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Social and Behavioral Determinants of Early Childhood Caries in the Aseer Region of Saudi Arabia

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ABSTRACT

Introduction: Early childhood caries is a multi-factorial disease that involves the susceptible tooth and host, fermentable carbohydrates in the diet, cariogenic micro-organisms and time. The aim of this study was to analyze the influence of socio-behavioral variables on the prevalence of dental caries among children of 4-5 years old.

Method: A cross-sectional survey was performed on a sample of 422 children presented to selected five Primary Health Care Centre Aseer region of Saudi Arabia. The investigation was made using the decayed, missing, and filled teeth index (World Health Organization Methodology) and detection criteria for non-cavitated lesions. A tested, self-administered questionnaire was administered to parents to obtain information about their socio-behavioral characteristics.

Results: It was found that caries have been significantly more prevalent in children from families with employed mothers ($p = 0.00811$). The presence of dental caries was found to be associated with the absence of oral health educators, oral health improving programs and oral health campaigns ($p = 0.0012$). The associations between consuming soft drinks and the route of applying oral hygiene were statistically significant ($p = 0.00001$).

Conclusion: A high caries prevalence (77.73%) and a lack of caries treatment are revealed among Saudi pre-school children in the Aseer region in this study. The current study has identified risk factors for presence of ECC in pre-school children within a Saudi community. ECC risk can significantly be increased by living with occupied mother ($p = 0.00811$), consuming more sweets and chocolates ($p = 0.00001$), absence of oral health educators and oral health promotion programs ($p = 0.0012$). These factors could be modified through public health strategies, such as effective publicity concerning general dental health, practical health advice and develop effective strategies to promote awareness amongst Saudi community.

KEYWORDS

Social; Behavioral; Oral; ECC; Caries; Saudi; Children.

INTRODUCTION

Early childhood caries is a multi-factorial disease that involves the susceptible tooth and host, fermentable carbohydrates in the diet, cariogenic micro-organisms and time [1, 2]. Early childhood caries (ECC) has been defined as the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surface on any primary tooth in children up to 71 months of age. In recent decades, there have been considerable improvements in the oral health of pre-school goers in many developed countries [3]. However, dental caries still affect a considerable number of children. Recent studies have shown that dental caries have decreased in Latin America and the Caribbean [4]. In Brazil, there was a 17% decrease in dental caries from 2003 to 2010, and the decayed, missing, and filled teeth index (dmft index) for 5-year-old children decreased from 2.80 to 2.30 [5].

Researchers have attempted to expand the basic microbiological models for ECC development to include various social,

demographic and behavioral factors such as ethnicity, family income, maternal education level, family status, tooth brushing habits and parental knowledge and beliefs [6, 7]. Although the predictive power of the variables studied so far was inconsistent, the high disease experience within selected community groups reflects the importance of factors other than the presence of Mutants streptococci alone in contributing to ECC development. Other cross-sectional models demonstrate the complex interaction between socio-economic status (SES), ethnicity, immigrant status, infant feeding, fluoride exposure, oral hygiene and ECC presence in preschool children [8-17]. However, because most studies of ECC have been conducted among specific ethnic, immigrant and lower socio-economic communities, extrapolation of current risk assessment models to the general population is still problematic.

In Saudi Arabia, recent studies have shown the high prevalence of dental caries among pre-school children and adults. Most of the studies that have been conducted in Saudi Arabia have shown significant association between the high prevalence of early childhood caries and some social and behavioral factors [18-21]. Although these factors have shown significant association, there are still other non-investigated factors that have not been reported previously in Saudi child population. The purpose of this study, therefore, was to discover and investigate the association between selected social and behavioral variables and the presence of ECC in the 4-5 years old Saudi child population.

OBJECTIVE

The objective of this study was to analyze the influence of selected socio-behavioral variables on the prevalence of dental caries in the 4-5 years old pre-school children within Aseer region of Saudi Arabia

METHOD AND DESIGN

A cross-sectional study including young pre-school Saudi child population in Aseer region, a region located at South part of Saudi Arabia, aged between 4 to 5 years was conducted. For this purpose, information was obtained using prevalence (percentage with caries). In the present study, the participants were children aged between 4 to 5 years attended to dental clinics at selected five Primary Health Care Centers in Aseer region, Saudi Arabia with their parents or at least one of them throughout the period between March to May 2015. For this, a self-administered questionnaire to obtain information regarding selected social and behavioral variables was prepared. The questionnaire consisted of 24 items vary between Multiple Choices Questions (MCQs), Likert scale and short essay questions. Moreover, it is pretested on 30 randomly selected individuals attended at Alkhoush Primary Health Care Center, one of the previously selected centers. The investigators were the dentists working at the selected dental clinics after we assured that they were aware about WHO criteria for detecting caries by mean of interviews. The investigation was made using the decayed, missing, and filled teeth index (World Health Organization Methodology) and detection criteria for non-cavitated lesions. A tested, self-administered questionnaire was administered to one of the parents among all the participants to obtain information about their socio-behavioral characteristics. Then, the data were modelled using chi square test at the 5 per cent level of significance using SPSS software.

RESULTS

Of the 422 children examined, the prevalence of caries was seen in N = 328 (77.73%).The prevalence of caries in female children was higher i.e., 96% compared to those among male children, which was 68%.The difference in the prevalence of caries was statistically significant viz. X2 = 43.13 , df = 1, Pvalue = .00001 (see Table 1& Figure 1). Children aged between 24-36 months showed a higher caries prevalence of 89% (N = 124) and there was a statistically significant relation between age of children and the prevalence of dental caries viz. X2 = 15.32, df = 2, Pvalue = 0.000471 (see Table 2.1). With regard to occupation of mothers, more than 70% (N = 299) of children recorded with employed mothers and 29.14% with housewife, out of which 80.27% of the children with employed mothers had caries. There was a statistically significant relation between occupation of mothers and the prevalence of dental caries viz. X2 = 7.009, df = 1, Pvalue = 0.00811 (see Table 2.2)

Table 1: Distribution of Children According to Gender and Caries Experience

Gender	Caries Free to Population			Caries Affected to Population			Total Number of Participants According to Gender	
	Frequency	% To Same Gender	% To Final Sample	Frequency	% To Same Gender	% To Final Sample	Frequency	%
Male	88	32	20.85	187	68	44.31	275	65.17
Female	6	4	1,4	141	96	33.41	147	34.83
Total	94		22.27	328		77.73	422	100

X2 = 43.13, df = 1, Pvalue = .00001

Table 2: Knowledge in Regard of Dental Caries and Social Factors, and ECC Experience.

	Caries Free to Population		Caries Affected to Population		Total	X2	df	Pvalue
	Frequency	%	Frequency	%				
1. Age (months)								
24-36	14	11	113	89	127	15.32	2	0.000471
37-48	27	22.88	91	77.11	118			
49-60	53	30	124	70	177			
2. Mother Occupation								
Housewife	39	32	84	68	123	7.009	1	0.00811
Employed	59	19	240	81	299			
3.Favored Meals								
Sweets	23	8	269	92	292	113.5	1	0.00001
Salts	71	55	59	45	130			
4. Eating Sweets								
Everyday	16	7	211	93	227	125.1	2	0.00001
Once\twice Per Week	29	23	97	77	126			
No	49	71	20	29	69			
5. Oral hygiene								
Toothpaste and Brush	68	64	39	36	107	144.17	3	0.00001
Siwak	14	18	64	82	78			
Mixed	10	5	181	95	191			
Nothing	2	4	44	96	46			
6. Diary drinks								
Sweetened Tea and Coffee	2	17	10	83	12	159.76	2	0.00001
Soft Drinks	17	6	274	94	291			
Only Water	75	63	44	37	119			
7. Importance of dental treatment								
Very Important	11	19	46	81	57	36.11	2	0.00001
It Depends	27	12	191	88	218			
Not Important	56	38	91	62	147			
8. Is There Dentist At School Where Your Kid Study								
Yes	1	50	1	50	2	4.76	2	0.0926
No	31	29	76	71	107			
I don't know	62	20	251	80	313			
9. Did You Attended To Oral Health Lectures Or Campaigns At Your Village								
Yes	6	67	3	33	9	10.46	1	0.0012
No, there is not	88	21	325	79	413			

Of the sample, 69.2% (N = 292) favored sweets in meals and during day over salts, while 30.8% (N=130) and 53.79% had eaten chocolates everyday at least once. In addition, 92.12% of children, who favored sweets, had caries. There was a statistically significant correlation of dental caries prevalence with type of favored meals viz. X2 = 113.50, df = 1, Pvalue = 0.00001 and with eating sweets and chocolates X2 = 125.11, df = 2, Pvalue = 0.00001 (see Table 2.3 and Table 2.4)

According to data, only 25.36% of children (N = 107) brushed their teeth, 63.55% of them had no caries while 78 out of 422 children used Siwak to brush their teeth, 82.1% of them had

caries. The majority of children in this study (N = 191) recorded in "Mixed group", those who used both toothbrush and Siwak to brush teeth. It is found that 94.76% of children in "Mixed group" had caries. There was a statistically significant correlation between caries prevalence and the method to apply oral hygiene viz. X2 = 144.17, df = 3, Pvalue = 0.00001 (see Table 2.5). The majority of sample (N=291) 68.96% chose soft drinks, out of which 94.16% of them had caries. There was statistically significant relation between prevalence of dental caries and type of drinks viz. X2 = 159.76, df = 2, Pvalue = 0.00001 (see Table 2.7& Figure 2).

A total of 97.87% (N = 413) of the final sample recorded that there were not attended or invited to any lecture or campaigns in relate to oral health care, out of which 78.7% of them (N = 325) had caries. A statistically significant correlation was found between caries prevalence and attending to oral health care programs and participating in oral health care campaigns viz. X2 = 10.46, df = 1, Pvalue = 0.0012 (see Table 2.9). Although most of the final sample (N = 420) had no dentist at school or didn't know about it in this regard, there was no statistical significant correlation between dental caries prevalence and presence of dentist at school X2 = 4.76 , df = 2, Pvalue = 0.0926 (see Table 2.8) .

DISCUSSION

This study is very important since it is the first epidemiological study for ECC presence conducted within the Aseer region. The new findings in the present study can be utilized in the development of more effective strategies for oral health promotion and prevention of ECC within this community. As compared with the previous studies in Saudi Arabia, prevalence of ECC among the children aged between 4-5 years in the Aseer region was found to be lesser than some studies conducted at Riyadh, Tabuk and Alahsa and higher than some other studies conducted at Jeddah and Tabuk [21-28].

In this study, significant association was found between the sex of the child and ECC. The prevalence of ECC among female children (95.5%) was more than that of male children (68%), which is contrary to many studies conducted in Saudi Arabia and other parts of the world [29-35]. Significant association was also found between the age of the child and ECC. This finding counteracts with the findings by Alkarimi HA, Khristine Marie G. in Philippines, Seval Olmez in Turkey and Wendt L.K. in Sweden. It was shown that the lower age is associated with higher prevalence of ECC, whereas they found that higher age is associated with higher prevalence of ECC among the children [36-39].

Influence of family variables on the presence of ECC reported to be high in previous studies conducted in this regard [40-46]. In this study, children of employed mothers have shown higher prevalence of ECC than those living with housewife mothers. Hence, there is significant association between occupation of mother and the prevalence of ECC. The highly significant role of sweets, chocolates, and soft drinks in higher prevalence of ECC is evident from the findings of this study which are supportive to the findings by Ghanim, Jose B. in Kerala, Rosenblatt, Bankel and others. [47-54].

The notable issues like poor oral health services, absence of oral health educators at schools and villages, and loss of oral health campaigns have been shown to be major determinants of ECC in the present study. Findings such as method of cleaning teeth and frequency of eating sweets and chocolates have shown significant relationship in the current study.

CONCLUSION

A high caries prevalence (77.73%) and a lack of caries treatment are revealed among Saudi pre-school children in the Aseer region in this study.

The current study has identified risk factors for presence of ECC in pre-school children within a Saudi community. ECC risk can significantly be increased by living with occupied mother (p = 0.00811), consuming more sweets and chocolates (p = 0.00001), absence of oral health educators and oral health promotion programs (p = 0.0012).

These factors could be modified through public health strategies, such as effective publicity concerning general dental health and practical health advice. The oral health promotion and education programs should address these risk factors to fight ECC and develop effective strategies to promote awareness amongst Saudi community.

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