

# Dental visit patterns and periodontal treatment needs among Saudi students

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## أنماط الزيارات لأطباء الأسنان والاحتياجات لمعالجة دواعم الأسنان لدى الطلاب السعوديين

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**الخلاصة:** هدفت هذه الدراسة إلى توصيف أنماط الزيارات لأطباء الأسنان، وارتباطها بصحة دواعم الأسنان لدى الطلاب الشباب في المملكة العربية السعودية. وقد شملت الدراسة عيّنة ممثلة اختيرت عشوائياً تضم 3090 طالباً. وقِيّمت الباحثة أنماط زيارة الطلاب لأطباء الأسنان باستخدام استبيان. وأجريت الفحوصات السريرية باستخدام مَنسَب دواعم الأسنان المجتمعي للتعرف على الاحتياجات من المعالجة. ولاحظت الباحثة أن العمر والجنس والمستوى التعليمي ترتبط بدرجة يُعْتَدُّ بها إحصائياً بصحة دواعم الأسنان. وكان معدّل انتشار مرض دواعم الأسنان أقل بدرجة يُعْتَدُّ بها إحصائياً بين الذين أشرف أطباء الأسنان على تعليمهم الطرق الصحيحة لاستخدام الفرشاة. وقد وجدت الباحثة أن أعلى معدّل لدواعم الأسنان المتمتعة بالصحة هي (23.9%)، وأقل احتياج للمعالجة المعقّدة (0%) كانت لدى الطلاب الذين لديهم تذكير سنوي بإجراء فحص سنوي روتيني (وهم 2.8% فقط من الطلاب).

**ABSTRACT** The aim of this study was to report on dental visit patterns and their association with periodontal health among young Saudi Arabian students. A representative sample of 3090 students was randomly selected. The students' dental visit patterns were assessed with a questionnaire. Clinical examinations were carried out using the community periodontal index of treatment needs. Age, sex and education level were significantly associated with the periodontal health. The prevalence of periodontal disease was significantly lower among subjects who were taught the right way to brush their teeth by the dentist. The highest occurrence of healthy periodontium (23.9%) and the lowest need for complex treatment (0%) were found among students who had annual reminders for check-ups (only 2.8% of the students).

## Habitudes de consultation dentaire et besoins en traitements parodontaux chez des étudiants saoudiens

**RÉSUMÉ** L'objectif de cette étude était de décrire les habitudes de jeunes étudiants saoudiens en matière de consultations dentaires et leur association avec la santé parodontale. Un échantillon représentatif de 3 090 étudiants a été sélectionné de manière aléatoire. Leurs habitudes de consultation dentaire ont été évaluées au moyen d'un questionnaire. Des examens cliniques ont été réalisés à l'aide de l'indice des besoins de la collectivité en matière de traitement des parodontopathies. L'âge, le sexe et le niveau d'instruction étaient associés de manière significative avec la santé parodontale. La prévalence des parodontopathies était sensiblement plus basse chez les sujets à qui leur dentiste avait appris à se brosser correctement les dents. La fréquence la plus élevée de ligaments alvéolo-dentaires sains (23,9 %) et le besoin de traitement complexe le plus faible (0 %) ont été relevés chez les étudiants qui recevaient des rappels annuels au sujet de leur bilan périodique (2,8 % des étudiants seulement).

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## Introduction

Personal oral hygiene routines are important at an individual level to maintain oral health. Equally important are regular dental visits, as they provide professional diagnostic and prophylactic services that are essential to prevent periodontal disease [1,2]. The percentage of individuals who report having visited the dentist the preceding year varies between studies in different countries [1,3–5]. As for gender, literature from several countries reported differences in oral health behaviour between males and females. In some studies, females visited dentists and used oral hygiene tools more frequently than males [4–8], whereas other studies did not find such a gender difference [3,9]. Various studies showed an association between the utilization of dental services and oral health [1,10,11].

This research is part of a larger study of the epidemiology of periodontal disease among the young Saudi Arabian population. The aims of this study were to assess the association between periodontal health status and dental visit patterns, and to identify the reasons for visiting or not visiting the dentist among students aged 11–24 years in Jeddah.

## Methods

### Study design and sample

This was a cross-sectional study conducted in Jeddah, the second largest city in Saudi Arabia and the largest city in Western province. The target population was middle-school, high-school and university students, aged 11–24 years old and resident in Jeddah city.

Prior to the study, a pilot study was carried out on a sample of 50 students to determine the sample size and test the questionnaire. Sampling was performed to select a population representative of young adults in the city and provide sufficient power to detect differences in periodontal disease where it existed. A

sample size of 3100 Saudi Arabian students was selected based on the Lemeshow formula [12].

A complete list of middle schools and high schools was obtained from the Ministry of Education. Schools were stratified according to sex (male and female), source of funding (private and public) and 6 geographic locations. Schools were then selected randomly from each stratum by proportional allocation; 21 middle schools (15 public and 6 private) and 14 high schools (10 public and 4 private) were included, out of a total of 260 middle and 210 high schools. Students from 8 colleges (4 female and 4 male) were selected, also using the proportional allocation technique.

### Questionnaire

The questionnaire used in the study included questions about demographic factors, dental visits, the reasons for visiting or not visiting the dentist and some signs of oral health conditions that might be noticed by the subjects.

The response rate was 97.5%, as the questionnaire was distributed to 3200 subjects and returned by 3122. Questionnaires were administered and collected in class by one of the dentists. The anonymity of participants was emphasized.

### Clinical examination

Examinations were conducted in classrooms by calibrated dentists. A lightweight portable examination light was used, and subjects were positioned so as to receive maximum illumination. Plane mouth mirrors and standard probes were used to conduct the examinations. Teeth were examined using the community periodontal index of treatment needs (CPITN) procedure of the World Health Organization (WHO) [13]. Teeth were examined in the following sequence: upper right sextant, upper anterior sextant, upper left posterior sextant, lower left posterior sextant, lower anterior sextant and lower right posterior sextant. For each of the 6 sextants examined, a code from 0 to

4 was given according to the following clinical criteria: (0) healthy gingiva; (1) bleeding observed directly or by using mouth mirror; (2) calculus felt during probing, but black areas of the probe were visible (3.5–5.5 mm from ball tip); (3) a pocket of 4 or 5 mm, the gingival margin was situated on the black area of the probe (3.5–5.5 mm from the probe tip); and (4) a pocket of > 6 mm, black area of the probe not visible. Based on the clinical findings, each subject was categorized into 1 of 4 treatment groups on the basis of the most severe condition found. The 4 treatment categories were as follows: no treatment (code 0); improved oral hygiene (code 1); improved oral hygiene and scaling (codes 2 & 3); and improved oral hygiene and complex treatment (code 4).

Prior to the study, 6 dentists were trained at King Abdulaziz University dental clinics, and the kappa statistics among the examiners for the CPITN were calculated. Examinations for CPITN among 50 students gave an inter-examiner kappa value of 0.65 and an intra-examiner kappa value of 0.72.

A total of 3090 students were examined according to the above methods.

### Statistical analysis

Data were processed and analysed using the statistical package *SPSS*, versions 13 and 16. Descriptive statistics, including frequency and percentages, were used. Two-sided likelihood ratio chi-squared tests were used to test associations between the dependent variable and the independent variables. The level of significant was set at 0.05.

## Results

### Description of the study population

The study sample consisted of 3090 students aged 11–24 years, 1281 aged 11–15, 1091 aged 16–19 years and 670 aged 20–24 years. Of these, 56.8% were females and 43.2% were males.

### Periodontal status

The association between CPITN and students' age, education level and sex is shown in Table 1. Age, sex and education level were significantly associated with periodontal health status ( $P < 0.001$ ). Approximately 20% of the 11–15 year age group and 10% of the 20–24 year age group had healthy periodontium. Over half the males (58.0%) and females (53.9%) had calculus.

The prevalence of periodontal disease increased significantly with age in both sexes ( $P < 0.001$ ).

### Dental visits and CPITN

Table 2 shows the relationship between the periodontal health of students and dental visits. Of the students 22.6% had never visited the dentist and 61.8% of them needed scaling; in contrast, among the majority of students who had ever visited the dentist, 54.3% needed scaling. Among participants who reported that they had not visited the dentist within the past year, 59.0% needed scaling.

The prevalence of periodontal disease was significantly lower among the subjects who reported that they had

been taught the right way to brush their teeth by the dentist (18.0% had healthy periodontium and 51.1% needed scaling), while among the rest of the students, 14.5% had healthy periodontium and 59.3% needed scaling.

### Dental visits by students' sex

Significantly more females (61.2%) had visited the dentist during the previous year than had males (55.9%). In addition, more females than males had been taught the right way to brush their teeth by their dentist ( $P < 0.001$ ) (Table 3).

**Table 1 Students' age, sex and education level by community periodontal index of treatment needs (CPITN) scores**

Demographic characteristic	Total students <sup>a</sup>		% of students CPITN score				P-value <sup>b</sup>
	No.	%	0	1	2	3	
<b>Age (years)</b>							
11–15	1281	42.1	20.5	31.8	46.8	0.9	< 0.001
16–19	1091	35.9	14.2	23.6	60.6	1.6	
20–24	670	22.0	10.3	16.9	65.7	7.2	
<b>Sex</b>							
Male	1267	43.2	22.3	17.7	58.1	1.9	< 0.001
Female	1656	56.8	11.1	31.8	54.1	3.0	
<b>Education level</b>							
Middle	1420	47.9	19.6	30.3	49.2	1.0	< 0.001
Secondary	871	29.4	14.9	23.5	60.7	0.8	
University	671	22.7	10.3	17.9	63.9	7.9	

<sup>a</sup>Numbers do not add up due to missing data.

<sup>b</sup>Chi-squared test.

**Table 2 Students' visits to the dentist by community periodontal index of treatment needs (CPITN) scores**

Dental visit	Total students		% of students CPITN score				P-value <sup>a</sup>
	No.	%	0	1	2	3	
<b>I have visited the dentist</b>							
Yes	2337	77.4	16.5	26.7	54.3	2.6	0.005
No	684	22.6	14.6	21.3	61.8	2.2	
<b>I visited the dentist last year</b>							
Yes	1768	58.9	15.8	27.7	53.8	2.7	0.007
No	1236	41.1	16.4	22.3	59.0	2.3	
<b>The dentist taught me the right way to brush teeth</b>							
Yes	1182	39.0	18.0	29.1	51.1	1.6	< 0.001
No	1845	61.0	14.5	23.2	59.3	3.0	

<sup>a</sup>Chi-squared test.

**Table 3 Students' visits to the dentist by sex**

Dental visit	Sex				P-value <sup>a</sup>
	Male		Female		
	No.	%	No.	%	
<b>I have visited the dentist</b>					
Yes	960	74.7	1333	79.9	< 0.001
No	326	25.3	335	20.1	
<b>I visited the dentist last year</b>					
Yes	715	55.9	1014	61.2	0.002
No	565	44.1	644	38.8	
<b>The dentist taught me the right way to brush teeth</b>					
Yes	466	36.6	669	40.1	< 0.001
No	808	63.4	998	59.9	

<sup>a</sup>Chi-squared test.

### Reasons for dental visits and CPITN

Pain and dental problems were the most common reason to visit the dentist, followed by random check-ups (Table 4). The subjects who were reminded of the annual visit by their dentist had the highest occurrence of healthy periodontium (23.9%) and none needed complex oral treatment (Table 4).

### Reasons for not visiting the dentist and CPITN

As shown in Table 5, the most common cause for not visiting the dentist was the feeling of having no need for a dental visit, followed by the fear of pain and not having the time to do so. There was a significant relationship between the periodontal health of students and the

reasons they stated for not visiting the dentist. The students who stated that there was no need for dental visits had the highest percentage of healthy periodontium (21.9%) and lowest percentage for needing complex treatment (0.9%).

### Discussion

This is the first study to explore the relationship between dental visit patterns and periodontal health in a representative sample of the young Saudi Arabian population. The almost universal occurrence of dental calculus in young populations suggests inadequate oral hygiene practices and other unhealthy dental behaviours. In the present study, the presence of calculus was the most common periodontal condition in both sexes and all age groups. This was similar

to most studies in the regions and elsewhere [14–16], but different from another study in Saudi Arabia [17]. In addition, calculus was present in more males than females, in agreement with studies from other countries [7,18,19].

In this study, around 60% of individuals had visited the dentist in the previous year, 8.6% had received regular check-ups and only 2.8% were reminded of annual check-ups by the dentist. In contrast, in Sweden, 90%–95% of all individuals visited the dentist on a regular basis every year or every other year, and about 70%–80% of all adults were enrolled in a recall system on the dentist's initiative [19]. Also in the USA, Dye and Selwitz reported that around 70% of subjects had visited the dentist within the past 12 months [1]. A study

**Table 4 Reasons given by students for visiting the dentist last year by community periodontal index of treatment needs (CPITN) score**

Reason for dental visit	Total students		% of students <sup>a</sup>			
	No.	%	CPITN score			
			0	1	2	3
Pain and dental problems	1179	49.4	15.0	26.5	56.1	2.4
Random check-up	399	16.7	18.3	26.1	52.4	3.3
Regular check-up	205	8.6	22.0	33.2	43.9	1.0
Gingival problems	171	7.2	8.2	23.4	66.7	1.8
Dentist reminder of annual visit	67	2.8	23.9	37.3	38.8	0.0
2 reasons	315	13.2	13.0	27.6	56.2	3.2
3+ reasons	50	2.1	26.0	34.0	38.0	2.0

<sup>a</sup>P < 0.001.

**Table 5** Reasons given by students for not visiting the dentist last year by community periodontal index of treatment needs (CPITN) score

Reason for not visiting the dentist	Total students		% of students <sup>a</sup>			
	No.	%	CPITN score			
			0	1	2	3
No need for dental visits	647	28.7	21.9	23.6	53.5	0.9
Fear of pain	556	24.7	12.9	25.2	59.2	2.7
Do not have time	385	17.1	13.5	25.5	58.4	2.6
Difficulty making an appointment	121	5.4	13.2	21.5	63.6	1.7
Difficulty reaching the dental clinic	78	3.5	16.7	26.9	50.0	6.4
Expensive treatment fees	68	3.0	16.2	20.6	58.8	4.4
2 reasons	322	14.3	10.6	23.3	63.7	2.5
3+ reasons	75	3.3	13.3	20.0	62.7	4.0

<sup>a</sup>*P* < 0.001.

conducted in California found that 66% reported visiting the dentist in the preceding year. About 41% said that getting a regular check-up was their main reason for the last dental care visit, and this percentage was higher in females than males [5]. A study in Michigan found a much higher percentage of regular visits, where 75% of subjects reported having a dental check-up at least once a year [20]. On the other hand, in Uganda only 21%–37% of the population has ever visited a dentist [21], and 44% received dental care in the past 2 years [22]. Similar to our results, other studies reported that females use dental services more regularly than males [4,6,23,24]. Others found no difference in dental behaviour between males and females [3,9].

In our study, the most common reason for visiting the dentist was pain and dental problems (49.9%). The regular check-up as a reason for visiting the dentist accounted for 8.6%, and reason for visits due to dentist reminders accounted for only 2.8%. Almas et al. in Saudi Arabia reported that 67% of males and 59% of females visited dentists only when in pain [25]. Similarly, in Jordan, male students visited the dentist only when in pain [4]. In contrast, in Finland, the most common reason for the most recent dental visit was a routine examination [24]. As for reasons for not visiting the dentist, our study found that feeling that there was no need for

a dental visit was the most common reason, followed by the fear of pain.

Our study showed an association between the utilization of dental services and periodontal health, especially if the dental visit was due to a reminder by the dentist or the patient was given oral hygiene instructions (i.e. taught how to brush by the dentist). The study also showed a very low percentage of regular annual visits in this group, which indicates a need to emphasize the importance of regular dental visits in addition to a better recall system by dentists.

The CPITN was endorsed by the WHO for population-based surveys in the 1980s. Although it has limitations, CPITN reflects unmet treatment needs and can give a fair assessment of the periodontal condition. It was used in this study because it has proved to be a simple and effective method for measuring and monitoring the severity of periodontal disease at the community level [26].

There are some limitations to our study. First, we used self-reported data. Such data may be less accurate than data collected by observation or examination. Measurement error due to misinterpretation of questions and memory error may occur [27]. To overcome this problem, a pilot study was performed, and the questions were worded as simply as possible. As a cross-sectional study design, inferences cannot be drawn about the casual relationship between the risk indicators

and periodontal disease. Nonetheless we were able to show a significant association between the periodontal health of students and the reasons they gave for not visiting the dentist.

Knowledge about the epidemiology of periodontal disease in Saudi Arabia will help to establish baseline data about dental health needs. The importance of the utilization of dental services should be emphasized through various channels, including schools, mass media and the oral health providers themselves. Schools provide a unique setting to develop awareness of the importance of regular dental visits. To help individuals and group advocates of health promotion in schools, the WHO has produced a programme “Information services on school health” [28]. The experiences of systemic oral health care programmes in some Middle Eastern countries should also be considered [3,29].

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