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Original Research Article

Dental caries and its associated factors among children aged 8-12 years in Libyan schools, Klang Valley, Malaysia

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Abstract

Background: Dental caries is a serious public health problem worldwide. Prevalence of dental caries among school children has increased in both developed and developing countries since the last few decades.

Objective: To determine the association of dental caries with socio demographic factors among Libyan school children aged 8-12 years in Klang Valley, Malaysia.

Methods: A cross-sectional study was conducted in three Libyan primary schools in Klang Valley, Malaysia. Five hundred and seventy children aged 8-12 years participated. They were randomly selected using proportional stratified sampling method. Dental caries was assessed using the WHO (1987) criteria.

Results: Response rate was 92.5%. The prevalence of dental caries was (55.8%), females have higher dental caries than males. Dental caries was found highly prevalent among; children their aged ≤10 years (64.7%), children whose father and mother have a job (58.5% and 58.7%) respectively, children whose father and mother have elementary level of education (69.6% and 61.0%) respectively. Chi square test showed significant association of dental caries with age group and father's education level. Logistic regression analysis identified young age (OR=11.78, 95% Cl: 2.305 -26.276) was significant predictor of dental caries among children.

Conclusions: Younger children are at higher risk of having dental caries in this study. Health education should be emphasized among younger Libyan school children.

Keywords: Dental Caries, primary school children, oral hygiene habits.

Introduction

Dental caries or tooth decay is a multi-factorial disease that commonly affects people of all ages throughout their lifetimes which – through interacting with food, dental plaque and microorganisms over a long period of time – leads to an irreversible destruction of the proper substance of the teeth, (Fejerskov, 2004). Dental caries is a very common and important dental public health problem and it is the most prevalent oral disease among children in the world (Featherstone, 2004). Caries is five times as common as asthma and seven times more common than hay fever thus, the most common chronic disease of childhood. Even in low caries risk populations, dental caries is still a very common childhood disease (Yabao et al., 2005).

In a number of developing countries dental caries prevalence has been affecting 60-90% of schoolchildren (Petersen, 2005). The prevalence of dental caries is of great interest for long and is a major subject of many epidemiological researches carried out in our country and abroad (Tobias, 2008). This disease not only causes damage to the teeth, but is also

responsible for several morbid conditions of the oral cavity and other systems of the body (Petersen et al., 2005). Many parents, from lack of awareness, tend to initiate their children's oral hygiene around the age of two years, and it is quite likely that by this age children first dental caries has appeared (Okada et al., 2002). Development of dental caries during the primary dentition frequently results into dental caries development in the permanent and mixed dentition as well. Those aged 8 to 12 years old are at the mixed dentition stage (Kassawara et al., 2010). Consequently, it is imperative to study this age group in order to develop necessary intervention and education in this area.

Materials and Method

Study design and study population

A cross-sectional study conducted in three Libyan schools in Klang Valley, Malaysia.

Study Instruments

Questionnaire

A self-constructed questionnaire was used, it was adopted from different sources like articles and research studies which were done on the same study design and the questionnaire was guided self-administrated. It has been prepared in the English language then was translated to Arabic language and translated back by experts who have experience in both Arabic and English language.

Oral examination

Oral examination was performed in the classrooms under daylight using dental mirrors, dental explorer and cotton rolls to control salivation during examination. The examination was done by the researcher and a trainer dentist; dental caries was conducted using the World Health Organization (WHO, 1987) diagnostic criteria for oral health survey.

Data analysis

All the data were analyzed by using (SPSS) Version 20.0. Descriptive analysis was used. Chi-square test and Fisher's exact test were used to determine the association between dental caries with socio-demographic factors, oral hygiene habits ($p > 0.05$). To determine the risk factors of dental caries, multivariate binary logistic regression analysis was done. In the final model of logistic regression, we included the variables from the first model of logistic regression analysis that had a p-value < 0.25 (Vallejos-Sanchez & Gutierrez, 1998). The results were being expressed as odds ratio (OR) with 95% (95% CI). P-value remained < 0.05 for the final model of logistic regression.

Results

Socio-demographic characteristics of students

As shown in Table 1, the mean and Standard Deviation (SD) of age among students was 9.91±1.414 years. The age is classified into two groups ≤10 years old were 348 students (61.1%) and >10 years old were 222 students (38.9%). There were 272 (47.7%) males and 298 (52.3%) females. The majority of students' fathers (83.5%) and mothers (54.2%) had high education level. However, mothers had higher percentage of elementary education (36.8%) than fathers (13.9%). Regarding parent's job status, high percentage of students' fathers had a job (91.1%) while the percentage of students' mothers who had a job was 59.6%. The prevalence of dental caries was 318 (55.8%).

Table 1: Socio-demographic characteristics of students (N=570)

Variables	Frequency	%
Age(9.91±1.414)		
≤10 years	348	61.1
>10 years	222	38.9
Gender		
Male	272	47.7
Female	298	52.3
Fathers Education level		
Primary	15	2.6
Elementary	79	13.9
High	476	83.5
Mothers Education level		
Primary	51	8.9
Elementary	210	36.8
High	309	54.2
Fathers job status		
Yes	519	91.1
No	51	8.9
Mothers job status		
Yes	340	59.6
No	230	40.4

As shown in Table 2, more than half of the children (55.8%) had dental caries. Therefore the students who were caries free were 252 (44.2%) of the sample size.

Association between socio-demographic characteristics with dental caries

Table 3 showed that, students who aged ≤10 years old had a high percentage of dental caries (64.7%) compared to students whom their age >10 years old (41.9%) and this indicates that the prevalence of dental caries increases with decreasing age of children.

Table 2: Dental caries distribution of respondents (N=570)

Dental caries status	Frequency =n	%
Dental caries present	318	55.8
Dental caries absent	252	44.2
Total	570	100

The association between dental caries and age groups was statistically significant (χ^2 = 28.474, p<0.001). However, Table 3 showed that, there was no significant association between gender and dental caries, (χ^2 = 0.400, p = 0.555). The descriptive analysis showed that males constitutes 54.4% and females' constitute 57.0% of dental caries; while males were 45.6% and female were 43.0 % of whom did not have dental caries. There was a significant association between fathers' education and dental caries (χ^2 = 7.373, p = 0.025). Dental caries by fathers' education level shown that the primary school level constitutes 60.0%, elementary school level was 69.6%, and high school level constitutes 53.4% of children who have dental caries. There was a significant association between dental caries and fathers' education level (χ^2 = 7.373, p=0.025). Whereas; there was no significant association between mothers education level and dental caries (χ^2 = 3.671, p=0.160). The descriptive analysis of dental caries by mothers' education shown that the primary school level constitutes (51.0%), elementary school level was (61.0%) and high school level constitutes (53.4%) of dental caries. Respondents whose fathers have a job have more percentage of dental caries (58.8%) than whose fathers do not have a job (55.5%) there was no a significant association between dental caries and fathers job status (χ^2 =0.209, p=0.661). In addition, the percentage of dental caries among students' whose mothers have a job (58.7%) was more than students' whose mothers do not have a job (53.8%). The result shows that, there was no significant association between dental caries and mothers' job status (χ^2 =1.320, p=0.265).

Table 3: Associations of dental caries with socio-demographic characteristics (N=570)

Socio-demographic characteristics	Dental caries		$\chi 2$	*df*	*p*-value
	Yes n(%)	No n(%)			
Age					
≤10 years	225 (64.7%)	123 (35.3%)	28.474	1	<0.001*[a]
>10 years	93 (41.9%)	129 (58.1%)			
Gender			0.400		
Male	148 (54.4%)	124 (45.6%)		1	0.555[a]
Female	170 (57.0%)	128 (43.0%)			
Fathers Education level					
Primary	9 (60.0%)	6 (40.0%)	7.373	2	0.025*
Elementary	55 (69.6%)	24 (30.4%)			
High	254 (53.4%)	222 (46.6%)			
Mothers Education level					
Primary	26 (51.0%)	25 (49.0%)	3.671	2	0.160
Elementary	128 (61.0%)	82 (39.0%)			
High	164 (53.1%)	145 (46.9%)			
Fathers job status					
Yes	288 (58.8%)	231 (41.2%)	0.209	1	0.661[a]
No	30 (55.5%)	21 (44.5%)			
Mothers job status					
Yes	135 (58.7%)	95(41.3 %)	1.320	1	0.265[a]
No	183 (53.8%)	157(46.2 %)			

*Level of significant at p<0.05, (a) Fisher's Exact Test Values.

Risk factors of dental caries

In multivariate analysis, logistic regression was performed to assess the impact of a number of factors with regards to dental caries. The full model containing all predictors was statistically significant, (p<0.01), indicating that the model was able to distinguish between respondents who were having or not having dental caries. As shown in Table 4, level of significance set at p-value <0.25. Therefore, the second step Logistic regression was performed based on the first step and set p-value at 0.25 to avoid missing potentially important variables, which could be a risk factor for dental caries. Gender was also included as it is a known confounder. The full model containing all predictors was statistically significant p <0.05. As shown in Table 5, age groups with the odd ratios of (OR=11.78), indicating that respondents who are in the age group of 10 years or less were about 11.78 times more likely to have dental caries compared with those of age group (more than 10 years).

Table 4: Risk factors of dental caries

Variables	B	S.E.	Sig.	Odds Ratio	95% C.I for EXP(B)	
					Lower	Upper
Age group						
≤10 years	2.651	0.883	0.003*	14.162	2.511	29.872
>10 years				Ref		
Gender						
Male	0.303	0.681	0.654	1.354	0.356	5.140
Female				Ref		
Father's job status						
No	-1.608	1.434	0.262	0.200	0.012	3.326
Yes				Ref		
Mother's job status						
No	-0.239	0.754	0.751	0.787	0.180	3.453
Yes				Ref		
Father's education level			0.521			
Primary	-1.784	7.437	0.810	0.168	0.000	7.321
Elementary	-0.700	7.435	0.925	0.496	0.000	8.454
High				Ref		
Mother's education level			0.509			
Primary	1.219	1.284	0.342	3.384	0.273	41.873
Elementary	0.355	1.337	0.790	1.427	0.104	19.591
High				Ref		

Cox and Snell R^2 =0 .709; Nagelkerke R^2 =0 .950; Ref= Reference group; *Level of significance at p < 0.25

Table 5: Predictors of dental caries

Variables	B	S.E.	Sig.	Adjusted Odds Ratio	95% C.I. for EXP(B)	
					Lower	Upper
Age group						
≤10 years	2.467	0.833	0.003*	11.786	2.305	26.276
>10 years				Ref		
Gender						
Male	0.347	0.668	0.604	1.707	0.191	2.619
Female				Ref		

Ref= Reference group; Adjusted for gender.*Level of significant at P<0.05

Discussion

The present study revealed that about 318 (55.8%) out 570 of Libyan school children were having dental caries whereas 44.2% of respondents did not have dental caries. The prevalence of dental caries was similar to the previous studies in Libya which reported that the prevalence of dental caries among school children aged 10-13 year was 56.9% (Baccush & Nayak, 1991) and 57.8% (Huew, 2010). Comparing the prevalence of dental caries in this study with previous studies conducted in different countries, the prevalence in the present study was lower than that found in the Philippines among schoolchildren the prevalence of dental caries was (74.9%) (Yabao et al., 2005), also study conducted by AlDosari et al., (2004) among 12-13 year-old school children in Saudi Arabia the percentages of dental caries were 92.3% and 87.9%, respectively . Similarly, it was lower than the study done by Auad et al (2009) among schoolchildren in Brazil the prevalence was 78% and in Saudi Arabia study was done by Amin & Al- Abad (2008) among primary school children, the prevalence of dental caries was 68.9%. Contrarily, the prevalence of dental caries in the present study was higher than in, Iran (36.2%) (Momeni et al., 2006), Tunisia (48.3%) (Abid, 2004), India (10%) (Bradley & Wendell, 2009).

Based on this study, the prevalence of dental caries was decreased with increasing age; it decreased from (64.7%) at age 10 years and less reaching (41.9%) at age above 10 years. This result was consistent with other studies were done by Elfaki et al., (2014) found that the prevalence of dental caries was (20.31%) higher among 10-11 years than (13.02%) among 12-13 years. Furthermore study conducted in India, which was found dental caries decrease with increase age (Sohi et al., 2012). This reason suggested behind the decreased prevalence of dental caries with an increased age group is due to increase in level of manual dexterity of the children, improving the oral hygiene also increased awareness about oral health (Grewal et al., 2009). Unlike Sahito et al.,(2015) who found that the prevalence of dental caries was 60% in the age group 8- 10 years and 80% in the age group 11-12 years and similar with the study was done by Baccush & Nayak (1991) among Libyan school children the percentages of dental caries were (53.7%, 55.7%, 56.7%, 66.6%) respectively for ages (10,11,12,13).

The prevalence of dental caries in this study was higher among females than males (57.0% and 54.4%) respectively. This is similar to the results reported by other studies, females' having been found a higher percentages of dental caries than males (Kiwanuka et al., 2006; Auad et al., 2009 and Huew, 2010). This result could be explained by the commonly fact, there is a trend towards earlier eruption of permanent teeth in females than males and they are exposed to risk factors for dental caries for a longer period of time than in males. However, a study in India found no difference between males and females in a study of 12 year-olds (Bradley & Wendell, 2009). In contrast, males were found to have a higher prevalence of dental caries than females in Libya (Al-Sharbati et al., 2000), and Tunisia (Abid, 2004), nevertheless these gender differences were not statistically significant. In the present study, there was no significant association between gender and dental caries ($\chi^2 = 0.400$, $p = 0.555$). The different background of children could explain the difference between the present study with others which found there was a significant association between gender and dental caries. The children in the current study have come to Malaysia with their parents for various purposes whereas in the other studies they were in their homeland or region.

In the present study, the percentage of dental caries increased with the increasing of mothers' educational level up to elementary school level, then decreased at higher levels. There was a significant association between dental caries and fathers level of education (p=0.025) whereas, there was not a significant association between dental caries and mothers level of education (p=0.160). The reason for this could be explained by the fact, parents with a high level of education observe and control the dietary habits of their children despite the fact that wealthy families who parents' had a high level of education might afford costly sugar products. This results agreement with previous study was done in Libya by Baccush & Nayak (1991) among Libyan school children, children whose mothers had a high level of education had a lower dental caries than those children with mothers of low level of education. In addition, similar study done by Hashim et al (2006) found that children of mothers with low level of education had high dental caries than children of mothers with high level of education. The reason for this result could be explained by those parents with a high level of education detect and organize the dietary habits of their children, even though the fact that rich families whose parents had a high level of education could afford pricey sugar products. This result recommends influence parents' level of education on dental health of their children.

The present study showed that there was no significant association between dental caries and parents job status (p =0.661) and (p =0.265) for fathers and mothers respectively. Children whose mothers and fathers had a job had higher rates of dental caries than children whose parents did not have a job. This result could be explained by the fact that parents who had a job spend more time away from home and their children, which might be influencing the increased frequency of consumption sugary food and soft drinks (Mangueira et al., 2009). People who have a job with income have better socio-economic status and may spend more on sweet food. This finding is similar to the trend observed in other developing countries where dental caries prevalence was observed to increase with increasing socio-economic status (Addo et al., 1991; Cleaton et al., 1994). This also might be explained by the fact that wealthy families who parents had a job might afford costly sugar products.

Conclusion

In conclusion, prevalence of dental caries among Libyan school children is high. Younger children were identified as a significant risk factor of dental caries among Libyan school children in Malaysia. Health education on good oral hygiene habits should be emphasized among younger Libyan school children.

Ethical Considerations

This study was held after considering some ethical issues that was set by Faculty of Medicine and Health Science, University Putra Malaysia. Approval letter was obtained from the headmaster of the schools. Obtained the consent from parents in order for their children to be the respondents for this study, confidentiality was assured to the parents. Approval letter was obtained from (JKEUPM), the Ethics Committee for Research Involving Human Subjects Universiti Putra Malaysia prior to embarking on this study.

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