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Periodontal status of adult subjects in relation to other local factors in Jazan region, Saudi Arabia

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Abstract:

Background: Information about the distribution patterns of periodontal disease and the possible existence of high-risk groups among adult population in Jazan region is scarce. **Aims:** This study was designed to explore the periodontal status and the effects of socio-demographic characteristics and habits among adult population living in Jazan region, Saudi Arabia (SA). **Materials and methods:** This work was a cross-sectional study conducted among 204 individuals. This population was composed of 172 males and 32 females with a mean age of 43.9 years. Structured questionnaire, which included general health status and possible risk factors for periodontal disease, was used for sampling. Clinical periodontal examination was carried out using the scheme used by the National Institute of Dental and Craniofacial Research. Data was analyzed using Statistical Package for Social Sciences software version 20. **Results:** Approximately 46.1% of population presented moderate pocket depths. The clinical attachment loss of ≤4 mm was 57.8%, and the fair oral hygiene was 40.2%. The effects of khat chewing, shammah dipping, and smoking on moderate pocketing were 50%, 47.7%, and 41.9%, respectively. The attachment losses of ≤4 mm were high in khat chewers, shammah dippers, and smokers at 63.1%, 68.8%, and 50.1%, respectively. The average poor oral hygiene among groups was high at 53.3%. Severe pocket depth and poor oral hygiene were significantly high among old age groups at 22.2% and 66.7%, respectively. Females showed significantly (*p*=0.05) higher mild gingivitis and better oral hygiene of 65.7% and 68.8%, respectively, compared with those of males. **Conclusion:** The prevalence of periodontal disease is high due to associated risk factors, including khat chewing, smoking, and poor oral hygiene. The elderly age group showed high levels of periodontal pocketing, attachment loss, and poor oral hygiene. Females also presented better oral hygiene and periodontal health than those of males.

Key words: Chronic periodontitis, periodontal disease, selectin, E-selectin, endothelial dysfunction

Introduction:

Periodontal disease has been prevalent throughout human history.[1] Research and clinical evidence indicated that the damage caused by periodontal disease to the supporting structures of the teeth in early adult life is irreparable. In middle adult life, periodontal disease destroys a large part of the natural dentition. The effect of periodontal disease on the general health of the population cannot be assessed.[2] Inflammatory periodontal disease constitutes probably the most common infections worldwide. Gingivitis is present in majority of adults. Moderate periodontitis and advanced periodontitis affect approximately 30% and 10% of the adult populations in the USA, respectively.

Deep pockets are present in 2%–18% of adults in western countries and at high prevalence in developing countries.[3-5] Periodontal disease may account for a significant portion of the proposed infection-associated risk of cardiovascular diseases because it is common in the populations.[6] A number of studies provided significant data and statistics to suggest and support the relationship of periodontal disease to cardiovascular diseases.[7] Most risk factors for cardiovascular disease are also regarded as risk factors for periodontal disease. The risk factors and indicators shared by periodontitis and systemic diseases, such as cardiovascular diseases, include tobacco smoking, stress, aging, race or ethnicity, and male gender.[8-9] Smoking can cause

bone loss and gum recession, and nicotine increases inflammation by reducing oxygen in gum tissues. This phenomenon triggers the overproduction of immune factors called cytokines (interleukins).[10] Other systemic diseases affecting periodontal disease are high levels of triglycerides (which are common in type 2 diabetes), which also impair periodontal health. A high blood sugar level is associated with severe form of periodontal disease; moreover, obesity, which is common in type 2 diabetes, may predispose a person to gum diseases.[11] The risk for chronic form of periodontal disease increases with age, and the combined effect of age and oral hygiene standard explains more than 90% of the variation in periodontal disease.[12]

Several local studies among different subpopulations in different areas of SA, namely, Abha,[13,14] Riyadh,[15,16] Jeddah,[17] Aljouf,[18] Al-Kharj,[19] Madinah,[20] and Jazan,[21,22] investigated the relationship of periodontal diseases with socio-economic, medical status of patients, awareness about periodontal diseases, and other local factors (smoking, shammah dipping, and khat chewing). Currently, no information is available regarding the pattern and distribution of periodontal disease among adult population in Jazan region, SA. This study was designed to explore the periodontal status and the effects of socio-demographic characteristics and habits, such as khat chewing, shammah dipping, and smoking, among adult population living in Jazan region, SA.

Materials and Methods:

Subject collection

Two-hundred and four individuals were recruited from the Jazan region of both sexes with age ≥17 years. Structured questionnaire, which included general health and possible risk factors for periodontal disease, was used for sampling. Consent was obtained from participants. Periodontal parameters were also assessed clinically.

Ethical clearance

The study proposal was submitted to the College of Dentistry Research and Publication Office for ethical clearance. Written informed consent was obtained from the participants prior to study commencement. Participants were informed that they will obtain no direct benefit from their participation. However, knowledge gained from the study may lead to the prevention and treatment of oral diseases (general population benefits). With regard to confidentiality, no information about the participants or what they provided during the research will be disclosed to others without their written permission.

Examiner calibration

All the clinical examinations and measurements were performed by more than one examiner. The examiners were trained and calibrated at the Division of Periodontology, College of Dentistry, University of Jazan, SA under the supervision of an expert staff. The periodontal examination followed the scheme used by the National Institute of Dental and Craniofacial Research, National Institutes of Health, Bethesda, Maryland.

Statistical analysis

Data was processed and analyzed by means of the Statistical Package for Social Sciences (SPSS version 20, Institute Inc., Cary, NC, USA). The frequency distributions of variables were computed separately for male and female students. Logistic regression analyses were conducted with knowledge scores and oral hygiene behavior as dependent variables. Contingency tables were also prepared for socio-demographic variables. Chi-square test was used for comparisons between males and females. Differences with a p<0.05 were considered statistically significant.

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Results:

The socio-demographic characteristic distributions of the participants' habits and general health were as follows. The population was composed mainly of patients aged 17-35 years (61.3%). In this population, the male group was 84.3%, and those married with secondary school education were 61.3%. The income per month <10,000 SR was 41.2% with good general health, khat chewing, and smoking of 76.5, 46.1, and 42.2%, respectively (**Table I**).

Table I: Number (n) and percentage (%) distribution of the socio-demographic characteristics of participants, habits, and general health

Characteristics of the items	(Number)	(%)
Age groups		
17–35 years	125	**61.3**
36–50 years	52	25.5
≥51	27	13.2
Gender		
Male	172	**84.3**
Female	32	15.7
Marital status		
Married	125	**61.3**
Unmarried	73	35.8
Divorced	6	2.9
Education		
≥Secondary	125	**61.3**
University	79	38.7
Income per month		
≤2000 SR	77	37.7
≤10.000 SR	84	**41.2**
≤20.000 SR	43	21.1
General health		
Good general health	156	**76.5**
Diabetics	19	9.3
Hypertensive	29	14.2
Habits		
Smoking	86	**42.2**
Khat chewing	92	**46.1**
Shamma dipping	61	29.9

The distribution of the study participants by oral hygiene methods and dental visit was as follows: Participants who used toothbrushes and Miswak were 61.3% and 38.7%, respectively. Participants who indicated dental visit were 48.5% (**Table II**).

Table II: Number (n) and percentage (%) distribution of the study participants by oral hygiene methods and dental visit

Oral hygiene methods	(N)	(%)
Toothbrush	125	**61.3**
Miswak	79	**38.7**
Combine method	36	17.6
Flossing	22	10.8
Dentist visit	99	**48.5**

The distribution of the study participants by periodontal status and oral health was as follows. The probing depth of ≤4–5 mm was moderate and mild at 46.1 and 41.1% respectively, the attachment loss of ≤4 m was 57.8%, and the fair oral health was 40.2% (**Table III**).

Table III: Number (n) and percentage (%) distribution of the study participants by periodontal status and oral health

Periodontal status and oral health items	(N)	(%)
Probing depth		
Mild ≤3 mm	90	**44.1**
Moderate ≤4–5 mm	94	**46.1**
Severe ≥6 mm	20	9.8
Attachment loss		
≤2 mm	42	20.6
≤4 mm	118	**57.8**
≥5 mm	44	21.6
Oral health		
Good	48	23.5
Fair	82	**40.2**
Poor	74	36.3

Table IV shows the number and percentage distribution of the study participants by periodontal status and bad habits. The probing depth of ≤4-5 mm for patients chewing khat, smoking, and using shammah was moderate at 50.0%, 41.9%, and 47.5%, respectively. The attachment

Table IV: Number (n) and percentage (%) distribution of the study participants by periodontal status and bad habits

Periodontal status items	Khat-chewing (*n*=92)		Smoking (*n*=86)		Shammah dipping (*n*=61)	
Probing depth	(*n*)	(%)	(*n*)	(%)	(*n*)	(%)
Mild ≤3 mm	32	34.8	36	**41.9**	19	31.1
Moderate ≤4–5 mm	46	**50.0***	36	**41.9**	29	**47.5**
Severe ≥6 mm	14	15.2	14	16.2	13	21.3
Attachment loss						
≤2 mm	11	11.9	20	23.3	16	26.2
≤4 mm	58	**63.1***	50	**50.1**	33	**54.0**
≥5 mm	23	25.0	16	18.6	42	68.8
Oral health						
Good	7	07.6	17	19.8	8	13.1
Fair	32	34.8	26	30.2	23	37.7
Poor	53	**57.6**	43	**50.0**	30	**49.2**

Table V: Number (n) and percentage (%) distribution of the study participants by the periodontal status and age groups

Periodontal status items	17–35 years (*n*=125)		36–50 years (*n*=52)		≥51 years (*n*=27)	
Probing depth	(*n*)	(%)	(*n*)	(%)	(*n*)	(%)
Mild ≤3 mm	57	40.6	25	48.0	8	**29.7***
Moderate ≤4–5 mm	61	48.8	20	38.5	13	48.1
Severe ≥6 mm	7	5.6	7	13.5	6	**22.2***
Attachment loss						
≤2 mm	28	22.4	13	25.0	1	3.7
≤4 mm	69	55.2	31	59.6	18	66.7
≥5 mm	28	22.4	8	15.4	8	29.6
Oral health						
Good	36	28.8	12	23.1	0	**0.0***
Fair	52	41.6	21	40.4	9	**33.3***
Poor	37	29.6	19	36.5	18	**66.7***

*Highly significant differences, *p*<0.01.

loss of ≤4 mm in subjects chewing khat, smoking, and using shammah was 63.3%, 50.1%, and 54%, respectively. Oral health was poor for patients chewing khat (57.6), smoking (50.0), and using shammah (49.2).

Table V presents the number and percentage distribution of the study participants by periodontal status and age grouping. Severe pocket depth and poor oral hygiene of 22.2% and 66.7%, respectively, were significantly higher among the old-aged groups than those in other groups.

Table VI, shows the number and percentage distribution of the study participants by periodontal status and gender differences. The probing depth of ≤3 mm (65.6%) was mild in females and that of ≤4-5 mm was moderate in males (48.8%). The attachment losses of ≤4 mm were 59.3% and 50.0% in males and females, respectively. The males showed fair to poor oral health, and females displayed good health. Females showed significantly (p=0.05) higher mild gingivitis and better oral hygiene of 65.6% and 68.8% than those of males, respectively.

Table VI: Number (n) and percentage (%) distribution of the study participants by periodontal status and gender differences

Periodontal status items	Males (*n*=172)		Females (*n*=32)	
Probing depth	(*n*)	(*%*)	(*n*)	(*%*)
Mild ≤3 mm	69	40.1	21	65.6*
Moderate	84	48.8	10	31.3*
≤4–5 mm	19	11.1	1	3.1*
Severe ≥6 mm				
Attachment loss				
	30	17.4	12	37.5*
≤2 mm	102	59.3	16	50.0*
≤4 mm	40	23.3	4	12.5*
≥5 mm				
Oral health				
Good	26	15.1	22	68.8*
Fair	77	44.8	5	15.6*
Poor	69	40.1	5	15.6*

*Significant differences, *p*<0.05.

Discussion:

Epidemiological data regarding the periodontal status of adults in Jazan region, Kingdom of SA have not been previously published online. The present cross sectional survey was undertaken together with such information, to aid the establishment of preventive oral health education programs. The participants of this study were selected because they were adults. We considered these participants' pool sample with equal knowledge in the field of oral health. The present results are considered representative for the adults of Jazan. Regarding the age group, this finding was in agreement with those obtained by Hossain et al (Abha), Farsi JMA (Jeddah), Shah & El Haddad (Al-KharJ), and Ahmed MS (Madinah).[13,19,20,16]

In this study, the highest age group was 17-35, and a large number of patients complained of diabetes and hypertension (**Table I**). With regard to the participants who were aged 20-35 years and the high number of patients with diabetes and cardiovascular disease, similar result was obtained from a survey conducted by Javali et al in Abha region,[14] SA.

Nevertheless, Alshehri FA,[17] conducted a study in Riyadh, SA and showed that the number of participants who complained of hypertension and diabetes is the least. This result can be explained by the knowledge and attitude of patients toward halitosis. No significant differences are also detected between the examined groups in previous studies. This result agreed with our current finding. A similar finding was also observed by Ahmed MS,[20] with regard to the age group of the participants, the monthly income, and the level of knowledge and oral care among females and males. As shown in **Table I**, 43% of our participants were smoking; a similar percentage was obtained with regard to smoking in a study conducted at Riyadh by Shetty AC.[15]

A study conducted between primary school teachers in Madinah region[20], SA, showed 75% high acceptability, which is attributed to the good knowledge and oral health care in using toothbrushes and miswak. A proximate percentage of 61.3% was obtained in the present study with regard to the use of toothbrushes, but a low percentage of 38.7% was observed in participants who used miswak (**Table II**).

Tobacco smoking, stress, aging, race or ethnicity, and male gender are among the risk factors and indicators of periodontitis.[8,9] Smoking can cause bone loss and gum recession, and nicotine increases inflammation by reducing oxygen in gum tissues. Other systemic diseases affecting periodontal disease are high levels of triglycerides (which are common in type 2 diabetes), which also impair periodontal health. A high blood sugar level is associated with severe form of periodontal disease; moreover, obesity, which is common in type 2 diabetes, may predispose a person to gum disease.[11] This finding coincided with the result obtained by Shetty AC;[15] they observed a strong relationship between smoking and periodontal diseases.

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The present results showed that periodontal disease parameters were high, which indicated that bad habits, such as khat chewing, smoking, and shammah dipping, affected the periodontal condition. This finding was consistent with those of previous observations.[8,9] Our results also displayed that males may be at high risk of developing periodontal disease. Thus, in this study, females showed significantly better oral hygiene than that of males. This outcome may be due to that females more consistently take care about their oral hygiene than that of males (**Table VI**).

Our study demonstrated that severe pocket depth and poor oral hygiene were significantly higher among the old-aged groups than those in other groups (**Table V**). This finding was in agreement with previous ones.[13,18] Therefore, the risk for chronic form of periodontal disease increases with age; additionally, the combined effect of age and oral hygiene standard explains more than 90% of the variation in periodontal disease.[12]

Notably, despite the widespread use of khat among adult population in Jazan region since ancient times, relatively little scientific attention has been given to its oral health side effects. Recently, several studies from other regions have reported the effects of khat chewing on periodontal health and loss of teeth. This finding was in agreement with previous results,[21,22] which concluded that chewing khat is a significant factor in periodontal pocketing, attachment loss, and periodontal diseases ending by loss of teeth.

Conclusions:

The following conclusions can be drawn from this cross-sectional study. The prevalence of periodontal disease was high due to associated risk factors, including khat chewing, smoking, and poor oral hygiene. Old-aged group showed higher levels of periodontal pocketing and attachment loss and poorer oral hygiene than those of the other groups. Females showed better results in oral hygiene and periodontal health than those of males. A large number of study subjects may be needed to confirm the findings of this study.

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