The knowledge and practices of oral hygiene methods and attendance pattern among school teachers in Riyadh, Saudi Arabia

Khalid Almas, *FDSRCS (Edin), FRACDS (Syd),* ***Thamir M. Al-Malik,*** *BDS,* ***Mohammed A. Al-Shehri,*** *BDS,* ***Nils Skaug,*** *DDS, Dr Odont (PhD).*

ABSTRACT

Objectives: The aim of this study was to find out the knowledge and practices of oral hygiene methods among primary and secondary school teachers in Riyadh, Kingdom of Saudi Arabia (KSA).

Methods: The study was carried out using a self-administered questionnaire. Four hundred and seventy teachers, male 236 (50.2%) and female 234 (48.8%) responded with a response rate of 85.5%. The study was conducted during October to December 2001 at primary and secondary schools in Riyadh City, KSA.

Results: Almost 86% of male and 90% of female teachers felt that dental caries is due to the wrong method of tooth brushing, while sugar and sugary drinks were considered the main factor by 90% of male and 98% of female teachers. Seventy-five percent of male and 72% of female teachers considered irregular tooth brushing a cause of gums disease with 32% of male and 39% of female teachers not knowing details with regards to microbial relationship of gum disease. Tooth brushing preference was common among 45% male and 49% female teachers due to perceived effect of better cleaning, while almost an equal percentage of male and females (62%) used miswak due to Sunnah. Thirty-three point five percent of female teachers brushed 3 times a day as compared to 19% male teachers. On daily basis brushing 3 times, a day was common among >5000 SR monthly income group. Male teachers preferred horizontal tooth brushing (40%) while female teachers preferred circular tooth brushing (45%). Miswak was more commonly used by male teachers as compared to female teachers. Female school teachers had a higher income as compared to male schoolteachers. Thirty-two percent of females and 28% of male teachers were regular attendees to the dentist. Males were more satisfied by their oral health as compared to female teachers and 56% of male and 63% of female teachers visited the dentist only on having pain (toothache).

Conclusion: It is concluded that there is much resemblance in knowledge and practice of oral hygiene habits among male and female schoolteachers and there is a need to enhance their knowledge regarding oral health and disease. Both need more awareness regarding oral health promotion to have a positive role in school oral health education for their students in collaboration with oral health care workers.

Saudi Med J 2003; Vol. 24 (10): 1087-1091

School teachers can play a major role in oral health education programs at school levels. Schools have a tremendous capacity to be supportive of programs involving preventive health and preventive dentistry for children.[1] It was found that teachers traditionally have educated children regarding oral health and often

From the Department of Preventive Dental Sciences (Almas), King Saud University, College of Dentistry, USC Program (Al-Malik, Al-Shehri), Armed Forces Hospital, Riyadh, *Kingdom of Saudi Arabia*. Faculty of Dentistry (Skaug), University of Bergen, *Norway*.

Received 10th March 2003. Accepted for publication in final form 5th July 2003.

Address correspondence and reprint request to: Ass. Prof. Khalid Almas, Department of Periodontics, New York University, College of Dentistry, 345 East 24th Street, New York, NY 10010-4086, United States of America. Tel. +1 (973) 5731713. Fax. +1 (201) 4356022. E-mail: khalidalmas@yahoo.com

participated in school based prevention program.[2] They are deliverers of dental health education and have many advantages over the dental profession.[3] Firstly, they are able to instruct all children rather than only those seeking dental care. Secondly, they have daily influence on children at a time when the children are developing their value system,[4] thirdly the close relationship built in classrooms allows teachers to individualize information to suit each child,[5] and finally, teachers are more skilled in educational psychology than dentists.[6] It has been reported that the college teachers were often deficient in oral health information, inadequate and even incorrect information's was delivered.[7,8] In a study of teacher's knowledge of preventive dentistry, it was concluded that elementary school teachers were ill-informed regarding the details of preventive dentistry.[9]

In a recent study from the Kingdom of Saudi Arabia (KSA),[10] it has been reported that out of 120 school teachers, 73% knew regarding the role of sugar plus bacteria in the development of dental caries, bleeding gums were related to improper tooth cleaning by 68%; and 76% considered tooth brushing can prevent dental caries. Moreover, 56% responded positively to the statement that school teachers should teach the children regarding the causes of dental disease. In another study by Khan et al[11] from Riyadh City, KSA, it was found that 34% of teachers had good oral hygiene, while 50.2% fair and 15.8% were poor. Regarding their knowledge, 65% of schoolteachers had a knowledge regarding tooth decay while 45% of schoolteachers were aware of gum diseases. Another study from Riyadh,[12] concluded that there is a deficiency in dental and general health knowledge among female teachers.

The aim of this study was to investigate the knowledge and practices of oral hygiene methods and attendance pattern to dentists among primary and secondary school teachers and to investigate the effect of economic status on their oral hygiene practice and level of satisfaction.

Methods. A convenience sample of four hundred and seventy male and female primary and secondary school teachers were included in the study. Riyadh was divided into 4 regions for selection of schools. Teachers were approached from 7 male and 9 female schools for a self-administered questionnaire. The questionnaire contained 14 different questions covering the knowledge of tooth decay, gingival disease, oral hygiene methods, frequency of tooth brushing and miswak (chewing stick) use, visit to dentists, income and level of satisfaction from oral health. The questionnaire was tested before embarking on the study. The schools administration had been informed before the visit to schools and permission was obtained.

The data were entered into a computer using FoxPro Program. Statistical Package for Social Sciences was utilized for data analysis. The data were generated for frequency distributions and Chi-square test for

Table 1 - Knowledge of cause of dental caries (tooth decay).

Causes of dental caries	Yes n (%)	No n (%)	Don't know n (%)	Significance level
Brushing the wrong way				
Male	193 (86.2)	18 (8)	13 (5.8)	x^2=2.244
Female	205 (89.9)	16 (7)	7 (3.1)	P=0.326
Consumption of too many drinks and sweets				
Male	200 (89.3)	18 (8)	6 (2.7)	x^2=13,576
Female	219 (97.8)	3 (1.3)	2 (0.9)	P=0.001
Not visiting dentist				
Male	170 (78.3)	40 (18.4)	7 (3.2)	x^2=8.654
Female	190 (88.4)	19 (8.8)	6 (2.8)	P=0.013
Bacteria is the cause				
Male	138 (63.3)	30 (13.8)	50 (22.9)	x^2=9.720
Female	103 (48.6)	45 (21.2)	64 (30.2)	P=0.008

Table 2 - Knowledge of cause of gingival disease.

Causes of gingival disease	Yes n (%)	No n (%)	Don't know n (%)	Significance level
Irregular teeth brushing				
Male	164 (74.5)	37 (16.8)	19 (8.6)	x^2=1.254
Female	158 (72.1)	35 (16)	26 (11.9)	P=0.534
Virus in the mouth				
Male	90 (43.5)	42 (20.3)	75 (36.2)	x^2=0.883
Female	79 (39.5)	47 (23.5)	74 (37)	P=0.643
Bacteria in the mouth				
Male	159 (74.6)	15 (7)	39 (18.3)	x^2=0.936
Female	152 (71.4)	14 (6.6)	47 (22.1)	P=0.626
Microb's in the mouth				
Male	105 (50.2)	37 (17.7)	67 (32.1)	x^2=10.572
Female	69 (34.7)	52 (26.1)	78 (92.2)	P=0.005

Table 3 - Knowledge and frequency of oral hygiene method by gender and income.

Variables	Nothing n (%)	Brushing n (%)	Miswak n (%)	Both n (%)	Fingers n (%)	Both
Male	8 (3.4)	81 (34.3)	22 (9.3)	123 (52.1)	2 (0.8)	x^2=23.889
Female	3 (1.3)	112 (47.9)	3 (1.3)	116 (49.6)	-	P=0.000
Income						
<=5000	3 (1.4)	91 (41.6)	14 (6.4)	109 (49.8)	2 (0.9)	x^2=2.389
>5000	2 (1.1)	69 (39.4)	9 (5.1)	95 (54.3)	-	P=0.665

comparisons. The *p*-value was set at 0.05 for significance level. The missing data were excluded from the analysis.

Results. Four hundred and seventy teachers, 236 (50.2%) male and 234 (48.8%) female schoolteachers responded with a response rate of 85% (470/550). Regarding knowledge of teachers, the cause of dental caries, 86% of male and 90% of female teachers responded that it is due to tooth brushing by a wrong method. Ninety percent of males and 98% females were aware of role of sugar and sugary drinks in dental caries (P= 0.001). Almost 78% male and 88% female thought that it might be due to not visiting dentist. Almost 23% of male and 30% female did not know that bacteria is the cause of dental caries (P=0.008) **(Table 1)**.

Regarding the knowledge pertaining to periodontal diseases, 75% male and 72% female responded that no regular tooth brushing is the cause of gingival disease. Regarding etiology of periodontal disease, 32% male and 39% of female teachers did not know with regards to microbial relationship of the gums disease (P=0.005) **(Table 2)**. Regarding oral hygiene methods 34% male and 48% female teachers used brushing (P=0.000) while on aggregate data, <5000 Saudi Riyals (SR) group monthly income teacher had the habit of brushing by 42% while >5000 SR almost 39% used brushing. There was no significant difference due to income (P= 0.665) **(Table 3)**.

Tooth brushing, 3 times a day was more common among female teachers (33.5%) than male teachers (18.6%) P=0.000. In relation to income, tooth brushing 3 times a day was 20.5% among <5000 SR income group and 31% in >5000 SR group (P=0.001). Towards preference of using toothbrush or miswak 45% of males and 48% female teachers preferred to use a toothbrush due to better cleaning effect, and regarding the use of the miswak 62% of males and 62% of females used it due to Sunnah, while 8% of males and 18% of females used it due to freshness (P=0.002) **(Table 4)**. The majority of the teachers, males 40% used horizontal brushing method while 45% of female teachers used circular brushing (P=<0.002). There was no significant difference in using miswak methods in both groups P=0.189. Fifty-nine percent of female teachers used miswak once a day while 47% male teachers used miswak more than 3 times a day (P= 0.000). There was no significant difference among different income groups on frequency of daily use of miswak (P=0.382) **(Table 5)**. There was a significant difference among male and

Table 4 - Comparison of preference of using toothbrush and miswak by gender.

Preferences	Better cleaning n (%)	Freshness n (%)	Latest n (%)	Better cost n (%)	Others n (%)	Significance level
Reason of using tooth brush instead of miswak						
Male	80 (44.7)	35 (19.6)	23 (12.8)	2 (1.1)	39 (21.8)	x^2=7.743
Female	98 (47.8)	57 (27.8)	19 (9.3)	3 (1.5)	28 (13.7)	P=0.101
Reason of using miswak instead of toothbrush			**Traditional**	**Sunnah**	**Others**	
Male	26 (16.3)	13 (8.1)	3 (1.9)	99 (61.9)	19 (11.9)	x^2=16.830
Female	22 (14.8)	27 (18.1)	4 (2.7)	93 (62.4)	3 (2)	P=0.002

Table 5 - Frequency of the method and daily use of miwak by genders and income comparison.

Gender	Vertical n (%)	Horizontal n (%)	Scrubbing n (%)	Circular n (%)	Randomly n (%)	Significance level
Male	30 (16.7)	62 (34.4)	24 (13.3)	20 (11.1)	44 (24.4)	x^2=6.142
Female	17 (10.3)	65 (39.4)	26 (15.8)	26 (15.8)	31 (18.8)	P=0.189
	Once	**Twice**	**3 times**	**>3 times**		
Male	47 (27.6)	23 (30.5)	20 (11.8)	80 (47.1)	-	x^2=38.772
Female	91 (59.1)	21 (13.6)	13 (8.4)	29 (18.8)	-	P=0.000
Income SR	**Once**	**Twice**	**3 times**	**>3 times**		
<=5000	63 (43.2)	17 (11.6)	15 (10.3)	51 (34.9)	-	x^2=3.066
>5000	61 (46.9)	22 (16.9)	12 (9.2)	35 (26.9)	-	P=0.382

Table 6 - Frequency of visiting dentist regularly and by interval of visit.

Gender	Yes n (%)		No n (%)			Significance level
Male	30 (16.7)	62 (34.4)	24 (13.3)	20 (11.1)	44 (24.4)	x^2=2.232
Female	17 (10.3)	65 (39.4)	26 (15.8)	26 (15.8)	31 (18.8)	P=0.135
	3 months	**6 months**	**Yearly**	**Feeling pain**	**Others**	
Male	5 (3.8)	6 (12)	32 (24.1)	74 (55.6)	6 (4.5)	x^2=5.907
Female	10 (6.7)	19 (12.7)	21 (14)	95 (63.3)	5 (3.3)	P=0.206

female teachers as far as level of satisfaction from oral health was concerned. Male teachers were more satisfied as compared to female teachers (P=0.001). The monthly income was significantly different among male and female schoolteachers. The majority of the male teachers had a lesser monthly income compared to females; such as 15% of males and 41% of female teachers had a monthly income in the range 5000-7000 SR (P=0.000). Only 32% of females and 28% of male teachers were regular visitors to the dentist **(Table 6)**. The majority of the males 56% and females 63% visited the dentist only on feeling pain (P=0.206).

Discussion. In this study, the response rate of 85% shows a keen interest of the schoolteachers in their oral health matters.

A recent consensus statement on oral hygiene concluded that bacterial plaque plays an important role in the etiology of dental caries, gingivitis and periodontitis that effective removal of dental plaque can result in the prevention or reduction of these disease.[13] It has been established that mechanical cleaning procedures are reliable means of controlling plaque, provided cleaning is sufficiently thorough and performed at regular intervals.[14,15] The present study was conducted to look into the knowledge of schoolteachers regarding oral health and their oral hygiene methods. Then the results were compared for male and female schoolteachers from primary and secondary schoolteachers from Riyadh, KSA. Though questionnaire approach is acceptable but it does inherent limitations of the investigation in the absence of the clinical examination of the subjects. The clinical examination would help to assess the gap between knowledge and practices of oral hygiene methods.

There was a lot of resemblance of responses by both male and female schoolteachers. Female schoolteachers had more brushing frequency as compared to male teachers. Miswak was used more by male teachers than female teachers. Sixty-two percent of both male and female teachers used miswak due to Sunnah. This reflects the social and religious norm of the society. The comparative studies of miswak and toothbrush have shown that, low periodontal treatment need was found among Saudi adults who used miswak.[16,17] Recently Darout et al[18] assessed and compared the periodontal status of adult Sudanese habitual miswak and toothbrush users. It was found that the periodontal status of the miswak users was better in the Sudanese population than that of toothbrush users and the efficacy of miswak used for oral hygiene was comparable to or slightly better than that of the toothbrush.

All of the above mentioned studies are in favor of promoting traditional oral hygiene tool of miswak. This can be integrated for oral health promotion activities as it is socially, culturally and religiously motivated. At all 3 levels, the miswak is practiced in KSA as an effective oral hygiene tool. Al-Tamimi and Peterson showed[10] that 26% of Medina City schoolteachers did not know anything with regards to tooth decay, and one third did not know anything regarding gums disease, which is in accordance with our study and the etiological factors, microbial relationship of caries and periodontal disease were similarly expressed by Riyadh schoolteachers. Khan et al[11] came with the same conclusion that one third of the teachers showed poor knowledge regarding caries and gum diseases. In our study we found that almost 3 quarters of the female and male teachers used miswak, which are in accordance with Khan et al[11] A study by Wyne et al[19] from Riyadh, KSA on a very small sample of 39 schoolteachers has shown that there is discrepancy among knowledge and practices of oral hygiene habits among primary schoolteachers. It is recommended that in future, studies on schoolteachers should be considered for socioeconomic status, oral health knowledge and their practices. In our study, we tried to find out any influence of monthly income on oral hygiene practices and it was found that higher income group had better oral hygiene practices.

Over all the female teachers practiced oral hygiene methods more frequently, majority of those concerned regarding their oral health and they were less satisfied with their oral health. But, there was no significant difference among both male and female schoolteachers as far as attendance to the dentist was concerned. Both male and female teachers visited the dentist in the dental pain (toothache) rather than having a regular pattern of visit to dentist. Further, research should also focus the barriers to visit dentist regularly among schoolteachers. Our results are in accordance with a study by Bokhari,[8]

Almas[20] regarding dental attendance pattern of schoolteachers, as there was no difference among male and female schoolteachers.

A study by Lang et al[21] has shown that schoolteachers have incomplete knowledge regarding oral diseases. In our study almost quarter of the teachers did not have knowledge regarding microbial relationship of caries and periodontal disease. These responses emphasize that there is a need of delivering the basic knowledge and information of health sciences especially the knowledge of oral health, hygiene practices and life style of the diseases. That would help to improve the oral health among school children in KSA as better awareness teachers can dissipate the oral hygiene information to the children. Both male and female schoolteachers had a very high level of knowledge regarding tooth brushing, role of sugar in dental caries and the importance of regular visit to dentist. Approximately 23% of males and 30% of female schoolteachers did not know the bacterial relationship to the dental caries. Thirty-two percent male and 39% female teachers did not know details regarding microbial relationship to periodontal disease. Three times daily tooth brushing was more common among female higher income group of schoolteachers. Use of miswak was more common and frequent among male schoolteachers and 62% of both female and male schoolteachers used miswak due to Sunnah. Male teachers were more satisfied with their oral health compared to female teachers. The majority of the males 56% and female 63% teachers visited dentists only on having pain (toothache).

In conclusion, there is a need to enhance the knowledge of oral health and disease among schoolteachers, so they could dissipate the knowledge to their pupils. There is a need to persuade schoolteachers to visit the dentist regularly and not only on having toothache, so early detection and treatment of dental and oral diseases may be provided. Further, research can be carried out to look into the effects of socioeconomic status, level of knowledge and oral health status of schoolteachers.

Acknowledgment. All the teachers are thanked for their participation in the study. Dr. Nazeer Khan is thanked for his help in data analysis. The study was registered with College of Dentistry Research Center (CDRC) No. NF 1800.

References

1. Kenney JB. The role and responsibility of schools in affecting dental health status – a potential yet unrealized. ***J Public Health Dent*** 1979; 39: 262-267.
2. Mullins R, Sprouse W. Dental health knowledge of elementary school teachers in bowling Green, Kentucky. ***J Am Soc Prev Dent*** 1973; 3: 60-65.
3. Kay EJ, Baba SP. Designing dental health education materials for schoolteachers: Formative evaluation research. ***J Clin Pediatr Dent*** 1991; 15: 195-198.
4. Haefner DP. Dental Health Education in Schools. Paper delivered at IADR [Abstract]. ***J Dental Research*** 1974; 53: 708.
5. La Rose R. Formative evaluation of children's television and mass communications research; progress in community. ***Science*** 1980; 11: 275-279.
6. Saylor L. Schools: An untapped resource in comprehensive health planning. ***J Sch Health*** 1969; 5: 487-492.
7. Freed JR, Goldstein MS. Dental health: What is being taught to college student? ***J Am Dent Assoc*** 1976; 92: 940-945.
8. Loupe MJ, Fazier PJ. Knowledge and attitude of schoolteachers toward oral health programs and preventive dentistry. ***J Am Dent Assoc*** 1983; 107: 229-234.
9. Raymond A, Flanders W. Effectiveness of dental health educational programs in schools. ***J Am Dent Assoc*** 1987; 114: 239-242.
10. Al-Tamimi S, Peterson PE. Oral health situation of school children, mothers and schoolteachers in Saudi Arabia. ***Int Dent J*** 1998; 48: 180-186.
11. Khan N, Al-Zarea B, Al-Mansour Mo'azzy. Dental caries, hygiene, fluorosis and oral health knowledge of primary school teachers of Riyadh, Saudi Arabia. ***Saudi Dental Journal*** 2001; 13: 128-132.
12. Al-Fawaz SA, Al-Shammery AR. Oral hygiene habits, health knowledge and diet survey among female teachers and buffet managers in Riyadh City. Internship Seminar Report. [Report] Riyadh (KSA): King Saud University, College of Dentistry; 2000.
13. Consensus statement on oral hygiene. ***Int Dent J*** 2000; 50: 139.
14. Löe H. Oral hygiene in the prevention of caries and periodontal disease. ***Int Dent J*** 2000; 50; 129-138.
15. Cancro L; Fishman SL. The expected effect on oral health of dental plaque control through mechanical removal. ***Periodontology*** 2000; 1995; 8: 60-74.
16. Al-Khateeb TL, O'Mullane DM, Whelton H, Sulaiman MI. Periodontal treatment needs among Saudi Arabian adults and their relationship to the use of miswak. ***Community Dent Health*** 1991; 8: 323-328.
17. Guile EE. Periodontal status of adults in central Saudi Arabia. ***Community Dent Oral Epidemiol*** 1992; 20: 159-160.
18. Darout IA, Al-Bandar JM, Skaug N. Periodontal status of adult Sudanese habitual users of miswak chewing sticks or toothbrush users. ***Acta Odontol Scand*** 2000; 58: 25-30.
19. Wyne AH, Al-Ghorabi BM, Al-Asisi YA, Khan NB. Caries prevalence in Saudi primary school children of Riyadh and their teacher's oral health knowledge, attitude and practices. ***Saudi Med J*** 2002; 23: 77-81.
20. Bokhari SAH, Almas K. Oral hygiene practices, knowledge and dental attendance pattern of secondary school teachers. ***JPDA*** 2001; 10: 9-12.
21. Lang P, Woolfolk M, Faja B. Oral health attitude of elementary school teachers in Michigan. ***J Public Health Dent*** 1989; 49: 44-50.