults aged 35–44 and 65–74 years from 1997 to 2005.^{3–5} These figures indicate implementation of efficacious and low-cost periodontal healthcare is urgently needed in many parts of the world. Tooth cleanliness, as measured by plaque and calculus accumulation, plays an essential role in periodontal health.⁶ In adults with periodontal disease, oral health-related quality of life can be moderately improved through basic periodontal treatments⁷ including routine non-surgical therapies and removal of dental biofilms and biofilm-retentive calculus by mechanical means (i.e., scaling and root surface debridement).⁸ Since the 1940s, there has been great general interest among epidemiologists in development of a suitable index system for quantification of the prevalence and severity of periodontal diseases in individuals as well as in population groups in all parts of the world.⁹ The CPITN was jointly developed by the WHO and FDI¹⁰ and since then it has been used worldwide to study periodontal disease in populations at community level, as well as the related treatment needs. It is claimed to be a simple, rapid, inexpensive, easily applied index which requires minimum equipment and has an international uniformity.¹¹ However, baseline data on periodontal knowledge, prevalence and severity of periodontal disease in a Kurdish population in Northern Iraq are not yet available, either from the WHO or individual utilization of this or any other periodontal disease index. Therefore, the aims of this study are to determine periodontal health status in a Kurdish population in Sulaimani/Iraq and find the impact of age, sex, location, visit to dentist, tooth brushing, use of mouth wash and interdental aids, systemic disease and smoking status on periodontal condition among the population base.

Subjects and methods

This cross-sectional study was conducted on patients attending the Periodontics Department of the College of Dentistry, University of Sulaimani from September 2016 to June 2018. The study protocol was

approved by the ethical committee of the Faculty of Medicine, University of Sulaimani (ethical approval number: 342). All participants signed an informed consent form after receiving a detailed information sheet about the study. Inclusion criteria were: patients aged ≥ 18 years old, with two or more teeth present in each sextant and not indicated for extraction. A single expert examiner collected all clinical parameters with 98% agreement of intra-examiner calibration.

The data were obtained through a data collection sheet that recorded the following: age (age group <20, 20–29, 30–39, 40–49, 50–59 and ≥ 60), sex, location (urban and rural), visit to dentist (No, regular and irregular), tooth brushing (no brushing or how many times per day), use of interdental hygiene (yes or no) and type (dental floss, interdental brush, single tufted brush), systemic disease (such as diabetes, hypertension), smoking status (yes or no) and if yes: how many cigarettes per day and missing teeth. Periodontal condition was assessed by CPITN index, bleeding index (BI) and plaque index (PI) of all teeth using WHO probe¹² (Figure 1). The CPITN is a practical index for population-based surveys. It is used as an indicator of periodontal status in a specific community or population.¹³ The CPITN measures the following conditions: no treatment needs (score 0), bleeding gingiva on gentle probing (score 1), presence of supra or subgingival calculus or other plaque retentive factors (score 2), 4 to 5mm PPD (score 3), and ≥ 6 mm PPD (score 4).¹⁴ The dentition was divided into sextants and the highest scores in terms of the worst periodontal condition around each tooth in that sextant were recorded.

Statistical analysis. Advice was taken from an expert statistician. Continuous data (age, missing teeth, PI and BI) were subjected first to the Shapiro–Wilk test for normal distribution and thereafter to appropriate parametric or nonparametric tests. A single overall CPITN score, calculated as the maximum score found over each sextant, was assigned to each sextant and the highest score in all sextants was assigned to each subject. Periodontal condition was then presented as percentage

per given population. The highest CPITN score per subject was used an outcome dependent variable dichotomized using accepted thresholds¹⁵ of low (CPITN < 3) and high (CPITN ≥ 3) for multiple logistic regression modeling. The association between periodontal condition and other confounders such as age, sex, location, visit to dentist, tooth brushing, use of interdental hygiene, systemic disease and smoking status and missing teeth was determined by logistic regression using the highest CPITN score per subject. Statistical significance was defined as $p \leq 0.05$. All calculations were performed using the SPSS software package (version 21; SPSS Inc., Chicago, IL, USA).

Results

During the study 1354 subjects (43.6% male and 56.4% female) with mean age of 30.8 ± 12.9 years were examined. The median of missing teeth in the examined population is 4 teeth (inter quartile range 2 – 8 teeth) with mean PI of 0.64 ± 0.24 and mean BI of 0.39 ± 0.28 (Figure 2). The majority of subjects were from urban areas (80.9%) and visited the dentist irregularly (81.3%) (Table 1). Just above half of the examined subjects brushed their teeth once a day and 67.1% did not use interdental aids, while mouth wash was used by only 8.3% (Table 1). Systemic diseases such as hypertension and diabetes were detected in only 5.7% and 4.2% of the examined population, respectively, and 79.2% were non-smokers (Table 1). At population level, calculus (score 2) was the most prevalent periodontal condition

(62.2%), followed by shallow pocket (score 3) with 22.2%. Bleeding (score 1) and deep periodontal pocket (score 4) were detected at 9% and 6.1%, respectively (Figure 3). At sextant level, calculus (score 2) was mostly detected at the lower anterior sextant (73.1%), whereas shallow pocket (score 3) and deep pocket (score 4) were most prevalent on the upper right (11.4% and 3.2%, respectively) and left (14% and 2.5%, respectively) sextants. Bleeding (score 1) was most prevalent at the upper anterior sextant (54.5%) (Figure 4). Furthermore, at age group level, the percentage of subjects with shallow and deep pocket increased steadily with age. For example, only 0.8% of subjects aged < 20 years old had deep pocket, but this figure increased to 2.9%, 7%, 8.9%, 18.6% and 23.4% for the age groups 20-29, 30-39, 40-49, 50-59 and > 60 years, respectively. In contrast, periodontal conditions determined with score 1 and 2 declined gradually with increasing age (Table 2).

Logistic regression was used to determine the relations between the examined variables and periodontal condition and it was revealed that age, sex (male), brushing and smoking are statistically significantly associated with poor periodontal condition (Table 3). Amongst those variables, age exhibited the highest odd ratio (6.1, 95% CI of 1.4-12.2). Meanwhile, other variables such as living area, visit to dentist, use of interdental aids and mouth wash plus presence of diabetes and hypertension showed no statistically significant association with periodontal condition at population level (Table 3).

Table 1: Characteristics of examined population.

Variables		Percentage	Variables		Percentage
Sex	Male	43.6	Interdental aids	None	67.1
	Female	56.4		Dental floss	20.5
Living area	Urban	80.9		Interdental brush	12.4
	Rural	19.1	Mouth wash	Yes	8.3
Dentist visit	None	7.4		No	91.7
	Regular	11.4	Systemic diseases	No	88.1
	Irregular	81.3		Hypertension	5.7
Brushing frequency	None	7.4		Diabetes	4.2
	Once a day	50.1	Both	2	
	Twice a day	34.4	Smoking	No	79.2
	≥ 3 a day	8.1		Current	14
		Former		6.8	

Table 2: Use of CPITN index to show periodontal status in different age groups.

Age group (years)	N	Percentage of persons with highest score				
		Healthy	Bleeding	Calculus	PPD 4-5mm	PPD ≥ 6 mm
< 20	122	0.8	14.8	68	15.6	0.8
20-29	674	0.1	12.6	67.1	17.4	2.8
30-39	229	1.7	6.1	57.6	27.5	7
40-49	169	0	2.4	59.8	29	8.9
50-59	113	0	0	50.4	31	18.6
≥ 60	47	0	2.1	36.2	38.3	23.4

Table 3. Multiple logistic regression estimates of the .effect of various factors on the odds of a high (≥3) CPITN score.

Factor	Reference category	Odd ratio	P value	95% CI
Age	<20	1.2	0.01	0.5 - 2.6
	20- 29	1.8	0.001	0.8 – 2.8
	30-39	3.3	0.0001	1.7 – 6.3
	40-49	3.7	0.0001	1.9 – 7.3
	≥50	6.1	0.0001	3.1 – 12.2
Sex	Male	2.24	0.001	1.4 – 3.5
Area of residence	Urban and Rural	1.1	0.44	0.7 – 2.3
Visit to dentist	Regular and irregular	0.6	0.48	0.27 – 1.3
Tooth brushing	How many times per days	2.1	0.01	1.1 – 2.8
Interdental aids	Floss or tooth picks.	1.001	0.95	0.9 – 3.2
Mouth wash	Yes or no	1.01	0.95	0.91- 3.6
Systemic Diseases	Diabetes, hypertension or both	1.05	0.94	0.26 – 4.1
Smoking	Current	1.8	0.001	1.5 – 2.1
	Former	1.4	0.014	1.1 – 1.8
Missing teeth		0.97	0.14	0.93 – 1.01
PI		0.9	0.84	0.3 – 2.5
BI		0.5	0.24	0.2 – 1.4

Discussion

This study has employed CPITN to investigate the prevalence of periodontal diseases in the Kurdish population of Sulaimani; additionally, the impacts on periodontal condition of other confounders such as age, sex, location, visit to dentist, tooth brushing, use of mouth wash and interdental aids, systemic disease, smoking status and missing teeth were examined. It is important to acknowledge that prevalence of periodontal diseases amongst the Kurdish population had not previously been examined using any criteria for determining periodontal diseases. As a first attempt to determine periodontal disease in this population, this study employed CPITN as it is extensively used in epidemiological studies for periodontal diseases and would therefore allow comparative assessment of the data of this study. Although CPITN has been criticized for inaccuracy in gingivitis and calculus detection and for generally underestimating periodontitis, this index is still widely accepted as a simple, quick to implement and reproducible assessment tool.¹⁶ Among the subjects examined, calculus (score 2) was the most common highest score (62.2%), which is in line with other studies.^{3,17,18} Severe periodontitis, as represented by score 4, was found in only 6.1% of the examined population (Figure 3), which is in accordance with the data reported in Hungary¹⁹ and Norway²⁰. Whereas, Pilot & Miyazaki²¹ in a European population found higher (10% to 15%) prevalence of periodontitis. These differences can be explained by the fact that periodontal diseases are multifactorial diseases, meaning that factors such as genetics, medication, systemic diseases, habit (such as smoking) and frequency of tooth brushing have an impact on the extent and severity of this disease and these confounders vary from one place to another. At sextant level, calculus is most prevalent at lower anterior sextant, which is obviously related to the presence of the Wharton's duct, and this is in agreement with other studies.^{22,23} Meanwhile, both shallow and deep pockets are most prevalent at upper posterior sextants and this is again similar to the result of other research (Figure 4).²⁴ Logistic regression showed that only age, sex (male), brushing and smoking status

have impact on periodontal condition ($P < 0.05$, Table 3). Periodontal condition was poorer in males than females and this is similar to the data reported by other studies.^{19,24,25} Age is another factor found to have impact on periodontal condition, with the present study showing a steady increase in prevalence and severity of periodontal disease with age (Table 2) which is in accordance with the WHO data bank and results of other studies.^{26,27} Smoking is well-known as a risk factor that contributes to poor periodontal condition, and the present study found both current and former smoking to be associated with poor periodontal condition (odd ratio = 1.8 and 1.4, respectively), which is in accordance with previous studies.^{28,29} Brushing is another factor shown to have impact on periodontal condition (odd ratio = 2.1), while at population level, other factors such as interdental aids, mouth wash, residence place, visit to dentist frequency and systemic diseases such as diabetes and hypertension showed no effect on periodontal condition, which is not in agreement with other studies.^{28,30,31} This can be related to factors such as small sample size and the limitations of the CPITN index mentioned earlier.

Conclusion

Prevalence and severity of periodontal diseases are high in the examined population and age, sex, brushing and smoking were found to have an impact on periodontal condition at population level. Further studies with larger sample size and full mouth examination are recommended. Furthermore, in Sulaimani, this study shows that periodontal condition and oral hygiene standards need improvement. Therefore, to prevent and control periodontal disease, a comprehensive intervention program is recommended at regional level.

Author Contribution

This study conducted only by Dr. Sarhang Sarwat Gul which contributed in conception and design, acquisition of data or analysis and interpretation of data, drafting the article and final approval of the version to be published.






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Conflict of interest

The author has no conflict of interest to declare.

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