Education

Parental awareness and attitude about oral health habits of their children and its relation to caries experience in 8–10-year-old children

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Abstract

Aims: To assess level of parental awareness and attitude about dental health habits of their children, presence of permanent first molars (PFMs) and its association with caries experience.

Methods and materials: A cross sectional observational study with dental examination was conducted. A random sample of 372 Libyan schoolchildren aged 8-10 years old in primary schools in Benghazi was collected. Information about parents' awareness of presence of PFMs and dental health habits of their children was collected through questionnaire completed by parents. Caries was assessed using DMFT index and WHO criteria. Data were entered into SPSS software version 25. Chi- square test, Cochran's test, sign test and logistic regression model were used for statistical analysis.

Results: Only 29% of parents were aware of eruption time of PFMs and 53.8% were aware that this tooth is not going to be changed. There were significance associations between fathers' educational level and their knowledge about the dental health habits for their children and DMFT of PFMs ($P<0.05$). The association between DMFT index and frequency of dental visit was significant ($P<0.05$). About 27.7% of sample who consumed sugary foods once a day, mean DMFT was (0.77, SD±1.190), and 37.6% who consumed sugary foods twice a day DMFT was (1.04, SD±1.294). Highest percent of decayed teeth was in the permanent lower left molars.

Conclusions: Low level of awareness of parents towards dental health habits for their children and high DMFT. Early parental education to raise their awareness about importance of PFMs must continue to avoid further distraction of dental health.

Keywords: children, parents' awareness, PFMs, caries experience

Introduction

Oral health is a fundamental part of general health. It causes tooth pain, discomfort, eating problems, loss of tooth, and delay language development and embarrassment. Parents' educational and cultural models have a significant impact on their children's oral health behaviors [1]. Parents' awareness has very essential part in oral and dental health of children. It is necessary for parents to recognize that they are role models for their children. Parents' education should ideally take place alongside with the children, this way; parents may learn how to improve their own oral hygiene while also helping the child with daily oral hygiene and develop a healthy oral health behavior [2]. According to a survey released by the American Department of Health, tooth decay is the most common chronic condition among children which has been impacting the people all across the world and has caused several complications and expenses [3]. Tooth decay is a complex infectious disease that involves the presence of a host, nutritional culture, and bacteria that create acid. The plaque in the mouth feeds the bacteria from substrates such as fermented carbohydrates and produces acid causing dental caries [4]. The frequency of dental caries between the various teeth differs considerably. The anatomical forms, the eruption time, and positioning of the tooth within the oral cavity give inherited disadvantages or preferences to the different strategies utilized in the control of plaque and thus dental caries and tooth loss. Permanent first molars (PFMs) are vulnerable to dental caries due to their morphology, time of their eruption with primary teeth and misidentifying them from the primary teeth. Parental knowledge about the presence of PFMs and these teeth will not be replaced could be the main cause for dental caries prevention. A special care is given to the dental caries of PFMs, because of its important role in establishing the good functionality of the dental-maxillary anatomy [5]. A study conducted in Nigeria appeared that the PFMs accounted for 42% of all extractions due to caries which is the highest when compared to other teeth [6]. The first teeth that erupt posterior to the primary teeth are the PFMs. The morphological occlusal forms as well as the strong big roots make PFMs the foremost critical teeth in the occlusion. These teeth maintain the vertical dimension of the face. Due to the easy eruption of PFMs without any deciduous tooth loss, parents usually assume that they are primary teeth [7]. Certainly in countries that have connected national programs of caries prevention, still the occlusal surface of the permanent first molars is the first to be affected with caries shortly after the eruption of tooth. The studies have shown that most parents/guardians have a small data about the permanent first molars and susceptibility of this tooth to caries. They frequently refer their children to dental specialist when there are acute pains of primary teeth or permanent first molars. In these cases, it is probably that the dental crown of the permanent first molar has been already damaged by dental

caries [8]. Agreeing to Chhabra (2012) [9] parental information and knowledge around dental health and hygiene habits has a critical effect on their children's oral hygiene. Okada *et al*., (2002) [10] proposed that standard dental check-up leads to helpful information and behavior of parents toward oral hygiene which will affect their children's oral health. Furthermore, knowledge and dental health information of the parents may have improved the oral health habits and behaviors of the children. The goals of the WHO in 2020 are to emphasize the important role of dental health research among children to assess their dental health status at least every five years [11,12]. A little data is available in Benghazi assessing the level of parental awareness and knowledge about the dental health habits of their children, about the existence of PFMs and its associations to caries experience in Libyan children. Therefore, the aims of this study were to evaluate the awareness and knowledge levels of parents of 8 to 10 years old children in Benghazi city about the oral health habits of their children, the presence of (PFMs), is this tooth going to be changed and to assess its association to DMFT index.

Methodology

Ethic approval and permissions to conduct the study were secured from both the research ethical committee of Benghazi University and the Ministry of Education. Permissions and signed informed consent forms were also obtained from schools, and the parents. In this analytic cross-sectional study, a stratified random sampling method was used. A total of 372 Libyan schoolchildren between 8 to 10 years old were selected from a population of 32,123 who were enrolled at 102 public primary schools in the city of Benghazi. The sample size was calculated at 5.5% margin of error, a 95% confidence interval (CI), and an estimated concordance of 50%. The minimal sample size to satisfy those parameters was estimated at 314 schoolchildren but the sample was increased by 40% to compensate for estimated lower participation, giving a required total of 440 participants. Benghazi city is divided into 4 educational offices; Center of Benghazi (20 schools with 5439 students aged 8-10 years old), Alsalawi (15 schools with 5773 students aged 8-10 years old), Sedi Khalifa (7 schools with 2387 students aged 8-10 years old), and Alberka (60 schools with 18524 students aged 8-10 years old). Of the sample 17% was from three schools from the center of Benghazi, 18% from three schools in Alsalawi, 7% from one school in Sedi khalifa, and 58% from 9 schools in Alberka. Schools were randomly selected in each educational office of Benghazi city and equal numbers of boys and girls in each class with target age groups were selected randomly. The inclusion criteria were children with signed informed consent forms from the parents and did not have any systemic disease or dental anomalies. The examination was done in March and April 2019 by three experienced and calibrated dentists. The DMFT index of the PFMs was recorded according to the World Health Organization diagnostic criteria [13]. To ensure the reproducibility of the application of diagnostic criteria and to provide data for intra examiner reproducibility, 20 subjects were randomly re-examined. The results of the dental examination were analyzed for reproducibility by Cohen's Kappa [13]. Clinical dental examinations of the participant subjects were done in the schools using a blunt-ended dental explorer, dental mirror, and flashlight in a private room at each school, the diagnostic kit used for each child is disposable and the examiner used disposable masks and gloves to reduce the risk of cross-infection. Caries was assessed using DMFT index of PFMs, decayed (DT), missing (MT), filled teeth (FT) and WHO criteria. By using appropriate questionnaire, it has become possible to get valid and reliable information about the knowledge and attitude of the parents on the dental health habits of their children. The questionnaires were filled out by the parents after explain the importance of the questionnaire to children's future dental health and after obtaining their informed consent. The questionnaires were distributed to the parents and they were asked to fill them about their awareness regarding the presence of PFMs and if they are going to be replaced**,** frequency of sugar intakes, frequency of tooth brushing, frequency of dental visits to the dentists, and about if their children were receiving oral hygiene advice. Also, the parents were asked about their level of education. The children who needed dental care were referred to the Primary Health Clinic and those who had sound molars were also referred for fissure sealants and fluoride applications. Oral hygiene instructions were acknowledged to all the students. The data were analyzed using the Statistical Program for Social Sciences-SPSS version 25 through frequency and percent, graph Bar chart, Chi-squared test, and Cochran test. The data dose did not follow the normal distribution, and the test was used non parameter. Cohen's Kappa was used to measure the level of intra-examiner agreement and the reproducibility of the application of diagnostic criteria for dental caries [13].

Results

From those children providing written consents, 372 Libyan schoolchildren were randomly selected and included in the study. Out of the total 372 children participating in this study, 198 (53.2%) were male and 174 (46.8%) were female. The majority of the participant children in the study sample were 10 years old 136 (36.60 %), and then who aged 9 years old 123 (33.1%) and aged 8 years old 113 (30.4%). The levels of intra-examiner agreements in the assessment of dental caries (using repeat examinations on 20 children) as measured by Cohen's Kappa [13] statistics were ranging from 0.82 to 1.00. This indicated a good level of agreement. There was no significant association between gender and the mean DMFT in the study population (P=0.260). Based on DMFT index, 78.76% of PFMs was sound, 19.02% was decayed, 0.74% was missed and 1.48% was filled. As table 1 demonstrates, that in the 8 years old children, 76.8% of PFMs was sound, 21.5% was decayed and only 1.3% was filled and 0.4% was missed. While in the 9 years old children 84.6% of PFMs was sound, 14.8% was decayed and only 0.6% was filled and none was extracted. In the 10 years old children 75.2% of PFMs was sound, 20.8% was decayed and only 2.4% was filled and 1.7% was missing. As table 2 shows, the association between DMFT of PFMs and visiting a dentist, about 49.2% of the children who had no

dental visit showed mean DMFT of PFMs was (0.77, SD±1.193), who had visited the dentist less than once a year the mean DMFT (1.31, SD±1.395). Where, the children who had visited the dentist once or twice a year, the mean DMFT was (0.81, SD±1.184). The association between DMFT and the number of dental visit (P=0.042) was significant (P<0.05).

About 27.7% of the total sample who consumed sugary foods once a day, the mean DMFT of PFMs was (0.77, SD±1.190), and 37.6% who consumed sugary foods twice a day the mean DMFT was (1.04, SD±1.294), while 17.2 % once a week the mean DMFT was (0.69, SD±1.180). Finally, 17.5% of the sample who consumed sugary foods two to three times a week the mean DMFT was (0.72, SD±1.139). The association between DMFT and the frequency of sugar intake was not significant (P>0.05). Of the sample, 33.6% of the children who brushed their teeth once a day the mean DMFT was (0.81, SD±1.189), while 24.5% of the children who reported tooth brushing two to three times a day the mean DMFT was (0.84, SD±1.302), and about 14.5% of the children reported tooth brushing once a week the mean DMFT was (0.94, SD±1.204). Up to 27.4% of the sample who reported brushing their teeth rarely or irregularly showed DMFT (0.85, SD±1.222). The association between DMFT and frequency of tooth brushing was not significant (P>0.05) as shown in table 2. Of the total sample, 43.3% of the children received advice from their dentist about oral hygiene. Up to 89.5% of parents advised their children to brush their teeth after eating sugary food or drinks as shown in table 2.

The highest percent of decayed teeth in PFMs was in the lower left molars (22.6%) and the lowest was the upper right molars (15.6%) as shown in figure 1. While the lower right molars showed the highest percent of missing teeth (1.3%) and the lower-left molars showed the lowest percentage of missing teeth (0.3%) and the highest percentage of filled teeth (3.0%) as shown in figure 1. As table 3 shows, that only 29.0% of parents were aware of the timing of the eruption of PFMs and 53.8% were aware that this tooth is not going to be changed. Parental knowledge about the timing of PFM eruption had a non-significant correlation with the mother and father's level of education. With regard to level of parental education, there were significance associations between fathers' educational level and their knowledge about the right answer regarding are these teeth going to be changed or not and the mean DMFT of PFMs (P<0.05) as shown in table 4.

Table 1: Distribution of sound, decayed, missed and filled teeth by age

Age		N	%
8 year	S	347	76.8%
	D	97	21.5%
	M	2	0.4%
	F	6	1.3%
9 year	S	416	84.6%
	D	73	14.8%
	M	0	0.0%
	F	3	0.6%
10 year	S	409	75.2%
	D	113	20.8%
	M	9	1.7%
	F	13	2.4%

Table 2: Association between DMFT, frequency of dental visit, frequency of sugar food intakes, frequency of tooth brushing and oral hygiene advice from dentist or parents

variables		Dental visit			Sugar food intakes				Tooth brushing				Did your child received advice from his dentist about oral hygiene		Do you advice your child to brush his teeth after consuming sugary foods	
		no dental visit	<1/y	1-2/y	1/d	2/d	1/W	2-3/W	1/d	2-3/d	1/W	rarely	Yes	No	Yes	No
DMFT	Mean	0.77	1.31	0.81	0.77	1.04	0.69	0.72	0.81	0.84	0.94	0.85	0.99	0.73	0.86	0.74
	SD	1.193	1.395	1.184	1.19	1.294	1.18	1.139	1.189	1.302	1.204	1.222	1.287	1.165	1.252	0.966
p value		0.042			0.336				0.067				0.251		0.194	

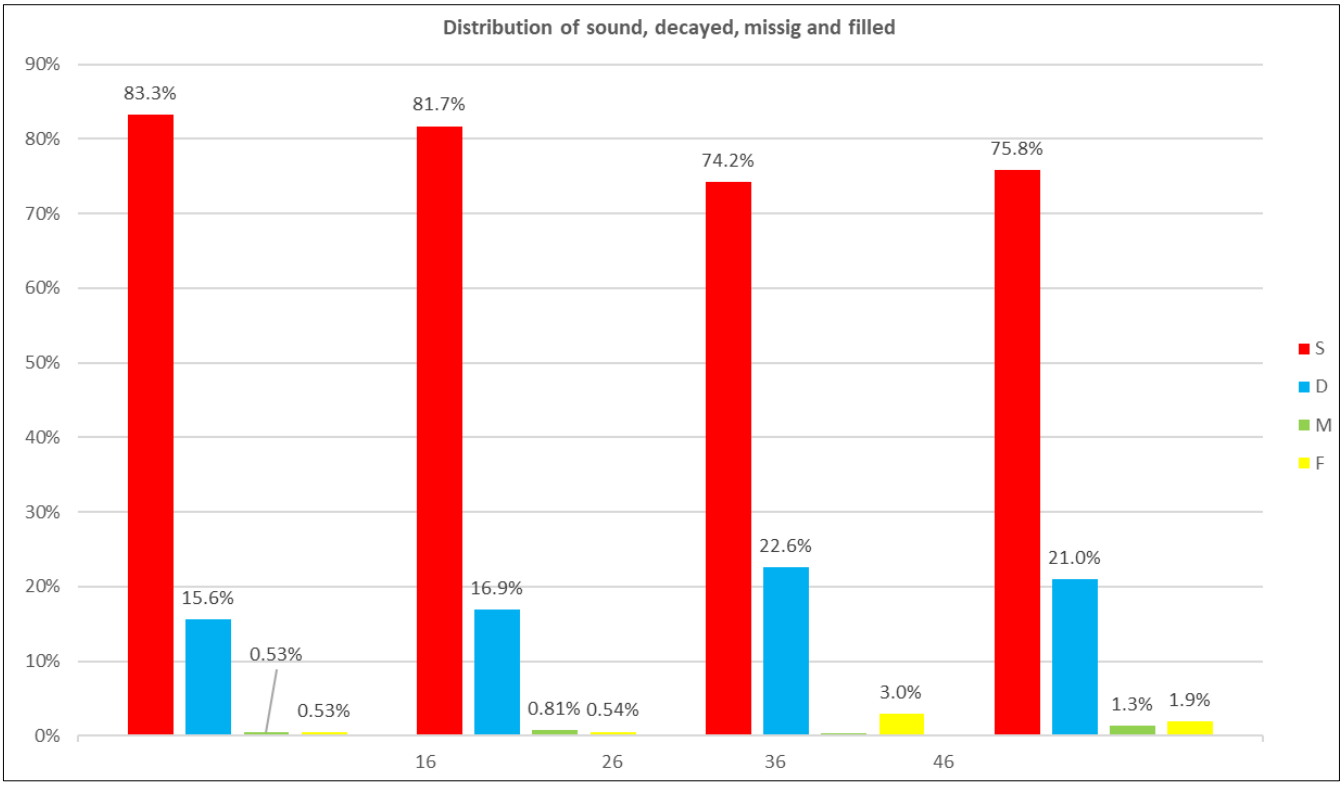

Fig 1: Distribution of sound, decayed, missing and filled teeth

Table 3: The association between the mean DMFT, awareness about timing of PFMs eruption and the parental education levels

Awareness about timing of PFMs eruption		**Education of Mather**			**Education of father**		
		Ud	H	B	Ud	H	B
		21(19.4%)	25(23.1%)	62(57.4%)	36(33.3%)	34(31.5%)	38(35.2%)
p value		0.65			0.278		
DMFT	mean	1.29	0.76	0.77	1.17	0.91	0.55
	SD	1.586	1.234	1.311	1.521	1.422	1.058
p value		0.264			0.146		

Chi-square test, significant correlation (P<0.05) (Ud) Under high-school diploma; (H) High-school diploma; (B) Bachelor's degree or higher

Table 4: The association between the mean DMFT and the parental education levels

Is this tooth going to be changed		**Education of Mather**				**Education of father**			
		I	Ud	H	B	I	Ud	H	B
		2(1%)	44(22%)	38(19%)	116(58%)	2(1%)	58(29%)	67(33.5%)	73(36.5%)
p value		0.673				0.998			
DMFT	mean	0	1.09	0.55	0.78	0	0.9	0.76	0.7
	SD	0	1.326	0.978	1.127	0	1.209	1.129	1.149
p value		00.06				0.043			

Chi-square test, significant correlation (P<0.05), (I) Illiterate; (Ud) Under high-school diploma; (H) High-school diploma; (B) Bachelor's degree or higher

Discussion

Few studies combined the parental knowledge of the dental health of their children, effects of dietary habits, oral hygiene habits and their related to dental decay in children in Libya. This cross-sectional study aimed to assess the parental awareness and attitude about the permanent first molars (PFMs) eruption, sugary foods consumption, oral hygiene habits, oral health habits of their children and its associations to caries experience in Libyan children between 8 to 10 years old in primary public schools in Benghazi. Therefore questionnaires survey completed by the parents and dental clinical examination for their children was conducted in Benghazi. The finding of this study showed that there was no significant association between gender and the mean DMFT in the study population. Likewise, other studies had results similar to our finding that there was no significance difference between caries in molars of girls and boys [14,15,16], and with higher experience of caries was observed among girls than boys [17]. Based on DMFT index, of the whole sample, 78.76% of PFMs was sound, 19.02% was decayed, 0.74% was missed and 1.48% was filled. This means around 21.24% of PFMs were decayed, filled or missed due to caries which is far from the WHO global

aim that by 2020 the carious PFMs should have decreased to 11% [18]. Anyway, these figures are lower than that reported in previous Libyan studies showed that the carious FPMs was 74.7% and 45% [19,20], respectively. Moreover, another study conducted among Iranians children reported carious FPMs was high 66.04% [21].

In this study, in the 8 years old children, 76.8% of PFMs was sound, and about 22% of PFMs was decayed, filled or missed due caries. While in the 9 years old children, 84.6% of PFMs was sound, and about 15% was decayed or filled. In the 10 years old children, 75.2% of PFMs was sound, and about 25% was decayed, filled or missing due to caries. This is far from the WHO global aim that by 2020 the carious PFMs should have decreased to 11% [18]. The differences of these results might be due to the differences in the frequency of sugary food intakes, frequency of tooth brushing, lack of dental awareness of the parents and children, frequency of dental visits and the fluoride in drinking water.

Regarding the association between DMFT in PFMs and visiting a dentist, the children who had visited the dentist less than once a year the mean DMFT of PFMs higher than that DMFT in the children who had visited the dentist once or twice a year. The association between DMFT and the number of dental visit ($P=0.042$) was significant ($P<0.05$). These finding explained that high prevalence of dental caries was associated with frequency of dental visiting to the dentist. The high level of dental caries could be attributed to lack of regular dental visits. Parents have a very essential part in training and educating children in healthy dental habits and regular visits to the dentist. Several studies showed that poor oral hygiene may induce dental caries and the parents stressed the importance of regular dental visits for prevention of dental disease in children [22,23]. Parents with history of child dental visit had significantly higher awareness of first permanent molar eruption [24]. On an other hand, other studies conducted in children revealed no significant correlation between caries and dental visit [7,15]. American Academy of Pediatric Dentistry recommends that regular visiting the dentist by the children every 6 months beginning at early age 12 months for prevention of dental diseases, treating early dental caries lesions before causing pain and more damage to the teeth and improve dental health [25].

Regarding to the sugary food's consumption, children who consumed sugary foods twice a day had the highest DMFT (1.04, SD±1.294) while children who consumed sugary foods once a week the mean DMFT was (0.69, SD±1.180). The mean of DMFT increased by more frequency of sugary foods consumption but the association between DMFT and the frequency of sugar intakes was not significant. These findings may be because the questionnaire reviews depend on parental reporting and the frequency of consumed sugary foods were subject to bias. Besides the dental caries is multifactorial condition influenced by the interaction of several factors such as sugary foods consumption, oral hygiene, saliva, and the fluoride in drinking water.

Anyway, these findings were similar with the results of previous studies of Libyan children. A study was connected among Libyan children, reported that sugary foods was not significantly associated with dental caries [23]. Furthermore, another study showed that the frequency of sugared foods intakes was not associated with dental caries [26]. Conversely, the finding of this study was different form the finding of other studies which reported that consumption of sugary food was associated with dental caries [15,27]. Caries is a highly prevalent chronic disease and it causes a lot of pain. Sugary foods are the most important dietary factors for causing dental caries. Anyway, high intakes of sugary foods may also have associations for diseases other than dental caries, mainly for the present obesity prevalent in children.

In this study, the association between DMFT and frequency of tooth brushing was not significant. Our finding has shown that tooth brushing can be only in part decrease the influence of sugary foods intake on dental caries effects in children. These results highlight the need for health education programs concentrating on improving tooth brushing habits. The results of this are in agreement with other studies reported that no statistically significant associate between frequency of tooth brushing and dental caries [23,28,29]. In contrast, several studies reported that frequency tooth brushing was significance associated with low level of dental caries [15,30,31,32]. Even though frequent tooth brushing reduced the risk related with the highest sugary foods intakes, children who reported brushing their teeth frequently were still at increased risk of having dental caries if they had frequent sugary foods intakes. This indicates the necessity for dental health education, since there is low level of dental awareness and attitudes of parents. In this study the highest percent of decayed teeth in PFMs were in the lower left molars and the lowest was the upper right molars. While the lower right PFMs showed the highest percent of missing teeth and the lower-left PFMs showed the lowest percentage of missing teeth and the highest percentage of filled teeth. Similar finding in other study showed the highest caries incidence rates were noted in the lower left PFMs [15]. The reason may be due to deep occlusal grooves and early eruption of lower PFMs makes them more vulnerable to dental caries. In this study, few numbers of parents were aware of the timing of the eruption of PFMs and aware that this tooth is not going to be changed. This demonstrates the necessity for dental health education as there is low level of dental awareness of parents. Parental knowledge and awareness about the timing of PFMs eruption had a non-significant correlation with the mother and father's level of education. Similar to previous finding in studies conducted on children showed that poor levels of knowledge of parents about the eruption time and importance of PFMs [8,15,24,33,34,35]. Other studies also showed that low level of knowledge, attitude of mothers about their children dental health [34,36]. With regard to the level of parental education, in this study, there were significance associations between fathers' educational level and their knowledge about the right answer regarding are these teeth going to be changed or not. The results of this study confirm the finding of other studies showed that the level of parents' awareness of PFMs eruption was increased significantly with education [24,37]. Also, this study showed that there was a significance association between fathers' educational level and the mean DMFT of PFMs. The

experience of caries decreased with fathers' increasing educational level. The highest caries-free percentage however, was observed among children whose fathers were educated to bachelor's degree or higher level. This finding suggests a strong influence of a parents' educational level on the oral health of their children. The reason for that may be the parents who have high educational level may associate with increased awareness of oral dental health habits for their children. These findings confirm studies conducted in Libyan school children showed significant association of dental caries and fathers' education level [32,38], and confirm a study conduct among children in Ajman, UAE [39]. However, other studies reported that high mothers' education levels associated with decreased dental caries prevalence [19,23,26,40]. Anyway, a study reported that both parental educational levels can have an effect on dental health of their children [3]. Anyhow, the reason may be due to the parents with high level of education associated to improved oral health. This is could be explained by that parent with a high level of education with increase awareness notice, care and organize the dietary habits of their children despites the fact that rich families who parents had high level of education could afford expensive sugary food products [41]. Conversely, several studies reported that parents' educational levels were not affected with DMFT [15,37,42]. Dental caries is multifactorial condition influenced by the interaction of chemical, biological, and behavioral factors. In this study, the level of dental caries could be attributed to many factors as frequency of sugary food consumption, the level of parents' awareness and education of parents, poor number of parents were aware of the timing of the eruption of PFMs and that these teeth are not going to be changed, lack of regular visit to the dentist, and low frequency of tooth brushing.

Conclusions

Low level of awareness and attitude of the parents towards the dental health habits for their children. Higher fathers' educational levels were associated with a lower dental caries experience in their children. This study recommends influence parents' level of education on oral health of their children. Parental' education and guiding for the purposes of reducing caries experience in children should be targeted. Teaching the parents the importance of their children dental health is essential. Foods low in sugar and oral hygiene instructions must continue to be encouraged to improve oral dental health in children. Health education messages targeting the parents and children to raise their awareness and knowledge regarding dental health habits, importance of PFMs, oral hygiene and sugary food consumption habits should be planned and applied. School-based programs to teach and encourage dental health should be done to affect the behavior of children and their parents in order to avoid further distraction of dental health. The findings of this study may provide a baseline database for further research and future dental health planes for children in Benghazi.

Conflict of interest

Authors have no conflict of interest.

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