Journal of Dentistry (2004) 32, 47–53

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Journal of Dentistry

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Oral health knowledge, attitude and behaviour among Saudi school students in Jeddah city

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Received 4 June 2003; accepted 8 August 2003

KEYWORDS
Oral health; Knowledge; Attitude; Behaviour; Saudi Arabia; Students; Preventive dental behaviour

Summary *Objectives*. To assess the knowledge, attitude and behaviour in relation to periodontal health status among Saudi intermediate and high school students living in Jeddah, Kingdom of Saudi Arabia.

Methods. A dental health questionnaire was distributed to a random sample of a total of 2586 Saudi students from intermediate and high school, aged 12–18 years residing in Jeddah.

Results. While about 87.1% knew that tooth brush helps prevent periodontal disease, only 33.1% knew that using dental floss helps in preventing periodontal disease. Females used brushing and flossing more than males, while males used miswak more than females. Tooth brushing ($P < 0.001$) and dental floss ($P < 0.015$) were used more frequently among private subjects, while miswak was utilized more frequently among governmental school students ($P < 0.005$). Dental pain was found to be the main reason for visiting the dentist among the target group.

Conclusions. It appears that knowledge, attitude, and behaviour concerning periodontal health among young Saudi school students living in Jeddah city are in need of improvement.

Introduction

The American Dental Association recommends that, to avoid oral diseases, individual should brush and floss at least once a day and visit a dentist regularly.[1]

Dental flossing and tooth brushing are the most commonly performed oral self-care behaviour.[2] Recent studies carried out in Michigan have found that on an average subjects reported brushing their teeth about twice a day. Around 90% of the population brushed at least once a day. About one-third of the sample reported flossing at least once a day. Three quarters of the population reported making periodic dental visits at least once a year.[3] Further, females are more likely to brush daily, as are those individuals with more education and higher income.[3–5] Historically, few individuals have practised flossing, but the use has slowly increased with women and the more educated.[6] In recent studies, nearly one-third of adults reported flossing on a daily basis.[3,5] Most children (73–83%) in Sweden, Denmark, Germany, Austria and Norway brushed their teeth twice a day. Tooth brushing was less frequent among boys than among

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doi:10.1016/j.jdent.2003.08.002

girls in all countries except in France, where 61% of both boys and girls brushed their teeth twice a day. Use of the dental floss was rare. In general, flossing was less frequent among boys than among girls.[7] African-Americans are less likely than whites to brush thoroughly, floss thoroughly and get dental check-up. More than 95% of both groups reported brushing daily, however, whites were more likely to brush teeth.[8] In Saudi Arabia, little is known about the oral health and oral care behaviour among Saudi school students.[9,10] The purpose of this study is to assess the knowledge, attitude and behaviour in relation to periodontal health status among Saudi intermediate and high school students living in Jeddah. Jeddah city is considered the second largest city in the Kingdom and the largest in the western region, for that reason it was chosen to conduct this study.

General knowledge and attitude in relation to periodontal disease was assessed. As for the behaviour, the use of various oral hygiene methods such as tooth brush, dental floss and miswak were included. Miswak is a stem or root of the plant *Salvadora persica*, it becomes brushlike after treatment and is suitable for oral hygiene.[9] The presence or lack of dental visits and the reasons behind each were also studied among the same group.

Materials and methods

A sample size of 2586 Saudi students from intermediate and high school aged 12–18 years residing in Jeddah, Kingdom of Saudi Arabia were randomly chosen from the studied population based on Lemeshow formula.[11] A multistage random sample using stratified random sample technique with proportion allocation was used to select the sample[11] to achieve a level of 0.05 and power of 0.80% to insure generalization of the results.

Only Saudi subjects living in Jeddah area were selected for the study on the basis of the lack of information about knowledge, attitude, and behaviour concerning periodontal disease in Saudi population. A multistage random sampling procedure was adopted to randomly select the required number of students representing all locations under the study. The Jeddah area was divided into four geographic areas. According to the addresses of the schools, every school was grouped into one of these areas. The study population consisted of two major education levels namely: intermediate schools and high schools. For both strata, intermediate and high schools were considered as strata and each of them consisted of four strata according to gender and being governmental or private schools, choosing sample from each of them was due to proportional allocation from each stratum.

A total of 1573 students from the intermediate category were chosen and 1013 students were selected from the high schools. The sample constitutes 49.2% males and 50.8% females. Intermediate school subjects constitute 60.8% and high school subjects constitute 39.2%. Also, 88.6% were from government school subjects and 11.4% were from private school subjects (Table 1).

A dental health questionnaire was distributed to all subjects. The questionnaires were developed to gain information on demographic information, knowledge about periodontal disease and methods of prevention, attitudes towards preventive methods of periodontal disease, dental health behaviour in relation to periodontal disease, and sources of information about dental health.

The questionnaire was pre-tested on a convenient sample of 50 subjects selected from schools. The questionnaire was modified based upon responses and the survey format was finalized. Knowledge, attitude and behaviour were analysed in relation to age, gender and school type.

The data was analysed by student test adjusted for paired, unpaired and chi square. Analysis of variance with repeated measure, Tucky's paired comparison procedures, and correlation coefficients were calculated using some published methods. Results were also compared between different groups by using Wilcoxon-rank sum test,[12] or by Fisher's exact test.[13] Multiple logistic regressions were used to assess the probability of having the disease and risk factor under study. Analysis of data was conducted using SPSS and SAS statistical program.[14]

Results

The distribution of subjects regarding knowledge of periodontal diseases is shown in Table 2. While

Table 1 Demographic characteristics of the sample.

Characteristics	Number of cases (*N*)	Percentage
School level		
Intermediate	1573	60.8
High school	1013	39.2
Gender		
Male	1273	49.2
Female	1313	50.8
School type		
Governmental	2292	88.6
Private	294	11.4

Table 2 Distribution of subjects regarding knowledge of periodontal diseases.

Knowledge regarding periodontal diseases	Very much agree (%)	Agree (%)	Do not know (%)	Reject (%)	Reject very much (%)
1. Using tooth brush help preventing periodontal diseases	39.4	47.9	8.5	3.3	0.9
2. Using dental floss helps preventing periodontal diseases	8.5	24.6	46.1	14.5	6.3
3. There are people with good teeth no matter what they do, and others with bad teeth no matter what they do	13.6	28.8	37.2	13.4	7.0
4. Even if you follow the dentist you will still have dental problems	7.4	13.4	17	33.4	28.7
5. Bleeding on brushing is a primary sign of gingivitis	19.1	35.0	36.2	7.2	2.5
6. Periodontal disease can lead to bone resolution	13.6	32.1	47.0	5.4	2.0
7. Dental problems can lead to other health problem	29.9	39.9	22.5	5.1	2.6

Table 3 Distribution of subjects regarding their attitude toward periodontal and dental health.

Attitude toward periodontal and dental health	Very much agree (%)	Agree (%)	Do not know (%)	Reject (%)	Reject very much (%)
1. Periodontal disease makes me look bad	45	38.7	10.4	4	1.9
2. Bad teeth affect my school progress	10.7	25.3	29.9	22.3	11.8
3. Loosing teeth is a natural sequence of getting old	15.7	34.1	27.5	15.2	7.4
4. Artificial teeth have fewer problems than natural teeth	10.9	20.2	37.9	17.9	13.1

about 87.1% knew that tooth brush helps prevent periodontal disease, only 33.1% knew that using dental floss helps in preventing periodontal disease. More than half of the subjects knew that bleeding on brushing is a primary sign of gingivitis.

Table 3 shows the distribution of preparatory and high school students regarding their attitude towards periodontal and dental health. Only about 23% of school students rejected the statement that loosing teeth is a natural sequence of getting old. Again, 31% of subjects rejected the concept that artificial teeth have fewer problems than natural teeth.

Tooth brushing was the method with the highest frequency (83.8%), followed by miswak (39.9%), while the least method used was the dental floss (19.6%). Toothpaste was found to be the main material used for cleaning teeth (91.1%) (Table 4).

A statistical significant difference was found between both genders. Females used brushing ($P < 0.001$) and flossing ($P < 0.02$) more than males, while males used miswak ($P < 0.001$) more than females (Table 5).

Again, a significant difference was found between the government and private school subjects. Tooth brush ($P < 0.001$) and dental floss ($P < 0.015$) were used more frequently among private school subjects, while miswak was used more frequently among governmental schools students ($P < 0.005$) (Table 6).

Table 7 shows the relationship between age at starting using the brushing and flossing once daily and age category. Those who were more than 15 years old significantly started using the tooth brush and the dental floss at older age than the group of 15 years and younger ($P < 0.001$, $P = 0.002$, respectively). No significant difference related to age was noticed with respect to using miswak. Around 40% of the subjects learned the right way of brushing from the dentist.

As for the use of electrical tooth brushes, about 2.8% of the sample used that aid. More private school children used electric toothbrushes, 7.5% versus only 2.2% of government school children ($P < 0.001$).

Regarding visiting the dentist, about 24% never visited the dentist, while 57% only visited the dentist last year. The relationship between reasons for visiting the dentist last year and the type of school is shown in Table 8. Dental pain was found to be the main reason for visiting the dentist among the whole group. The main significant difference between government and private school was for visiting the dentist for regular check up ($P < 0.001$)

Table 4 Frequency of the use of the different method of cleaning teeth.

Methods of cleaning teeth	Yes (%)	No (%)
1. Brushing	83.8	16.2
2. Dental floss or tooth picks	19.6	80.4
3. Miswak	39.9	60.1
4. Mouth wash	35.6	64.2

Table 5 Relationship between frequency of brushing flossing and the use of Miswak and gender.

Behaviour	Gender	Do not clean teeth with brush	Less than once/day	Once or twice/day	Once or twice/day	Once/day	Twice or more/day	Statistical significance
Brushing	Male	9.0	5.0	7.5	22.8	30.9	24.7	($P < 0.001$)
	Female	2.2	1.6	1.8	9.0	33.6	51.9	
	Total	5.6	4.6	4.6	15.8	32.3	38.5	
Flossing	Male	73.1	6.1	4.9	7.6	5.7	2.6	($P = 0.02$)
	Female	69.7	5.3	4.1	9.4	8.8	2.7	
	Total	71.4	5.7	4.5	8.5	7.2	2.7	
Miswak	Male	19.2	15.1	22.5	10.1	10.1	17.4	($P < 0.001$)
	Female	37.1	14.5	13.9	11.3	11.3	7.6	
	Total	28.3	14.8	14.8	10.7	10.7	12.5	

or check up ($P < 0.001$). Those two reasons contributed to 25.5% for governmental school subjects compared to around 50% from the private school subjects. As for gender, the only reason for visiting the dentist with significant difference was the regular check up, with more females visiting the dentist than males ($P = 0.02$).

Comparing genders as regard to the reasons for not visiting the dentists, significant difference was noticed between male and female subjects in the various reasons, particularly no need to visit dentist and fear from pain (Table 9). When comparing governmental with the private schools, fear from pain and transportation difficulty was significantly higher among governmental subjects than private students (0.016, 0.06 borderline).

Discussion

A dental health questionnaire focused on knowledge, attitude, and behaviour concerning periodontal health status was conducted with a multistage random sample using stratified random sample technique, among Saudi school students living in Jeddah city. The limitation of this research is being evaluated on the basis of self-reported data. Measurement error due to misinterpretation of questions and memory errors are subject to occur.[15,16] To overcome this problem the questions were worded simply and pilot study was performed. On the other hand, previous studies found that self-report of daily flossing and annual check-up predicted plaque, calculus, gingivitis and periodontal destruction. Findings also contribute to confidence in the measurement used in this study.[17,18] Furthermore, because the study was a non-experimental cross-sectional designs, evidence about prediction of causal relationships cannot be provided.

This paper focuses on describing differences among age, gender, school type in relation to their knowledge, attitude and behaviour toward periodontal health. Concerning knowledge, most of subjects knew that the use of toothbrush help prevent periodontal disease, however, more than two-third of school students were unaware that dental floss helps prevent periodontal disease. This result indicates that improvement in knowledge toward the use of dental floss is needed. Interventions to increase the knowledge and subsequent use of flossing is essential and is in agreement with other studies.[3,4]

Table 6 Relationship between type of school and how many times students brushed flossed and the use of miswak

Behaviour	Type of School	Never brushed	Less than once/month	Once or twice/month	Once or twice/week	Once/day	Twice ore more/day	Statistical Significance
Brushing	Government	6.1	3.5	5	17.1	32.5	35.8	$P < 0.001$
	Private	1.7	1.4	1.7	5.8	30.0	59.4	
	Total	5.6	3.3	4.6	15.8	32.3	38.5	
Flossing	Government	73.1	5.4	4.4	8.0	6.8	2.2	$P < 0.015$
	Private	57.8	8.2	5.1	12.2	10.2	6.5	
	Total	71.4	5.7	4.5	8.5	7.2	2.7	
Miswak	Government	27.7	14.4	14.3	19.6	11.0	12.9	$P < 0.005$
	Private	32.3	17.7	28.7	13.9	8.5	8.9	
	Total	20.3	14.8	14.8	19.0	10.7	12.5	

Table 7 Relationship between age at start using tooth brush and dental floss once daily and age categories.

Behaviour	Age	Age starting the use regularly				Statistical significance
		Mean	Sd	Min	Max	
Brushing	<12 years	7.4	3.4	4	11	($P < 0.001$)
	12-15 years	7.3	3.1	1	15	
	>15-18 years	8.4	3.6	1	17	
	18 + years	9.9	3.9	2	20	
Flossing	<12 years	8.5	7.1	1	12	($P = 0.002$)
	12-15 years	10.1	5.6	1	15	
	>15-18 years	11.9	6.2	1	17	
	18 + years	13.1	4.1	2	21	

In relation to attitude, less than a quarter of students knew that loosing teeth is not a natural sequence of getting old, and rejected the concept that artificial teeth are less problematic than natural teeth. As for behaviour, tooth brushing was the highest method used for cleaning teeth, followed by miswak. Again, the least method used was the dental floss. This is in agreement with previous studies.[3,18] In previous study, no differences were found in plaque scores between miswak and tooth brush users and a positive association between the frequency of miswak and the lower need for periodontal treatment was shown.[9,19] Because of the scientific merit of using miswak and the emphasis of using miswak as a cultural and religious belief among the Saudi population, the right method of using miswak as a cleaning technique to achieve maximum benefits should be stressed through various interventions.

The frequency of brushing, flossing and use of miswak in relation to gender, support the trend found in other studies.[6,7] Females used brushing and flossing more than males, however, males used miswak more than females. Again, this result is justified by the cultural belief among Saudi communities.

When evaluating distribution of using various methods of oral hygiene technique and type of school, our hypothesis is that private school students have better oral health preventive behaviour than public school on the basis that SES is higher among private school students. This has been proven by the finding that electric tooth brush was used more among private school children. In addition, tooth brush and floss were used more among private school students, while miswak was used more among government school students. The result emphasize the important of using miswak as the first method for cleaning teeth because economic reasons might be a barrier for not using tooth brush.

It appears that, those who were more than 15 years old significantly started tooth brushing and flossing at older age than those groups of 15 years and younger. This result indicates that the younger generation are more aware of preventive dental health behaviours. Probably, the scattered interventions performed in the latest years had influenced these findings.

Pain was the main reason for visiting the dentist and agrees with other study.[20] Reasons for this drastic behaviour might be lack of knowledge regarding the importance of visiting the dentist regularly. Around half of the students from the private schools visited the dentist for check-up and regular check-up, compared to only one-quarter from the governmental schools. This might contribute to awareness of the parents of the private school students indicating the need to educate the other group. Findings showed that females significantly visited the dentist for regular check-up more than males, which coincides with other study.[3]

It appears, that knowledge, attitude and behaviour concerning periodontal health among young Saudi school student living in Jeddah city are in need of improvement. A complementary approach

Table 8 Relationship between reasons for visiting the dentist last year and type of school.

Reasons for visiting dentists last year	Type of School				*P*-value
	Government		Private		
	No.	%	No.	%	
1. Regular check up	183	8.0	64	21.8	<0.001
2. Dentist remind me	115	5.0	19	6.5	NS
3. Gum pain	301	13.1	26	8.8	0.04
4. Pain in teeth	114	48.6	120	40.8	0.014
5. Check up	402	17.5	82	27.9	<0.001

Table 9 Relation between reasons for not visiting the dentist and gender

Reasons for not visiting the dentist	Gender				P-Value	Odds ratio	95% (C.I) for odds ratio
	Male		Female				
	No.	%	No.	%			
1. No need to visit the dentist	380	29.9	309	23.5	0.0003	1.38	(1.16, 1.65)
2. Difficulty in getting appointment	117	9.2	78	5.9	0.002	1.6	(1.18, 2.18)
3. Fear from pain	247	19.4	411	31.3	<0.001	0.53	(0.44, 0.64)
4. Costly	73	5.7	65	5.0	NS	1.17	(0.82, 1.67)
5. Transportation difficulty	54	4.2	62	4.7	NS	0.89	(0.61, 1.32)
6. No time	328	25.8	240	18.3	<0.001	1.55	(1.28, 1.88)

would be to encourage students who do not use toothbrush to use miswak for cleaning teeth. The right technique of using miswak should be taught. Lissau et al. [21] analysed the relationship between dental health behaviour and periodontal disease. Their results showed that dental health behaviour in children and in adulthood were together responsible for between 10 and 14% of the variance in level of periodontal disease indicator.[21] Again, a baseline of various clinical measures like gingival inflammation, probing depth, CPITN and BANA scores and professional judgement were less efficient than self-efficacy in predicting future periodontal status. Thus, subjects who had a low awareness of the disease process (low self-efficacy) did not recognize or seek action for prevention or active care when indicated.[22] A sequential education program combined with daily self-monitoring of the behaviour to be changed, have been successful in improving older persons oral hygiene habits.[23]

Conclusions

The findings suggested that the group of 15 years and older, male students in governmental school would be the start appropriate target group. This group will receive the first organized intervention leading towards improving periodontal health status through increasing their knowledge, attitude and behaviour, then followed by other groups.

Acknowledgements

This research was supported by King Abdulaziz University, Grant No. 015/415.

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