

PREVALENCE OF PERIODONTAL DISEASES AMONG ~~UNIVERSITIES~~ STUDENTS IN AL-BASRAH GOVERNORATE, IRAQ -A CROSS-SECTIONAL STUDY

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ABSTRACT : Basic epidemiological information are very essential for the assessment of the extent of and nature of periodontal disease and hence the need for treatment and as an aid for planning of public dental services. To measure the prevalence of periodontal diseases among ~~students of Al-Basrah University~~ by using community periodontal index for treatment needs criteria. A cross-sectional study involving 1012 undergraduate students aged 18-24 years of both genders was carried out. A multi-stage systematic random sampling was used, in which all colleges were covered; one department from each college then a systematic sample was drawn from the student's list. Data included socio-demographic characteristics and results of clinical periodontal examination through using community periodontal index for treatment needs criteria. The results of present study show the prevalence of periodontal diseases collectively (Bleeding, calculus and pockets) was 77.8%. Variation in prevalence did exist with relatively higher rates and significant association for older age, male and smoker students, while students from peripheral residence showed non-significant association.

It can be concluded Periodontal diseases were very prevalent among ~~students of AL-Basrah University~~ regardless of various characteristics of students. A comprehensive approach to periodontal care of ~~university~~ students is highly recommended.

Key words : AL-Basrah, prevalence rate, periodontal disease, cross-sectional study.

INTRODUCTION

A healthy life is the fantasy of every individual irrespective of any physical or social contrasts; oral health is an integral part and very much important for the accomplishment and preservation of general health (Javali, 2011). Periodontal diseases are a spectrum of health abnormalities, the most common oral diseases affecting the encompassing structures of the teeth including the gingiva, periodontal ligament and alveolar bone. These abnormalities may be restricted to the gingiva (gingivitis) or may extend to the periodontal ligament space and alveolar bone (periodontitis). Periodontitis may lead to tooth mobility, pathologic migration and eventual loss of teeth (Popoola *et al*, 2015; Tonetti *et al*, 2017).

The clinical indications of periodontal illness may show up at any age (Mârtu *et al*, 2013) and epidemiological investigations demonstrated that gingivitis, which fluctuates in seriousness, is very nearly a widespread finding in children, adolescents and young adults while damaging periodontitis is of lower

pervasiveness in younger individuals when contrasted with middle aged and older adults (Chauhan *et al*, 2012).

Many developing countries have a lack in oral health staff, in which administrations are generally offered from local or focal emergency clinics of urban focuses and little significance is given to preventive dental consideration (Mehta *et al*, 2010).

The community periodontal index for treatment needs (CPITN) was developed by Oral Health Unit of World Health Organization (WHO) in collaboration with the Federation Dentaire International (FDI) to assess periodontal health status. It is a simple, time saving method of assessing the treatment needs (TNs) of a specified population group, and has stood as the major index in a number of major epidemiological studies on the prevalence of periodontal disease (Bhardwaj *et al*, 2012; Magzoub *et al*, 2016; Dey *et al*, 2017).

In AL-Basrah governorate there is no previous epidemiological data pertaining to periodontal health status of AL-Basrah governorate generally and ~~students of AL-~~

Basrah universities in particular. At governorate level, the dentist to population ratio is (1:3,116) in urban areas and 1:28,121 in rural areas. The dentist/population ratio and acute shortages of trained manpower has led to compromise in dental health (BASRAH, 2018).

The study specifically aims to determine the prevalence of periodontal diseases among undergraduate students of AL-Basrah Universities by using CPITN criteria.

MATERIALS AND METHODS

An observational cross-sectional study was designed at the Department of Periodontics, College of Dentistry, and University of Baghdad to assess periodontal health status among students of universities in Al-Basrah governorate, which is the most southern governorate of Iraq.

The study population in the present study consisted of undergraduate students of AL-Basrah universities. The age ranged between 18-24 years of both genders. The total enrollment of undergraduate students was 33783 for the academic year 2018-2019 distributed in different colleges of the existing universities (one public and three private).

A pilot study on small sample from three colleges was carried out to obtain the prevalence of periodontal disease to calculate the total sample size required as there is no previous data in Al-Basrah governorate concerning the prevalence of periodontal disease. The sample size (N) was calculated by using Cochran's equation ($N = Z^2 P (1-P)/D^2$) (Charan and Biswas, 2013).

The calculated sample size was 1012; sample selection was based on a multistage systematic random sampling procedure (WHO, 2013) involving all colleges in Al-Basrah, private and government colleges as stage one. In stage two one department was randomly selected and from each department a systematic random sample of 46 students was drawn, interviewed and examined. The excluded students were those with orthodontic treatment, dental implants and medically compromised conditions contraindicating the periodontal examination (e.g. Human immunodeficiency viruses, Acquired immune deficiency syndrome). Also students with any medical conditions which may influence the periodontal health status (medically compromised individuals), such as diabetic mellitus and subjects on chronic medications.

A specially prepared validated structured questionnaire was used for registration of students' sociodemographic characteristics in terms of age, gender, residency and smoking status and findings of clinical

periodontal examination.

The study protocol was approved by Ethical Committee of the College of Dentistry, University of Baghdad. Approval for the study and permission to examine the students was obtained from Presidency of the University of Al-Basrah and the concerned authorities in various colleges. Written informed consent was obtained from each participant.

The CPITN codes were recorded by a single examiner for all participants included in the study. Criteria of the used index (Ainamo *et al*, 1982) were reviewed and discussed by the examiner with an experienced examiner before clinical alignment session, which was carried out during December 2018. The examination of the students in this study was conducted according to WHO guidelines (WHO, 2013). The scoring criteria were followed as suggested by Ainamo *et al* (1982). In which mouth was divided into six sextants for each student. Appropriate highest code for each sextant was determined. As soon as the highest code criteria were determined there was no need to examine for the presence of lower code criteria. The index teeth examined were 17, 16, 11, 26, 27, 36, 37, 31, 46 and 47 for students aged 20 years and above, while students aged 19 years and below, the index teeth examined were 16, 11, 26, 36, 31 and 46. An index tooth was probed, using the WHO CPITN-E probe as sensing instrument to detect 6, 5 and 4 mm pocket depth, subgingival calculus and plaque retentive factors, bleeding response in that specific order. Data were feed on Statistical Package for Social Science (version 23). Data were checked, and analyzed for univariate and multivariate analysis. For significance detection; Pearson chi-square (χ^2) test was used for qualitative data. A P-value (P) of ≤ 0.05 was considered significant.

RESULTS

Pilot study

The obtained result of a pilot study, which was carried out to obtain the prevalence of periodontal diseases to calculate the total sample size required for the present study was 62%.

Socio-demographic characteristics

Table 1 shows selected sociodemographic characteristics of the studied students. The age ranged between 18 and 24 years. Females constituted 58.1% and males 41.9%, most were resident in urban areas (54.4%) and non-smokers (81%).

Periodontal health status

Viewing the results of clinical periodontal examination

in Table 2, which was involving evaluation of periodontal health status using CPITN showed that 22.2% had healthy periodontium, 29.6% had bleeding on probing, a highest proportion of them had calculus 36.5%, while pocket depth of 4-5 mm and pocket depth of 6 mm or more were detected in 10.8% and 0.9% of students, respectively.

Table 1 : Distribution of students according to socio-demographic characteristics.

Variables	Characteristics	Number	Percentage
Age	18	60	5.9%
	19	143	14.1%
	20	185	18.3%
	21	181	17.9%
	22	178	17.6%
	23	146	14.4%
	24	119	11.8%
Total		1210	100%
Gender	Male	424	41.9%
	Female	588	58.1%
Total		1012	100%
Address	Urban	551	54.4%
	Rural	461	45.6%
Total		1012	100%
Smoking Status	Smoker	192	19%
	Non-smoker	820	81%
Total		1012	100%

Table 2 : Distribution of students according to results of periodontal health status using CPITN.

CPITN	Numbers	Percentage
Healthy periodontium	225	22.2
Bleeding	300	29.6
Calculus	369	36.5
Pocket depth 4-5 mm	109	10.8
Pocket depth 6 mm or more	9	0.9
Total	1012	100

Association between categorical variables with highest CPITN codes

Age : Students of age group 18-20 years old have higher percentage of healthy periodontium and less percentage of other diseased codes (2, 3 and 4) with exception of code 1 which have higher percentage when compared with students of age group 21-24 years old who have opposite findings. Statistically significant association was existed ($P < 0.05$) as shown in Table 3.

Gender : Female students tend to have healthier

Table 3 : Statistical analysis and distribution of students according to their highest CPITN codes by age.

CPITN Codes	Age 18-20 No. (%)	Age 21-24 No. (%)	Total No. (%)
Healthy periodontium	108(27.8)	117 (18.8)	225(22.2)
Bleeding on probing	122(31.4)	178 (28.5)	300 (29.6)
Calculus	124 (32)	245 (39.3)	369 (36.5)
Pocket depth 4-5 mm	33 (8.5)	76 (12.2)	109(10.8)
pocket depth of 6 mm and more	1 (0.3)	8 (1.3)	9 (0.9)
Total	388 (100)	624(100)	1012 (100)

$\chi^2 = 18.89$, $DF = 4$, $P < 0.05$ (S)

Table 4 : Statistical analysis and distribution of students according to their highest CPITN codes by gender.

CPITN Codes	Student's Gender		Total No. (%)
	Male No. (%)	Female No. (%)	
Healthy periodontium	77 (18.1)	148 (25.2)	225 (22.2)
Bleeding	121 (28.5)	179 (30.4)	300 (29.6)
Calculus	179 (42.2)	190 (32.3)	369 (36.5)
Pocket depth 4-5 mm	43 (10.1)	66 (11.2)	109 (10.8)
Pocket depth 6 mm or more	4 (0.9)	5 (0.9)	9 (0.9)
Total	424 (100)	588 (100)	1012 (100)

$\chi^2 = 12.67$, $DF = 4$, $P < 0.05$ (S)

periodontium (25.2%) and a lesser percentage of calculus (32.3%) as compared to male students. These associations were statistically significant ($P < 0.05$) as shown in Table 4.

Residence : Students from urban areas lean towards having healthier periodontium 24.3% and higher percentage of calculus 37.6% than rural areas, controversial pocket depths of 4, 5 mm (12.1%) and 6 mm or more (1.5%) having higher percentages in

Table 5 : Statistical analysis and distribution of students according to their highest CPITN codes by residency.

CPITN Codes	Student's Address		Total
	Urban No. (%)	Rural No. (%)	
Healthy periodontium	134(24.3)	91(19.7)	225(22.2)
Bleeding	155(28.1)	145(31.5)	300(29.6)
Calculus	207(37.6)	162(35.1)	369(36.5)
Pocket depth 4-5 mm	53(9.6)	56(12.1)	109(10.8)
Pocket depth 6 mm or more	2(0.4)	7(1.5)	9(0.9)
Total	551(100)	461(100)	1012(100)

$\chi^2 = 8.97$, $DF = 4$, $P > 0.05$ (NS)

students from rural areas, statistically non-significant association was existed ($P>0.05$) as shown in Table 5.

Smoking : Nonsmoker students tend to have healthier periodontium (24.6%) than smoker students who have higher percentage of calculus (43.2%) and pocket depth of 4-5 mm (13.5%). While distribution of other CPITN codes were slightly similar among both smokers and nonsmokers. The associations between highest CPITN codes and smoking was statistically significant ($P<0.05$) as shown in Table 6.

Table 6 : Statistical analysis and distribution of students according to their highest CPITN codes by smoking status.

CPITN Codes	Smoking Status		Total No.(%)
	Non-smoker No.(%)	Smoker No.(%)	
Healthy periodontium	202 (24.6)	23 (12.0)	225 (22.2)
Bleeding	242 (29.5)	58 (30.2)	300 (29.6)
Calculus	286 (34.9)	83 (43.2)	369 (36.5)
Pocket depth 4-5 mm	83 (10.1)	26 (13.5)	109 (10.8)
Pocket depth 6 mm or more	7 (0.9)	2 (1)	9 (0.9)
Total	820 (100)	192 (100)	1012 (100)

$\chi^2 = 15.96$, $DF = 4$, $P < 0.05$ (S)

DISCUSSION

The CPITN has been used in many studies as a basic epidemiological tool for assessment of the extent of and nature of periodontal disease and hence the need for treatment and as an aid for planning of public dental services. It was used in this study because it has been proved as feasible and effective method for measuring and monitoring the severity of periodontal diseases (Ainamo *et al*, 1982).

The present study is the first study of its kind in Al-Basrah governorate generally and ~~students of Al-Basrah universities~~ particularly, in which large population of students were examined with CPITN index to estimate the prevalence of periodontal disease among them. The overall prevalence rate of all forms of periodontal diseases in this study was 77.8% which is considered a high prevalence rate in such group of young ages and study criteria that concerned only with ~~university~~ students. The high prevalence rate as such may be explained by lack of motivation, regular visits to dentist, oral habits like smoking in male gender and lack of awareness among the students about periodontal diseases.

The high prevalence rate in the present study demonstrated with a study carried on 455 dental and medical students aged (18-32) years old of the medical

university of Bialystok in Poland (Wawrzyn-Sobczak *et al*, 2005).

A high prevalence rate was also reported in other studies (Khamrco, 1999; Pol *et al*, 2004; Batra *et al*, 2014; Sekhon *et al*, 2015; Mahajani *et al*, 2016). Regarding CPITN codes, the most prevalent code in the presented study was code 2 (calculus) followed by code 1 (bleeding), code 0 (healthy periodontium), code 3 (pocket depth of 4-5mm) and at last code 4 (pocket depth of 6 mm and more) in that specific order. This finding partly agrees with a study carried out in Yemen by (Dhaifullah *et al.*, 2015) on three colleges (medicine, dentistry and literature) with sequence of CPITN from highest to least recorded codes (code 2-1-0-3) with no evidence of code 4. Thus calculus was the commonest code in the present study and other studies (Farsi, 2010; Peeran *et al*, 2013). When an association of periodontal disease was explored with selected variables using univariate analysis the results partially agree and partially disagree with other relevant studies.

Age : Statistically significant association was revealed between age groups and highest CPITN codes. This finding was revealed by a study carried in Saudi Arabia on middle (11-15 years old), secondary (16-19 years old) and university (20-24 years old) students (Farsi, 2010). Also, the results in accordance with another study carried on subjects with age range (15-44) in which subjects with age range of (15-19 years old) have healthier periodontium with no evidence of pocket depth of 6 mm or more when compared with age range (20-29 years old) that have opposite findings (Shah, 2010).

This significant association of periodontal disease severity with age, might be explained by the cumulative effects and prolonged exposure of periodontium to pathogenic factors in bacterial deposits (Sekhon *et al*, 2015).

Gender : Males had a higher prevalence rate of periodontal disease than female students, in which a significant difference existed between both genders in the present study. This finding was in agreement with the findings in a number of studies (Bhardwaj *et al*, 2012; Batra *et al*, 2014; ALMugeiren, 2018). But contrasted with at least two other studies (Khamrco, 1999; Pol *et al*, 2004), which reported opposite results or equal prevalence in both males and females. The favorable results in females in most of the studies might be due the fact that females are more aware of maintenance of their oral hygiene and regular professional dental care, also females place more attention to esthetic issues which are on the top reasons nowadays. In addition, deleterious

oral habits are more prevalent in males like tobacco smoking, which is established as a known risk factor for periodontal disease (Pradhan and Bhat, 2009; Singh *et al*, 2012).

Residency : Although, results statistically non-significant, students from urban areas tended to have healthier periodontium than rural areas, with the most prevalent pockets recorded among the latter, a finding that is consistent with many studies that find a wide variation in the periodontal health status of urban and rural population (Nethravathi *et al*, 2015; Singla *et al*, 2016).

The current finding of non-significant differences between groups is surprising result indeed as rural areas in many studies such as in study by Sanei *et al* (2005) showed poorer oral hygiene when compared to urban residents that result may be explained by variation in behavior and available amenities and services related to dental hygiene and dental care.

Smoking : Results in this study revealed a significant difference between smokers and non-smokers in their periodontal health status, in which non-smokers have healthier periodontium than smokers.

This outcome is in accordance with many studies, which revealed that smoking is an important risk factor for development of periodontal diseases. A study by Wawrzyn *et al* (2005) on 455 medical and dentistry students of the medical university of Bialystok showed significant difference between the two groups of smoking *i.e.* smokers and non-smokers. Another study carried out on three colleges (medicine, dentistry and literature) showed that lower prevalence rate of periodontal disease in medical fields compared to non-medical field students, which was explained by author as result of higher prevalence of smoking in literature students (Dhaifullah *et al*, 2015). Tobacco has been shown to affect periodontium by several means like increased colonization of shallow periodontal pockets by periodontal pathogens and increased levels of periodontal pathogens in deep periodontal pockets. Smoking also may alter neutrophil chemotaxis, phagocytosis and oxidative burst (Sood, 2005).

Study concluded that High prevalence rate of periodontal diseases among undergraduate students in Al-Basrah universities. This indicates the need for initiating adequate awareness regarding oral hygiene; specifically primary prevention which could help in reducing the prevalence of periodontal diseases, which recommended a sufficient manpower cover in Al-Basrah governorate. Also an adequate periodontal care system is highly needed at university level.

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