

Dental health status and caries pattern of preschool children in Al-Kharj, Saudi Arabia

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ABSTRACT

Objective: The objective of this study was to assess dental caries and its relation to plaque, tooth brushing habit and past dental attendance, and to determine the caries pattern in primary dentition of preschool children.

Methods: One hundred and three, 5-year-old children, from preschool nurseries in Al-Kharj, Kingdom of Saudi Arabia were studied in 1994. The World Health Organization criteria was used to determine caries.

Results: Only 16.5% were caries free. The mean decayed missing filled teeth (dmft) was 7.1, and by excluding caries free children it was 8.5. The decay component of dmft was

predominant (82%). Almost 90% of the children had plaque present on their teeth and one-third never brushed their teeth while two-thirds had never been to a dentist. All children who never brushed their teeth had plaque and caries. Molars were the teeth, which were most frequently carious, and caries among all teeth was always bilateral.

Conclusion: There was high prevalence of untreated caries and high dental needs with concomitant poor dental health among these preschool children.

Saudi Med J 2003; Vol. 24 (12): 1347-1351

In a recent years, there has been a consistent and significant decrease in the prevalence of dental caries in many developed countries.¹⁻³ There has been a marked decline in caries experience in 5-year-old children over the last 2 decades in the United Kingdom.¹ However, caries experience has been increasing in developing countries.⁴⁻⁷ Wyne et al⁸ reported very high caries prevalence in preschool children in the Kingdom of Saudi Arabia (KSA). The available data indicates that the percentage of caries free children in Middle East ranges from 10-28% in 5-6-year-old children.^{4,7-14} The most common tooth with caries reported in children with nursing caries was maxillary central incisor.⁸ The role of tooth brushing in prevention of dental diseases has been well established and amongst dental diseases especially the risk of

periodontal diseases is increased by the presence of plaque and it has also been identified as an etiological factor for caries.¹⁵ Tooth brushing and its frequency is a positive behavior in attaining good oral and dental health.^{16,17} A number of studies have been carried out on the oral hygiene practices along with the plaque removal and the caries experience,¹⁸⁻²¹ but not much work has been carried out on the Saudi preschool children in this regard. Such information is considered important to correlate with future caries pattern, and then formulate appropriate preventive oral health programmers. Among primary dentition, some studies reported that molars were more prone to caries as compared to anterior teeth,^{13,22} while few studies suggested otherwise.^{8,11} Caries have been reported bilateral in primary dentition.^{8,22-24}

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Received 2nd April 2003. Accepted for publication in final form 24th August 2003.

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There is a scarcity of information on oral health status of preschool children in the Middle East especially in KSA.

The purpose of the present study was to assess the dental caries level and pattern, presence of plaque, oral hygiene habits and dental attendance pattern of 5-year-old preschool children in Al-Kharj, KSA.

Methods. Al-Kharj is a small military town 90 kms from Riyadh, KSA. One hundred and three 5-year-old children attending the 2 nurseries in Al-Kharj were examined; the majority of 5-year-old children in the town attend the nurseries. All the children were examined by the author, under standard conditions. The children were examined in a supine position in a dental chair, and the oral cavity was illuminated with a dental light. Presence of dental plaque as well as tooth-specific caries pattern was recorded, based on oral examination. Plaque level was assessed as present or absent on the buccal and lingual surfaces of all teeth. For caries assessment, the teeth were wiped clean and dried with gauze and compressed air prior to dental examination with a mirror and probe. The presence of caries was determined according to the World Health Organization (WHO) criteria.²⁵ No radiographs were taken. To check the reproducibility of the caries diagnosis, 10% of the children were re-examined by the examiner and intra-examiner reproducibility kappa statistic was 0.89 by kappa test. The data was entered into the computer and statistical package for social sciences was used for statistical analysis to compare tooth brushing frequency, plaque score and decayed missing filled teeth (dmft) and caries pattern, using χ^2 test at $p=0.05$ level for significance.

Results. Out of 103 children examined, 53 (51.5%) were male while 50 (48.5%) were female. No significant difference was found between the mean dmft scores of males (7.1; SD 6.1) and females (7.1; SD 5.2), therefore a combined data is presented. More than three-quarters (80.6%) had untreated caries. Only one-fifth (20.4%) of the children had some teeth filled, and one in 10 children (8.4%) had teeth missing due to caries. The mean dmft of the sample was 7.1 (SD 5.7). The decay component of the mean dmft score was predominant at 5.8 (SD 5.0) (Table 1). The mean dmft for caries present in children was 8.5 (SD 5.1) (Table 1). In these children, 96.5% had active decay, 24% had some teeth filled while 22% had teeth missing due to caries. Among the total sample, 17 (16.5%) had no clinical caries while one-third had a dmft of greater than 10. Only in one-tenth (10.7%) plaque was absent. Almost one-third had never brushed their teeth. The majority of the children (70.9%) had not had a dental visit (Table 2). All children who visited dentist had caries and three-quarters who never visited dentist had caries. All children who never brushed their teeth had plaque ($p=0.005$) and caries ($p=0.004$). Children who

visited the dentist were more regular in brushing compared to non-attendees ($p=0.5$). Gender in relation to plaque, brushing and visit to the dentist was not statistically significant. The most commonly affected teeth with caries were mandibular first (61.2%) and second molars (60%) and least affected were mandibular lateral incisors (7.7%) (Table 3). Decay was the main component among dmft of the individual teeth (Table 4). When dmft of upper incisors with lower incisors, upper and lower incisors with upper and lower molars, lower incisors with lower molars, were compared, it was highly statistically significant (Table 5). Caries was found bilateral in all the teeth (Table 3).

Discussion. In the present study very few children (16.5%) were caries free. The percentage of caries free children is low compared to developed countries such as the UK¹ but is not much different from other Middle Eastern countries such as Kuwait, Syria, Jordan, and Abu Dhabi.^{4,7,9,10} The mean dmft of 7.1 in this study is quite similar to a recent report from Riyadh, KSA (dmft 6.9) in preschool children.⁸ The decayed component is the major part of dmft. No radiographs were used in the present study. Hence, there may be undiagnosed caries and actual caries experience of these children may be higher than these values. This indicates a higher treatment need in these children. Despite free availability of dental care in KSA and considerable governmental expenditure on the dental services, a high dmft and decayed component persist. This may be an indication of poor interest in dental care by the parents and behavioral studies are required to find out the reasons for lack of interest on part of the parents. Dental health education programs should be developed to target new and prospective Saudi mothers, and they should be approached at the Well Baby Clinics and maternity clinics to reinforce the importance of dental health of their children.

High sugar intake has frequently been reported in relation to their cariogenic effect.^{26,27} Frequent consumption of these foods in childhood seems to be common in the Arab world.^{9,28} Parents should restrict their children's intake of sweets and help their children to brush their teeth. A report showed that very young children take cariogenic snacks twice a day in Riyadh, KSA, with more than 40% of the children not brushing their teeth. Easy access and frequent exposure to these foods and drinks and lack of oral hygiene probably explain the high caries experience of Saudi children.²⁹ One-third of the children never brushed their teeth, and all children who never brushed their teeth had caries and plaque present. Role of caries, plaque and tooth brushing is well established.¹⁵

Barriers to dental care services should be lowered, and kindergarten based oral health promotion and prevention programs should be planned in Al-Kharj. Approximately three-quarters of the children in this

Table 1 - Decayed missing filled teeth (dmft) score of the preschool children.

Sample	Mean d (SD ±)	Mean m (SD ±)	Mean f (SD ±)	Mean dmft (SD ±)
All children (103)	5.8 (5.0)	0.5 (1.6)	0.8 (1.9)	7.1 (5.7)
Excluding caries free (86)	6.9 (4.7)	0.6 (1.8)	1.0 (2.1)	8.5 (5.1)

Table 3 - Caries prevalence with tooth location in the primary dentition.

Tooth	Maxillary		Total (%)	Mandibular		Total (%)
	R (%)	L (%)		R (%)	L (%)	
Central incisor	54.4	54.4	54.4	13.6	13.6	13.6
Lateral incisor	34	38.8	36.4	8.7	6.8	7.7
Canine	10.7	11.7	11.2	12.6	12.6	12.6
First molar	55.3	51.5	53.4	61.2	61.2	61.2
Second molar	48.5	47.6	48	61.2	59.2	60.2

Table 2 - Dental health status of the children.

Condition	n (%)
Caries	
Present	86 (83.5)
Absent	17 (16.5)
Plaque	
Present	92 (89.3)
Absent	11 (10.7)
Bushing habit	
Twice -a-day	21 (20.4)
Once-a-day	49 (47.6)
Never	33 (32)
Visit to a dentist	
Yes	30 (29.1)
No	73 (70.9)

Table 4 - Decayed missing filled teeth and the location of the teeth.

Teeth	d	m	f	dmft
Upper centralincisors	0.8	0.1	0.2	1.1
Upper lateral incisors	0.5	0.1	0.1	0.7
Upper canines	0.2	0.0	0.0	0.2
Upper first molars	0.9	0.1	0.1	1.1
Upper second molar	0.8	0.1	0.0	0.9
Lower central incisors	0.2	0.0	0.0	0.2
Lower lateral incisors	0.1	0.0	0.0	0.1
Lower canines	0.2	0.0	0.0	0.2
Lower first molars	0.9	0.2	0.1	1.2
lower second molar	0.9	0.2	0.0	1.1

Table 5 - Comparison of decayed, missing, filled teeth among groups of teeth.

Dmft score	p value
Upper incisors 1.8 (SD=1.7) versus Lower incisors 0.4 (SD=1.0)	0.0001
Upper and lower incisors 2.2 (SD=0.2) versus Upper and lower molars 4.5 (SD=0.3)	0.001
Upper molars 2.0 (SD=0.2) versus Lower molars 2.4 (SD=0.2)	0.1
Upper incisors 1.8 (SD=1.7) versus Upper molars 2.0 (SD=1.7)	0.7
Lower incisors 0.4 (SD=1.0) versus Lower molars 2.4 (SD=1.7)	0.000
Upper canines 0.2 (SD=0.6) versus Lower canines 0.3 (SD=0.6)	0.9

study were never visited dentist had caries. The profession agrees that regular attendance is conducive to good oral health.³⁰ Such a large number of children not attending a dentist and with very high caries prevalence is alarming.

In the present study, mandibular molars had a high prevalence of caries, which is similar to other studies in KSA,^{11,22} while another study showed caries prevalence in maxillary incisors but the sample was taken from children with nursing caries only.⁸ Caries in all the teeth were bilateral which is in accordance of the results of other studies.^{8,22-24} Hence, during dental examination of the children, if the caries have been diagnosed in a tooth on one side of the arch, one must look at the same tooth on the other side of the arch for caries. A high prevalence of caries in the primary molars point out to the risk of caries in the first permanent molars as it erupts. Hence, regular monitoring of the newly erupted first permanent molars and prevention and early intervention should be carried out.

Late start of tooth brushing and first dental visit, and high cariogenic diet, poor oral hygiene and high prevalence of caries among Saudi children have been frequently reported.³¹⁻³⁴ A high level of untreated caries, poor oral hygiene habits, high plaque presence and large number of children never visiting a dentist, in the present study, demands an urgent need for implementation of effective oral health promotion for the children in KSA. Attention has to be focused to preschool children. A dental health education program is required to target new and prospective Saudi parents. Parents should be advised to bring their children for early dental check ups, restrict the intake of sweets and maintain good oral hygiene of their children. Mothers could be approached at the Well Baby clinics, maternity clinics and primary health centers to reinforce the importance of dental health of their children.

In conclusion, this study shows that a very small proportion of children are caries free and majority of children had untreated decay. Large numbers of children do not brush their teeth. Majority of children never visited dentist and had caries, and all children who visited dentist had caries. Therefore, there is unmet need of dental treatment in both groups of attendees and non-attendees. Hence, they have high dental needs with concomitant poor dental behaviors.

Acknowledgment. The author wishes to thank Dr. Nazir Khan for his help in statistical analysis, Dr. Hashim Nainar for reviewing this article and Dr. Sami Al-Saeed for the Arabic translation.

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