

Saudi parents knowledge of and attitude toward the prevention of dental caries

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أجريت هذه الدراسة لتقييم مدى معرفة الأهالي السعوديين وموقفهم تجاه وقاية أسنان أطفالهم من النخور السنية في منطقة الإحساء. طلب من حوالي 1748 من الأهالي المشاركة في هذه الدراسة من خلال ملى استبيان وزع على أطفالهم المدرسين في سبعة عشرة مدرسة للذكور في منطقة الإحساء. وبلغ عدد الأهالي الذين أعادوا الاستبيان 952 (46.5%). أظهرت النتائج أن 6.7% من الذكور و 9.7% من الإناث من أهالي الطلبة المشاركين يقومون بتفريش أسنان أطفالهم لغرض الوقاية من النخور السنية، بينما أكثر من 50% من الأهالي من كلا الجنسين يتبعون نظام التقليل من تناول السكريات بالإضافة للثقافة السنية لأطفالهم. واعتبر حوالي 12% منهم أن الزيارات السنية ليست ضرورية للوقاية من النخور السنية، ولم يلاحظ أي اختلاف جوهري بين الجنسين أو من ناحية العمر في الطرق الأربعة المختلفة ($P > 0.05$). بينما لوحظ اختلاف واضح بين الأهالي فيما يتعلق بالمستوى الثقافي باستثناء الثقافة السنية.

أظهر اختبار كاي المربع دلالة إحصائية $P < 0.0001$ بالنسبة لتفريش الأسنان و $P < 0.041$ بالنسبة للتقليل من تناول السكريات و $P < 0.002$ بالنسبة لزيارات طبيب الأسنان. لوحظ تأثير واضح لمستوى الدخل على عادات تفريش الأسنان ($P = 0.003$). وأكثر من نصف الأهالي يدركون أهمية تفريش الأسنان والتقليل من تناول السكريات لكن ليس لديهم المعرفة الكافية حول أهمية الزيارات السنية واستعمال الفلور للوقاية من النخور السنية. ويمكن الاستنتاج بناء على هذه النتائج أن المعرفة السنية والموقف تجاه الوقاية يتأثران بالمستوى الثقافي والدخل العائلي لكن دون أي تأثير للجنس أو العمر.

This study was conducted to assess Saudi parents knowledge of and attitude toward the prevention of dental caries in their children in Al-Ahsa region. Parents (N=1748) were requested to complete self-administered questionnaires that were distributed to their children studying in seventeen primary schools for boys in Al-Ahsa and 952 parents (54.46%) returned the questionnaires. The results showed that 74.6% male and 73.9% of female parents carried out tooth brushing for their children to prevent dental caries while more than 50.0% of both parents practiced sugar reduction and dental education. Dental visits were not regarded as an effective method (12.0%) in reducing dental caries and there was no significant difference in sex or age of parents in the four different methods ($P > 0.05$). Statistically significant differences were observed between the parents based on their educational level except in dental education to the children. Chi-square tests showed $P < 0.0001$ for brushing, $P < 0.041$ for sugar reduction and $P < 0.002$ for dental visits. The family income significantly influenced only the tooth brushing habits ($P = 0.003$). More than half of the parents knew the importance of tooth brushing and sugar reduction but not enough about dental visits and the use of fluoride and fissure sealants to prevent caries. Based on the results, it is concluded that dental knowledge and attitudes are influenced by level of education and family income but not by age or sex.

Introduction

Dental caries remains the most common disease affecting humans. Numerous studies have reviewed the effectiveness of different preventive measures in different populations. In spite of these studies, children still suffer from high caries incidence. In western countries, the prevalence of dental caries is low compared to developing countries.¹ Saudi Arabia is a developing country with a population of 23 million.² Approximately half of the population is under 18 years of age. The prevalence of dental caries in Saudi children has been reported in different studies.³⁻⁵ Al-Shammery *et al.*³ have reported that the dmft of 6-year-old children in Saudi Arabia was 3.14 for boys and 3.43 for girls, respectively, and that the prevalence of dental caries in primary teeth was higher in the urban than in the rural areas.

Parents have a major role in preventing dental diseases in their children. In addition, they have a major role in any preventive measure. Parents' knowledge about different preventive methods has been studied previously. In Kuwaiti mothers,

Peterson *et al.*⁶ found that 74% of them knew that dental caries was caused by sweets and candy. Half of the mothers also were aware of the harmful effects of sugary drinks and the preventive effect of fluoride. In Saudi Arabia, the prevalence of dental caries in children is high.³ It is known that prevention is the main objective of any health planning strategy. It appears that Saudi parents do not have enough knowledge about different methods for caries prevention. This knowledge of parents about the prevention of dental disease has not been studied in Saudi Arabia. It would be interesting to investigate different parental factors that may play a role on their knowledge about dental caries prevention. Therefore, the purpose of this study was to assess the Saudi parents knowledge of and attitude toward the prevention of dental caries in their children in Al-Ahsa region of Saudi Arabia.

Methods

Subjects

The study population consisted of Saudi parents of children in the first grade who live in Al-

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Ahsa , Eastern province of Saudi Arabia. A list of names and addresses of all boys primary schools in Al-Ahsa region (173) was obtained. To be a representative sample, seventeen schools were selected from different urban (5) and rural (12) areas with different socioeconomic levels. The headmaster of each school was contacted and his approval was obtained. Children were given the questionnaire (one/child) for their parents (Appendix). Questionnaires were distributed with a cover page included for the explanation of the study purpose, soliciting cooperation and guaranteeing confidentiality of responses. The questionnaires were collected the following day. No attempts were made to send another questionnaire for parents who did not reply.

Questionnaire

The survey questionnaire was developed, reviewed and tested among ten parents in order to ensure the reliability and validity of the questionnaire. The questionnaire was modified based on the results of the pilot study. It consisted of questions about the demographic details of the parents, and their knowledge of the methods of prevention of dental caries. The questionnaire also documented information on practice of the parents on their children to prevent dental caries by the following four methods: tooth brushing, sugar reduction, dental education and dental clinic visits. In addition, parents' knowledge of fluoride and fissure sealants was assessed.

Statistical Analysis

All responses were edited, entered into a computer database and examined statistically using a statistical package for social sciences (SPSS). Descriptive statistics were generated for all items. The results were reported by percentages.

Results

A total of 1748 questionnaires were distributed. The number of parents who returned the questionnaire was 952 corresponding to a response rate was 54.5%. The demographic data of the participants as published in a previous article⁷ are presented in Table 1.

Table 2 shows the response of the participants to the question what do you do to reduce dental caries in your children? Both mothers and fathers carried out tooth brushing, sugar reduction and dental education (> 50%). Dental visits were not regarded by the parents to be an effective method

Table 1. Demographic characteristics of the study sample.

Characteristic	Item	No.* (%)
Parent's area	Urban	322 (33.8)
	Rural	630 (66.3)
Parent's sex	Male	676 (76.9)
	Female	203 (23.1)
Parent's education level	Illiterate	162 (17.3)
	Primary	293 (31.3)
	Intermediate	175 (18.7)
	Secondary College	161 (17.2)
Parent's income (Saudi Riyal/month)	< 2000	144 (15.4)
	2001-4000	327 (39.9)
	4001-6000	196 (23.9)
	6001-10000	116 (14.1)
	>10000	108 (13.2)
Number of children	1-3	73 (8.9)
	4-6	183 (22.2)
	7-9	260 (31.5)
	10-12	221 (26.8)
		113 (13.7)

* The total number per characteristic is different from the total number (N=952) because some parents did not answer all the questions.

Table 2. Relationship between different parental factors and their effort to reduce dental caries (N=952)*.

Factor		Method (%)			
		Tooth Brushing	Sugar reduction	Dental visits	Dental education
Gender	Male	74.6	50.0	12.4	58.1
	Female	73.9	50.7	12.3	63.1
	P- value [†]		0.854	0.967	0.206
Age	20-29		61.9	14.3	56.2
	30-39		54.0	9.6	
	40-49		54.1	11.9	65.1
	>50		42.9	7.1	58.7
	P-value [†]		0.200	0.500	45.2
Level of Education	Illiterate		50.0		
	Primary		44.4		53.1
	Intermediate		49.7		57.0
	High school		50.3		64.0
	College		60.4		62.7
	P value [†]		0.041		59.0
Income	< 2,000 SR		50.5		
	2,001-4,000		50.0		55.0
	4,001-6,000		46.6		62.2
	6,001-10,000		52.8		63.8
	> 10,000		60.3		63.6
	P value [†]		0.450		61.6

*The total number per characteristic is different from the total number (N=952) because some parents did not answer all the questions.

[†]Chi-square tests

in reducing dental caries (approximately 12%). There was no difference between mothers and fathers in the four different methods. Similarly, no difference was detected between the different age groups ($P > 0.05$). Statistically significant differences were observed between participants based on their educational levels. For tooth brushing, significant difference was found between the different levels of education ($P < 0.0001$). Illiterate participants brushed less frequently (56.8%) than the participants who graduated from college (84.7%). Similar observations were found between illiterate and college degree holders when asked about sugar reduction (50.0% and 60.4%, respectively). Only 6 to 7% of the illiterate and college degree holders participants saw dental visits as a practice important to reduce dental caries. However, a higher percentage (11-16%) of parents with primary, intermediate or high school education recognized dental visits as a preventive method against dental caries. These differences were statistically significant ($P=0.002$). No significant difference was seen between different educational level groups when asked about dental education as a measure to reduce dental caries. The brushing habit increased as the income increased ($P=0.003$). High-income participants (>10,000 SR/month) did more brushing for their children than the low income participants. No significant difference was observed between different income groups for the other three methods of sugar reduction, dental visits and dental education ($P > 0.05$).

Participants were asked about their knowledge of different preventive measures for dental caries. Table 3 shows their distribution and the relationship with different parental factors. Male knowledge about the importance of tooth brushing as a preventive measure was similar to that of female at 74.6% and 73.9%, respectively. For the other three preventive measures (sugar consumption reduction, dental visits and using fluoride), no significant difference was seen between males and females. In addition, there was no difference between different age groups and education level on their response ($P > 0.05$). Similarly, no significant difference was seen between participants' income and their knowledge of different preventive methods except for sugar reduction method ($P=0.005$).

The majority of the participants (83.6%) answered yes when they were asked, did you hear about fluoride? (Table 4). A lower proportion of parents knew about the fissure sealant (59.3 %).

Table 3. Relationship between different parental factors and their knowledge about prevention of dental caries (N=952)*.

Factor		Method (%)			
		Tooth Brushing	Sugar reduction	Dental visits	Using Fluoride
Gender	Male	74.6	50	12.4	5.0
	Female	73.9	50.7	12.3	3.9
	P-value [†]	0.881	0.854	0.967	0.524
Age	20-29		12.4		
	30-39	68.6	10.0	13.3	7.6
	40-49		15.6	13.8	4.6
	>50	77.0	8.5	13.8	14.3
	P-value [†]	76.1	0.527	14.3	2.4
Level of Education	Illiterate	0.245	16.7		
	Primary		19.8		
	Intermediate		21.1	19.1	3.1
	High school	69.1	14.3	17.1	6.1
	College	72.4	23.6	12.6	4.6
	P value [†]	68.6	0.241	12.4	6.2
Income	< 2,000 SR	80.1	19.6	0.343	0.499
	2,001-4,000	72.2	19.9		
	4,001-6,000		13.8	18.7	
	6,001-10,000	0.138	12.0	12.8	2.8
	> 10,000		32.9	12.1	4.6
	P value [†]		0.005	13.0	6.0

*The total number per characteristic is different from the total number (N=952) because some parents did not answer all the questions.

[†]Chi-square tests

Table 4. Parents knowledge of fluoride and fissure sealant.

Question	Answer	No.* (%)
Did you hear about fluoride?	Yes	782 (83.6)
	No	153 (16.4)
Did you hear about fissure sealant?	Yes	538 (59.3)
	No	369 (40.7)
Fissure sealants are effective for preventing dental caries.	Agree	375 (61.3)
	Disagree	114 (18.6)
	Do not know	123 (20.1)
Fissure sealant is most important for permanent teeth.	Agree	350 (57.1)
	Disagree	120 (19.6)
	Do not know	143 (23.3)
Fluoride and sealant can prevent	Agree	379 (61.2)
	Disagree	59 (9.5)
	Do not know	

*The total number per characteristic is different from the total number (N=952) because some parents did not answer all the questions.

Table 4 also shows that parents' knowledge about fissure sealants was less favorable as only 61.3 % of

the parents accepted the effectiveness of sealants in preventing dental caries and 57.1 % recognized the importance of sealants to permanent teeth. In addition, 61.2% agreed that both fluoride and sealants could prevent caries in most teeth.

Table 5 shows parents' knowledge of fluoride. Not all the participants knew the beneficial effect of the fluoride. A high number of parents thought that fluoride cleans the teeth and makes them whiter (80.4% and 69.3%, respectively). Approximately one third of the parents (37.1%) did not know that fluoride is an essential nutrient for bone and teeth. However, 84.5 % of the parents agreed that fluoride makes teeth more resistant to caries while 77.3 % knew that fluoride can reverse cavities.

Table 5. Parents knowledge of fluoride (N=952)*.

Statement	Answer	No.	%
Fluoride can reverse small cavities	Agree	608	73.3
	Disagree	115	
	Do not know	106	
Fluoride makes teeth more resistant to caries	Agree	699	84.5
	Disagree	55	
	Do not know	73	
Fluoride cleans the teeth	Agree	657	6.7
	Disagree	91	
	Do not know	69	
Fluoride makes teeth whiter	Agree	570	
	Disagree	139	
	Do not know	114	
Fluoride is an essential nutrient for bone and teeth	Agree	270	
	Disagree	249	
	Do not know	306	

*The total number per characteristic is different from the total number (N=952) because some parents did not answer all the questions.

Discussion

This study was conducted to determine the effect of different parental factors (sex, age, level of education and socioeconomic status) on their dental knowledge of and attitude toward the prevention of dental caries in their children. The study sample was convenient as participants were selected from different socioeconomic levels. The non-random sample could be a limitation of the study. Chi-square tests showed no significant differences between the two sexes in their response to efforts to reduce dental caries. More than half of both fathers and mothers practiced tooth brushing, reduction of sugar consumption

and dental education as a means to reduce dental caries level but only about 12% knew that regular dental visits will also help reduce dental caries. Results showed that dental visits were not practiced by participants. A possible explanation for this is the role of dentists in practicing and/or explaining different preventive measures to their patients. It might be that parents were not made aware of the importance of regular dental visits by their dentists.

The non-significant difference in the response to the four different methods of reducing caries by all age groups appear to suggest that the age of the parents were not a factor in caries prevention in the children. This finding contradicts the earlier report of Kinnby *et al.*⁸ that age of parents was an important social background factor in pre-school children's dental health.

Furthermore, the results showed that the majority of parents who participated in this study practiced tooth brushing as a means of reducing dental caries in their children. Similarly, they carried out dental education to their children as a means for preventing dental caries. Response by the parents to the tooth brushing, sugar consumption reduction and dental visits showed significant differences according to their levels of education and supports earlier findings.^{8,9} There is ample evidence that the parents' behavior is influenced by the family income though only the tooth brushing behavior showed a statistically significant level in the comparisons between family incomes. This influence of income had also been reported earlier in other populations.⁹

It is interesting that, on parents' knowledge about the prevention of dental caries, there are no sex differences with both knowing very little about the use of fluoride in caries prevention (male 5% and female 3.9%). There are similarities in knowledge by age, level of education as well as the income of the parents. However, high income group differs significantly from others by their knowledge of the reduction of sugar intake to prevent dental caries. It is possible that affluence and access to more refined carbohydrates increase correspondingly with the family income and enable the parents to know more about sugar reduction to prevent dental caries.⁹ This would support Tinanoff's suggestion¹⁰ that socio-demographic factors have an effect on caries risk with the children of higher social classes having lower caries levels.

More parents (82.1%) were aware of fluoride than of fissure sealants (56.5%). It was surprising that most parents knew the importance of the

ability of fluoride to reduce dental caries. This may be related to the fact that more than half of parents had intermediate, secondary or college education. It may also be due to contact with the dental profession by the attendance of their children and/or themselves at the dental clinics. However, there is limited knowledge on fluoride being an essential nutrient of bone and teeth.

When parents were asked about the effect of fluoride, a high number of participants thought fluoride cleans the teeth and 59.9% of them agreed that fluoride makes the teeth whiter. This means that parents knew that fluoride is good for the teeth but the mechanism of its effectiveness is not yet clear. This suggests one possible reason for the parent's lack of knowledge which may be due to the dentists' poor role in explaining the different preventive methods. It may also be due to incomplete information obtained from the media.

While there is less knowledge of fissure sealant than of fluoride, the same group of parents that recognized the effect of fissure sealant (39.4%) also recognized that fluoride and sealant could prevent caries in most teeth (39.8%). This knowledge of the parents is most encouraging and demonstrates a modest dental knowledge, attitude and behavior amongst the Saudi parents in Al-Ahsa region.

In a similar Danish study by Peterson,⁹ most parents (93%) believed that dental diseases are preventable by means of proper oral hygiene habits, restriction of sugar and sweets intake as well as the use of fluorides. In the present study, about 74% and 50% of Saudi parents respectively believed in tooth brushing and sugar restriction to prevent caries. The proportion of Saudi parents reporting dental visits and use of fluoride in prevention was much lower than that in the Danish parents. The high dental knowledge among the Danish parents was due to the information given by its Public Dental Health Service.⁹ It is interesting that in Kuwait, 74% of the mothers answered that dental caries is caused by sweets and candy while 49% ensured tooth brushing twice daily.⁶ These are reversed results to those of the present study on Saudi parents. Comparison may not be valid due to the difference in the questionnaires given to the parents in the two countries.

However, there are still many areas of limited knowledge or attitude in Saudi parents. Consequently, there is a great need for oral health education to parents as well as their children in the region surveyed. Perhaps, this great need should apply to the whole of Saudi Arabia as recommended in earlier studies.^{5,11}

Conclusions

The findings in this study permit the following conclusions:

1. Three out of four parents practice tooth brushing as a method to prevent dental caries.
2. Parents knowledge of and attitude to sugar intake reduction and dental education is a modest one.
3. Dental visits were not regarded as an effective method to reduce dental caries.
4. The four methods of caries prevention among parents showed no significant differences by age or sex.
5. Overall, dental knowledge and attitudes were significantly affected by the level of education and family income.

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Appendix

Biographic & Demographic Questions:

1. Gender: a) Male b) Female
2. Age (years): _____
3. Educational Level:
 - a) Illiterate b) Elementary
 - c) Intermediate d) High School
 - e) College
4. Income (SR): a) < 2000 b) 2001 - 4000
 c) 4001 - 6000 d) 6001- 1000
 e) > 10,000
5. Number of children: _____

Questions investigating the knowledge and attitude of parents toward the prevention of dental caries:

1. What are the things you do to prevent dental caries in your children?
 - a. Daily cleaning using tooth brush and tooth paste
 - b. Cut down sugar/ avoid sugar and sweets
 - c. Visit the dentist regularly
 - d. Educate the child about how to take care of his/her teeth
2. In your opinion, what is the best way to prevent dental caries?

- a. Daily cleaning using tooth brush and tooth paste
- b. Reduce sugar-containing food and drinks
- c. Regular visits to the dentist
- d. Using the fluoride
3. Did you hear about the fluoride?
 - a. Yes b. No
 If yes, please answer the following questions:
4. Fluoride can reverse small cavities?
 - a. Agree b. Disagree c. I do not know
5. Fluoride makes the teeth more resistant to dental caries?
 - a. Agree b. Disagree c. I do not know
6. Fluoride cleans the teeth?
 - a. Agree b. Disagree c. I do not know
7. Fluoride makes teeth whiter?
 - a. Agree b. Disagree c. I do not know
8. Fluoride is an essential nutrient for bone and teeth?
 - a. Agree b. Disagree c. I do not know
9. Did you hear about fissure sealant?
 - a. Yes b. No
 If yes, please answer the following questions:
10. Fissure sealants are effective for the prevention of dental caries.
 - a. Agree b. Disagree c. I do not know
11. Fissure sealant is most important for permanent teeth.
 - a. Agree b. Disagree c. I do not know
12. Fluoride and fissure sealant can prevent caries in most teeth.
 - a. Agree b. Disagree c. I do not know