Factors affecting periodontal health status among undergraduate students

By Huda Jassem Jebur

Factors affecting periodontal health status among undergraduate students

Yasir Al-Mohammad [1], Huda Jassem Jebur [2], Hussein Shakir Saleh Al Noor [3]

[1] Department of prosthodontics, University of Basrah, College of Dentistry, Iraq
[2] Department of periodontology, University of Basrah, College of Dentistry, Iraq
[3] Department of pediatrics, orthodontics and prevention (POP), University of Basrah, College of Dentistry, Iraq

Corresponding author:
Huda jebur
Basrah, Iraq
Z-code: 61001
+7810331113
Medicalresearch77@yahoo.com

Abstract

Introduction: To date, epidemiological studies to determine periodontal health in Basrah Governorate generally and colleges' students specifically are generally lacking. Therefore, an epidemiological study to assess periodontal health status is being urgently needed.

Aims: To study the influence, if any, of frequency of tooth cleaning, frequency of visits to the dental clinic, social characteristics, and personal habits on periodontal health status.

Methods: A cross-sectional study was conducted after obtaining ethical clearance from the ethical committee of the College of Dentistry/University of Baghdad to assess the periodontal health status using the community periodontal index for treatment needs criteria among undergraduate students of AL-Basrah College for the academic year 2018-2019. The final sample size consisted of 1012 students of both genders which were chosen randomly through multistage systematic random sampling.

Results: Periodontal health status varies significantly among students by frequency of tooth cleaning and visits to dentists. Binary logistic regression showed that less frequent tooth cleaning, less frequent visits to dentist, and poor lifestyle were significant predictors of unhealthy periodontium.

Conclusion: Periodontal diseases are highly prevalent among college students. This discrepancy emphases the role of personal and professional oral hygiene measures.

Keywords: Periodontal Health Status, Cross-Sectional Study, Al-Basrah, CPITN

Introduction

Periodontal diseases (PDs) are a spectrum of inflammatory conditions; influencing the tooth surroundings (gingiva, periodontal ligament, and alveolar bone). A situation exclusive to the gingiva (gingivitis) or progressive to the periodontal ligament space and alveolar bone (periodontitis). The latter sequences to tooth mobility, pathologic migration, and eventual tooth loss [1,2].

Identification of risk factors that affect periodontium facilitates the work of policy makers and health care providers as well as the lay individuals to take appropriate action to improve dental health and adopt practical preventive and curative programs [3].

A risk factor is defined as a condition that, when present, increases the likelihood that an individual will develop disease occurrence and or severity [4,5].

Initiation and progression of periodontal infections are clearly modified by local and systemic conditions (risk factors). The effective disease management requires a clear understanding of all associated risk factors [6]. These risk factors can be categorized as modifiable and non-modifiable [7,8].

Among the important modifiable risk factors are plaque and poor oral hygiene, which increase the probability of infection because they assist in retaining microorganisms in proximity to periodontal tissues [9,10]. Poor oral hygiene, insufficient tooth brushing, and practice of oral hygiene predispose to bacterial build-up of dental plaque, which harbors teeth and gingiva initiating inflammatory changes in periodontal tissues [11].

Socioeconomic status (SES) was also implicated in the risk of periodontal diseases [12,13]. Poor lifestyle increases the risk of periodontal disease through intervening behavioral factors such as smoking, alcohol consumption, inadequate sleep and lack of exercise [14-16].

The quantification of the relative effects (if any) of each of these risk factors is a prerequisite to formulate the necessary action programs. These programs are likely to be more effective when applied as early as possible during the life of people. College students are a young population and represent the bulk of future manpower on the nation, the care for them including dental care is expected to be very rewarding. This article reports results pertaining to a study carried out to identify the extent and risk factors of periodontal disease among students of Al-Basrah College. Specifically reporting the main factors affecting the extent of periodontal diseases among these students.

Methods

The study was a cross-sectional one involving 1012 college undergraduate students who were drawn from the students lists registered at Al-Basrah College in Al-Basrah governorate at the beginning of the academic year 2018-2019. A multi-stage sampling was used to draw participants from all colleges. The community periodontal index for treatment needs (CPITN) was the used criteria in the present study. Examining the students was performed following World Health organization (WHO) guidelines. The mouth was divided into six sextants with the optimum highest

code for each. Once the highest code criterion was established, the lower code criteria were no need to be further examined. The index teeth tested were 17, 16, 11, 26, 27, 36, 37, 31, 46, and 47 for those aged 20 years and above, while for those below 20 years tested teeth were 16, 11, 26, 36, 31 and 46. The CPITN-E probe was used to detect 6mm or more pocket depth for each index tooth (code 4). (Code 3) was given to 5 and 4 mm pocket depth. (Code 2) for supragingival or subgingival calculus and plaque retentive factors. Bleeding response (code 1) and (code 0) for healthy periodontium [17].

Students were interviewed and informed consent was taken from each student prior to a specially prepared validated close-ended questionnaire taken in which different data were recorded including demographic characteristics such as age, gender, and residency; dental health practices and pattern of visits to the dental clinic including tooth cleaning, frequency of tooth cleaning, method of teeth cleaning, method of teeth brushing, using and types of interdental aids, frequency of visits to dentist, reason for dental visits and factors affecting dental attendance; medical history (menstruation and pregnancy); social characteristics (marital status, socioeconomic status and smoking) and personal habits (lifestyle factors) [17].

Data was recorded by the researchers and fed into IBM SPSS (Statistical Package for Social Science) statistics for windows, version 23(IBM. Corp., Armonk, N.Y., USA). Data were checked and analyzed by univariate and multivariate analysis. For significance detection, Pearson chi-square (X^2) test for qualitative data and logistic regression analyses were used to control for confounding effect of variables. A P-value (P) of ≤ 0.05 was considered statistically significant(S), while P <0.001 and P >0.05 were considered statistically highly significant (HS) and non-significant (NS) respectively.

Results

The CPITN code 0 was represented by healthy periodontium, while code 1and 2(gingivitis) and codes 3 and 4(periodontitis) were represented by diseased or unhealthy periodontium in the following results. Details are shown in Table 1.

Results concerning the association between age, gender, residency, and smoking with the highest CPITN codes were discussed thoroughly in a previous article [17].

Marital status: Single students had healthier periodontium and less percentages of both gingivitis and periodontitis, in which non-significant association was ascertained.

SES and lifestyle: students with very good, good SES, and good lifestyles were associated with healthier periodontium and less percentage of unhealthy counterparts, where non-significant associations were assigned for both.

Frequency of tooth cleaning and visits to dentists: Students with more than three times/day tooth cleaning regardless method of cleaning and those with regular dental checkups were associated with better periodontal condition. In which the frequency of tooth cleaning and visits to the dentist have a significant and highly significant association, respectively.

To identify the relative importance of the various risk factors inquired in this study, to overcome the effect of confounding variables and to identify independent predictors of periodontal health status, a binary logistic model was applied. The independent variable was represented by

CPITN, which was coded dichotomously as 1 denoting healthy (code 0) and 2 denoting unhealthy periodontium (including bleeding, calculus and pockets of any depth i.e. codes 1, 2, 3 and 4).

For all students included, as explanatory variables or predictors were marital status, socioeconomic status, lifestyle, frequency of tooth cleaning, and frequency of visits to dentists.

Three variables were independent and significant predictors of unhealthy periodontium. These were poor lifestyle, less frequent visits to dentist, and less frequent tooth cleaning. All other variables were found to be non-significantly associated with CPITN codes (p>0.05) as are shown in Table 2.

Table 1: Statistical analysis and distribution of students according to healthy and diseased periodontium by different categorical variables

Variable	Healthy Periodontium No. (%)	Gingivitis + Periodontitis No. (%)	Total No. (%)	Statistical Analysis
Marital status				$X^2=0.596$
Single	211(22.5)	726(77.5)	937(100)	**DF=1**
Married	14(18.7)	61(81.3)	75(100)	**P>0.05(NS)**
Total	225(22.2)	787(77.8)	1012(100)	
SES				$X^2=2.394$
Very good	16(24.6)	49(75.4)	65(100)	**DF=1**
Good	112(24.1)	353(75.9)	465(100)	**P>0.05(NS)**
Accaptable	94(20.2)	372(79.8)	466(100)	
Low	3(18.8)	13(81.3)	16(100)	
Total	255(22.2)	787(77.8)	1012(100)	
Lifestyle				$X^2=10.548$
Poor lifestyle	38(16.8)	188(83.2)	226(100)	**DF=2**
Moderate lifestyle	81(21.9)	289(78.1)	370(100)	**P>0.05(NS)**
Good lifestyle	106(25.5)	310(74.5)	416(100)	
Total	225(22.2)	787(77.8)	1012(100)	
Frequency of teeth cleaning				$X^2=12.983$
Once/day	73(19.5)	301(80.5)	374(100)	**DF=4**
Twice/day	123(25.2)	365(74.8)	488(100)	**P<0.05(S)**
Thrice /day	26(25)	78(75)	104(100)	
More than thrice /day	2(100)	0(0)	2(100)	
Occasional	1(2.9)	34(97.1)	35(100)	
Total	225(22.2)	778(77.6)	1003(100)	

Frequency of visits to dentist				
				X^2=23.892 DF=3 P<0.001(HS)
Regular	35(42.7)	47(57.3)	82(100)	
Irregular	65(23.3)	214(76.7)	279(100)	
Never	36(17.6)	168(82.4)	204(100)	
On emergency	89(19.9)	358(80.1)	447(100)	
Total	225(22.2)	787(77.8)	1012(100)	

Table 2: Binary logistic regression analysis model of variables affecting periodontal health status, CPITN≥ 1 among all students

Variables	P Value	OR*	(95% CI**)
Significant predictors			
Less frequent visits to dentist	0.001	1.272	(1.101-1.468)
Less frequent teeth cleaning	0.023	9.372	(0.009-0.550)
Poor lifestyle	0.015	0.902	(0.828-0.981)
Non-significant predictors			
Marital status	0.608	0.852	(0.461 -1.573)
Socioeconomic status	0.408	1.107	(0.870-1.408)

*=Odds Ratio   **=Confidence Interval

Discussion

The present study is the first study of its kind in Al-Basrah governorate, in which a large population of undergraduate students of AL-Basrah College in Al-Basrah governorate were examined with CPITN index to assess their periodontal health status.

For the association between the previously mentioned variables and the highest CPITN codes, the following was concluded for:

Being married or not could not significantly predict periodontal health status, although married students tended to have a higher prevalence of periodontal disease. This result is in accordance with the results by [18,19]. The underlying reason for this observation and higher prevalence of PD severity among married couples may be due to their higher indulgence in dental care practices compared with singles, but also it may be attributed to high financial responsibility for them so less attention paid by them to preventive dental practices.

Despite the tendency of periodontal disease to be more frequent among students of lower socioeconomic status, the results of the present study showed a statistically non-significant association of the highest CPITN codes with different levels of SES. Other studies reported results of similar trends but statistically significant, such as in a study by [20] in which low socioeconomic status was related to higher prevalence of periodontal diseases. Another study reported that "CPITN codes did not vary significantly with socioeconomic status" [1].

Individuals in lower socio-economics may have less knowledge and access to oral health care besides the minimum or absence of visits to dental specialists but for pain, so considered as curative, and not preventive. Moreover, additional aids such as mouthwash or interproximal brushes can be regarded as a must or a minority of highly sophisticated life [5].

This conclusion is supported by the results in the present study where fewer visits to dentists and less tooth cleaning were significant predictors of periodontal disease.

Regarding lifestyle in the present study, a statistically non-significant association was witnessed between periodontal health status with lifestyle groups. But healthier periodontium was more prominent among students with good lifestyle and the overall prevalence rate of periodontal diseases was observed in descending order from a good, moderate then poor lifestyle to that specific order as in a study by [15].

The discrepancy of non-significant associations in the study results compared to other studies could be due to the fact that the study population is more or less homogenous in their overall lifestyle status, or due to bias in student's reporting of data (under and over reporting). Although binary logistic regression revealed poor lifestyle as one of the significant predictors of unhealthy or diseased periodontium.

The present study showed a significant association between periodontal condition and tooth cleaning frequency. In which the highest percentage of healthy periodontium was recorded among students who clean their teeth more than three times/day. The result was stated in a study [21] in which a statistically significant difference in the prevalence of PD as indicated by CPITN codes between those who performed oral prophylaxis on the basis of once and twice daily.

The high frequency of tooth cleaning among the studied students with a high percentage of healthy periodontium is a reflection of a better level of education. Education is a key factor in socioeconomic status, which is associated with higher frequency of cleaning.

A healthier periodontium was noticed among students with scheduled dental visits resembling a study conducted in Saudi Arabia [22] comparing the periodontal health of two sets of students with and without precise dental checking within the last year of the conducted study, in which a significant difference within CPITN codes was noticed.

The high significance reveals how essential to prevent and detect the early onset of dental diseases by the schematic and scheduled checkups as scaling for eliminating calculus with its plaque retentive roll.

It remains true in statistical terms that univariate analysis cannot easily exclude the interaction and confounding effects of various variables on a specific outcome. No doubt that the health status of the periodontium is a product of the effect of multiple variables. This is true in the present study. To control for confounding effects and identify significant independent predictors of periodontal health status, a logistic regression analysis was done for all students. The results showed that less frequent tooth cleaning, less frequent dental visits, and poor lifestyle predicted unhealthy periodontium for all students.

Multivariate regression analysis of the dependent variables of teeth with shallow and deep pockets in a study by [23] showed that irregular dental visits were significantly associated. Another study by [24] showed that in logistic regression analysis with periodontal pockets more than 3 mm as the dependent variable, tooth brushing frequency was one of the most significant variables.

Conclusion

The overall prevalence rate of PDs is considered a high prevalence rate in such criteria of young age group and that is concerned only with college students. This study highlighted that dental health-related practices, dental visits, and personal health habits play an important role in periodontal health.

Conflict of interest

'The authors declare that there are no conflicts of interest regarding the publication of this article.'

Sources of funding for research

None

References

(1) POPOOLA, B. O., DOSUMU, E. B. & IFESANYA, J. U. 2015. Periodontal status and treatment need among adolescents in Ibadan, Southwestern Nigeria. *Brazilian Journal of Oral Sciences,*14 (2)**,** 117-121.

(2) TONETTI, M. S., JEPSEN, S., JIN, L. & OTOMO-CORGEL, J. 2017. Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: A call for global action. *J Clin Periodontol,* 44(5)**,** 456-462.

(3) VAN DYKE, T. E. & SHEILESH, D. 2005. Risk factors for periodontitis. *Journal of the International Academy of Periodontology,* 7 (1)**,** 3-7.

(4) PAPAPANOU, P. N. and LINDHE, J.2015. Epidemiology of Periodontal Diseases. *Clinical periodontology and implant dentistry.* 6th ed. John Wiley and Sons, Ltd,125-166.

(5) ELANGOVAN,S. NOVAK,K.F.,and NOVAK,M.J.2019. Clinical Risk Assessment. *Newman and Carranza's Clinical Periodontology.* 13th ed. Elsevier,Inc, 410-412.

(6) AVASTHY, P., GOVILA, V., VERMA, S., PANT, V. A. & SHARMA, M. 2015. Risk Factors for Periodontal Diseases. *Journal Of Applied Dental and Medical Sciences,* 1(1)**,** 44-54.

(7) ALJEHANI, Y. A. 2014. Risk factors of periodontal disease: review of the literature. *International journal of dentistry***,** 182513.

(8) NAZIR, M. A. 2017. Prevalence of periodontal disease, its association with systemic diseases and prevention. *Int J Health Sci (Qassim),* 11(2)**,** 72-80.

(8) BEREZOW, A. B. & DARVEAU, R. P. 2011. Microbial shift and periodontitis. *Periodontol 2000,* 55(1)**,** 36-47.

(10) HASAN, A. & PALMER, R. 2014. A clinical guide to periodontology: Pathology of periodontal disease. *Br Dent J. ,* 216(8)**,** 457.

(11) DE OLIVEIRA, C., WATT, R. & HAMER, M. 2010. Toothbrushing, inflammation, and risk of cardiovascular disease: results from Scottish Health Survey. *Bmj,* 340**,** c2451.

(12) BERTOLDI, C., LALLA, M., PRADELLI, J. M., CORTELLINI, P., LUCCHI, A. & ZAFFE, D. 2013. Risk factors and socioeconomic condition effects on

periodontal and dental health: A pilot study among adults over fifty years of age. *European journal of dentistry,* 7**,** 336-346.

(13) ALMERICH-SILLA, J.-M., ALMIñANA-PASTOR, P. J., BORONAT-CATALá, M., BELLOT-ARCíS, C. & MONTIEL-COMPANY, J.-M. 2017. Socioeconomic factors and severity of periodontal disease in adults (35-44 years). A cross sectional study. *Journal of clinical and experimental dentistry,* 9(8)**,** 988-994.

(14) GUNDALA, R. & CHAVA, V. K. 2010. Effect of lifestyle, education and socioeconomic status on periodontal health. *Contemporary clinical dentistry,* 1**,** 23-26.

(14) SINGLA, R., ACHARYA, S. & SINGLA, N. J. W. J. O. D. 2016. Comparative study of lifestyle-related risk factors of periodontal disease among urban and rural population of India. *World Journal of Dentistry,* 7 (3)**,** 129-134.

(15) MITRA, D., ROY, S. S., MALAWAT, A., KUNDU, D. K., CHAKRABORTY, A. & JANA, D. 2019. ASSOCIATION BETWEEN EDUCATION LEVEL AND LIFESTYLE ON PERIODONTAL HEALTH STATUS IN ADULTS (35-44 YEARS)-A CROSS SECTIONAL STUDY. *International Journal of Scientific Research,* 8 (8).

(16) JEBUR, H. J. & AHMED, M. A .2020. Prevalence of Periodontal Diseases among Universities Students in Al-Basrah Governorate, Iraq -A Cross-Sectional Study. Biochem. Cell. Arch, 20(1), 2229-2234.

(17) PERSSON, G. R., PERSSON, R. E., HOLLENDER, L. G. & KIYAK, H. A. 2004. The impact of ethnicity, gender, and marital status on periodontal and systemic health of older subjects in the Trials to Enhance Elders' Teeth and Oral Health (TEETH). *J Periodontol,* 75 (6)**,** 817-23.

(18) DEMIRER, S., GURSOY, U. K., OZDEMIR, H., ERDEMIR, E. O. & UITTO, V. J. 2012. Periodontal health knowledge and smoking are associated with periodontal treatment need according to tooth brushing levels. *West Indian Med J,* 61(2)**,** 191-7.AKHIONBARE, O. & OJEHANON, P. 2016. A study of the effect of frequency of tooth brushing on the prevalence of inflammatory periodontal diseases. *Port Harcourt Medical Journal,* 10 (3)**,** 119-123.

(19) SANADHYA, S., AAPALIYA, P., JAIN, S., SHARMA, N., CHOUDHARY, G. & DOBARIA, N. 2015. Assessment and comparison of clinical dental status and its impact on oral health-related quality of life among rural and urban adults of Udaipur, India: A cross-sectional study. *Journal of Basic and Clinical Pharmacy,*6 (2)**,** 50.

(20) AKHIONBARE, OSAGIE, AND PATRICK I. OJEHANON. "A study of the effect of frequency of tooth brushing on the prevalence of inflammatory periodontal diseases." Port Harcourt Medical Journal 10, no. 3 (2016): 119.

(21) FARSI, J. M. 2010. Dental visit patterns and periodontal treatment needs among Saudi students. *East Mediterr Health J,* 16 (7)**,** 801-6.

(22) KRUSTRUP, U. & ERIK PETERSEN, P. 2006. Periodontal conditions in 35-44 and 65-74-year-old adults in Denmark. *Acta Odontol Scand,* 64(2)**,** 65-73.

(23) SAKKI, T. K., KNUUTTILA, M. L., VIMPARI, S. S. & HARTIKAINEN, M. S. 1995. Association of lifestyle with periodontal health. *Community Dent Oral Epidemiol,* 23 (3)**,** 155-8.