Original Article

Indian Journal of Dental Education
Volume 10 Number 2, April - June 2017
DOI: https://dx.doi.org/10.21088/ijde.0974.6099.10217.1

Early Childhood Caries Prevalence in Sudanese Preschool Children

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Abstract

Introduction: Dental caries is one of the most important global oral health problems. The distribution and severity vary in different parts of the world. This study aimed to determine the caries prevalence among a sample of preschool children and to assess the relation between maternal variables (age, educational level, occupation and family size) and the dental caries status of their preschool children. *Subjects and Methods:* A cross-sectional pre-school based study for 419 preschool children aged 3-5 years old were selected randomly from 21 kindergartens in Khartoum North, Sudan. Data were collected through clinical examination and interviews. (dmft) were recorded according to WHO criteria. Face-to- face interviews mothers to determine maternal variables. *Results:* The majority (71.4 %) of the children examined had caries. The mean dmft± SD was 4.36 ± 4.40. A statistically significant association between dental caries status and child's age was found (P=0.00). No statistically significant correlations were observed between all maternal variables and the prevalence of dental caries of their preschool children. *Conclusion:* The prevalence of early childhood caries was high among preschool children in Khartoum North. School dental health programs; obligatory dental examinations and tooth brushing exercises should be implemented in kindergartens and schools to promote dental awareness and help in dental caries prevention.

Keywords: Early Childhood Caries; Preschool Children; Maternal Variables.

Introduction

Dental caries is one of the most important global oral health problems worldwide, particularly in developing countries [1].

Caries affecting preschool children known as early childhood caries (ECC) which is defined as" the presence of one or more decayed , missing (due to caries), or filled tooth surfaces in any primary tooth in a child less than 6 years old". ECC imposes significant threats to the physical, psychological and social well-being of young children as dental pain and subsequent tooth loss resulting in difficulty in eating, speaking, sleeping and socializing [2].

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Received on 17.05.2017, **Accepted on** 13.06.2017

The prevalence of ECC is especially high in many low-income and socially disadvantaged populations [3-7]. This is largely attributed to increasing consumption of sugars, inadequate exposure to fluorides and poor oral hygiene [4,5,8,9]. ECC varies greatly between different studies which may be due to several factors such as children studied; their age and the accessibility for examination; socio-economic status; ethnic and cultural factors and criteria used for diagnosis [8]. Number of studies had been carried out for the prevalence of dental caries in preschool children, the dmft showed wide variation among different populations ranging from 1.5 in Brazil up to 11 in Kosovo. [4,7-11]

There is a paucity of literature available regarding prevalence of dental caries among preschool children in Sudan. Raadal et al (1993) studied caries prevalence among 4-5 years old preschool children, the mean decayed, missed, filled teeth (dmft) was 1.68 [12]. To our knowledge, there is no study exploring the prevalence of ECC among preschool children. Therefore, this study aimed to assess the prevalence of ECC and related risk indicators in a sample of preschool Sudanese children.

Subjects and Methods

First an ethical clearance was obtained from the Research Committee, Faculty of dentistry, University of Khartoum and the head ministries of the selected kindergartens in order to conduct this study. A consent letter was sent to the parents of the selected children through the kindergarten's authorities. This was a descriptive, cross-sectional, pre-school based study on a sample of preschool children in Khartoum North locality, Khartoum state, Sudan. A Sample of 419 children was calculated based on the formula (1.96) 2 × pq × dmft/d2 taking p = 0.26 from previous study [13] with a relative error (d) of 6% and design effect.

Khartoum North locality was divided into four sectors. A list of all kindergartens was obtained from the Administration of Preschool Education at the State Ministry of Education/Khartoum North. A multi-stage cluster sampling technique was used to select 5 kindergartens randomly from each sector. A random cluster consisting of 21 children were chosen from selected kindergarten.

A request letter explaining the purposes of the study was sent to the mothers of the selected children through the kindergartens authorities. Mothers were asked to attend the kindergarten and direct interviewed questionnaires were completed by the main researcher.

Medically fit Sudanese pre-school children aged 3-5 years old were included in the study. Exclusion criteria were children in early mixed dentition and those whose mothers did not agree to participate or fail to attend the day for interview. Examination was carried out by the main investigator according to WHO 1997 criteria for caries detection in children [14]. The child was seated in supine position on an ordinary chair under day light in front of the examiner in the teacher's office. Examination was carried out using a plane dental mirror and probe, "dmft" (decayed, missing and filled teeth index were used.

Statistical Analysis

Data were collected, summarized, cleaned and coded. All statistical analyses were performed with the Statistical Package for Social Sciences (SPSS) program (version 20). Descriptive statistics; frequency distribution tables, graph, means and standard deviations were used. Chi square and median tests were used to study the association between dental health status and children's age and gender respectively. Chi square was applied for testing the statistical significance of different relationships between caries status of preschool children and maternal variables (age, educational level, occupation and number of children in the family). For all tests, a level of probability of $P \leq 0.05$ was considered significant.

Results

The majority 299 (71.4 %) of the children examined had caries, the mean dmft ± SD was 4.36 ± 4.40. A statistically significant association between dental caries status and child's age was found (P=0.00) Figure1.

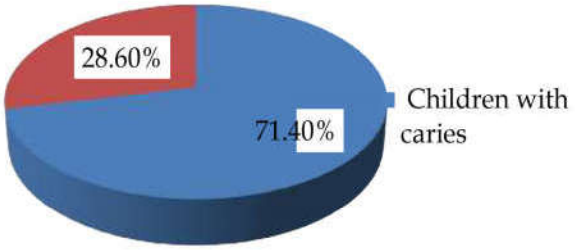

Fig. 1: Sample distribution according to caries prevalence

It was obvious that caries prevalence increased with age, the percentage of caries among 3, 4 and 5 years of age was 48.9%, 72.5% and 80.8% respectively Table1.

Table 1: The association between dental caries status and child's age

Age (years)	Caries						Dmft			
	Caries Free		With Caries		Total		Mean	Std. Deviation SD	P value	X^2
	N	%	N	%	N	%	$\bar{\chi}$			
3	45	51.1	43	48.9	88	100	1.72	2.58	0.00*	30.3
4	38	27.5	100	72.5	138	100	4.57	4.45		
5	37	19.2	156	80.8	193	100	5.40	4.55		
Total	120	28.6	299	71.4 4	419	100	4.36	4.40		

P≤ 0.05 highly significant association

Table 2: The association between dental caries status and gender

Age in years	Gender	Number	Mean dmft	Std. Deviation	T test	P-value
3	Boy	37	1.76	2.74	0.097	0.928
	Girl	51	1.71	2.48		
4	Boy	65	5.28	5.22	1.786	0.079
	Girl	73	3.93	3.56		
5	Boy	81	4.93	4.46	1.243	0.215
	Girl	112	5.75	4.60		
Total	Boy	183	4.41	4.65	0.222	0.827
	Girl	236	4.31	4.21		

No statistically significant difference

Table 3: Relationship between maternal variables and caries status of pre-school children

Maternal variables		Caries status		P-value	X^2
		Caries Free Count (%)	Caries Count (%)		
Mother's age	< 20 yrs	4 (1)	6 (1.4)		
	20-40 yrs	111 (26.5)	274 (65.4)	0.508	1.35
	>40 yrs	5 (1.2)	19 (4.5)		
Mother' education level	Illiterate	3 (0.7)	7 (1.7)		
	Less than High school	4 (1)	20 (4.8)		
	Competed high school	23 (5.5)	86 (20.5)		
	University	69 (16.5)	152 (36.3)		
	Above university	21 (5)	34 (8.1)	0.194	7.89
Mother's Occupation	Professional	15 (3.6)	29 (6,9)		
	intermediate	20(4.8)	30 (7.2)		
	Non-manual-mamanual skilled	17(4.1)	41 (9.8)		
	semi skilled	0 (0)	0 (0)		
	non skilled	0 (0)	0 (0)	0.163	5.124
	housewife	68 (16.2)	199 (47.5)		
Number of children in the family	One child	19 (4.5)	48 (11.5)		
	2 -5 children	98 (23.4)	244 (58.2)	0.994	0.012
	>5 children	3 (7)	7 (1.7)		

P $\geq$0.05 statistically insignificant

Concerning gender, no statistically significant difference in dmft was found between boys and girls Table 2.

No statistically significant correlations were observed between all maternal variables (age, educational level, occupation and number of children in the family) and the prevalence of dental caries of their preschool children (P < 0.05). It was noticed that most mothers of caries free children were between 20-40 years old, had university educational level, housewives and had 2-5 children Table 3.

Discussion

This was a cross sectional study, carried out to determine the caries prevalence among preschool children 3-5 years old in Khartoum North, Sudan, and to assess the relationship between maternal variables and dental caries status of the preschool children.

In the current study, the mean dmft ± SD was found 4.36 ± 4.40, only 28.6% of the examined children were caries free. The result recorded high caries level in comparison to previous Sudanese studies where dmft was 1.68 [12]. the dmft was recorded 3.1 and 3.95 among preschool children in Uganda [15] and China [4] respectively. However, dmft in Brazil and Trinidad, values among the same age group were 1.53 and 1.40 respectively [5,7]. In contrast, much higher dmft values 10.9 and 11 were found in UAE and Kosovo respectively [8,9].

Difference in the mean dmft among preschool children among different populations may be partially attributed to insufficient dental health knowledge and poor practices among mothers, specially on-demand prolonged bottle feeding, high sweet consumption, poor oral hygiene, lack of adequate fluoride and irregular dental visits.

Nevertheless, a socioeconomic and cultural background plays a major role in this issue [1].

The relationship between dental caries and maternal factors has been well documented in the literature[4,7,16]. The current study failed to demonstrate significant correlation between neither maternal age (p=0.508), educational level (p=0.194), occupation (p=0.163) nor family size (p=0.994) on the dental health status of their preschool children. Similarly, Naidu et al reported no significant associations between child's dental health status and the socio-demographic variables in Trindad [5]. In contrast, numerous studies reported that parent's educational level was critical factor which influence the children's dental health [15-19].

In the present study no significant correlation existed between mother's age, occupation and family size with dental caries status of preschool children. Similarly, the result obtained by Folayan et al reported no significant association between neither mother's age nor family sizes with the child's dental caries status [20]. Whereas, Casthilo AR et al in a systematic review concluded that parent's age, educational level and social class were important factors directly influence their children's dental health [21]. Hooley et al descript that lower parent's age and level parental occupation was associated with higher prevalence or severity of dental caries [16]. Adeniyi A et al found that maternal age, education were positively correlated with the child's caries and oral hygiene status [18].

In Norwegian and Chinese studies, increased number of siblings was significantly associated with ECC among preschool children [6, 22, 23]. The association between financial, social, and educational factors of mothers and dental caries had complex interactions; this may explain the diversity of results among different populations.

Conclusion

The majority of the participated children (71.2 %) had caries. The mean dmft ± SD was 4.36 ± 4.40. Dental caries was significantly associated with children's age (P=0.00). The data may be of meaning in planning future oral health prevention and treatment programmes intentionally preschool children.

Strengths and Limitations of the Study

This was the second published study in Sudan in concern to prevalence ECC among preschool children. Single investigator for interviews and clinical examination was involved in the current study to provide best possible consistency and reproducibility. All children included in the study were given a written referral to dental clinic University of Khartoum as needed. Using the WHO criteria of caries detection without bitewing radiographs may underestimate the actual prevalence of dental caries.

Recommendations

School dental health programs, obligatory dental examinations and tooth brushing exercises should be implemented in all kindergartens and schools to promote dental awareness and help in dental caries prevention. The results of this study can be viewed as preliminary findings. Further studies for more representative sample size and different areas in Sudan should be planned.

Conflict of Interest

We declare that there is no conflict of interest in this paper

Acknowledgement

The authors gratefully acknowledge all the children, mothers participated in the study and to all kindergartens authorities for their cooperation.

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