

Prevalence and Risk Factors of Dental Caries Among 6 To 12 Years Old Children In Tripoli City, Libya

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Abstract

Original Research Article

Dental caries is a localized, chronic, progressive disease, causing demineralization of the hard tissues of tooth surfaces and also known as tooth decay. The prevalence of DC is high in developing countries compared with developed countries. The aim of the study was to estimate the prevalence of dental caries among the children in age between 6 to 12 years old, and to identify the relationship between dental caries and socio-demographical factors. A cross sectional study was conducted on 392 children in Tripoli/ Libya in the age group of 6–12 years. The prevalence of dental caries was assessed by decayed, missing, and filled teeth (DMFT)/dmft index. The data were analyzed by using SPSS software, version 24. Chi square test was applied to elaborate the significance of the association/differences between study variables. The overall dental caries prevalence was 74.7%. The overall average of dental caries in permanent dentition among children using the (DMFT index) = 0.882 ± 1.68 . There was statistically significant difference between boys and girls ($P= 0.02$). Higher prevalence of DMFT score was observed among children ages of 12, while the lowest prevalence was observed among children ages between 6 to 7 ($P= 0.000$). Dental caries amongst 6 to 12 year-old children in Tripoli/Libya is a common public health problem. Therefore, comprehensive oral health educational programs for both children and their parents are needed in order to reduce dental caries among children.

Keywords: Dental caries, DMFT index, children, Tripoli, Libya.

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INTRODUCTION

Dental caries (DC) is a localized, chronic, progressive disease, causing demineralization of the hard tissues of tooth surfaces and also known as tooth decay. Almost 90% of the world's population will have oral disease in their lifetime ranging from DC, periodontal diseases and oral cancer [1]. The untreated DC leads to pain and discomfort during eating and sleeping, this will have consequential effect on general health of the child such as decrease in weight, growth and quality of life, and it may affect child's eating, speaking and also it may affect the normal function at home and in school among children.

DC is not a self-limiting disease, and if not treated at the beginning the child's condition will worsen. DC can interfere with a child's ability to succeed in school. Also, evidence showed that increases in missed school time caused by chronic illnesses can lead to a decline in school performance [2].

The untreated DC will lead to increase treatment difficulties, which will increase the cost of

treatment. DC is considered as the fourth most expensive disease to treat; according to FDI dental treatment of high-income countries compose about 5% - 10% of public health expenditure for oral health and is one of the most expensive diseases to treat [1]. It was estimated that the total annual cost of treating DC in United States of America to be 3513\$ /1000 children. This would exceed the total health budget for children of most low-income countries, so they will suffer from the accumulation of untreated oral diseases due to the expenses of dental treatment [3].

The prevalence of DC is high in developing countries compared with developed countries [4]. However, the prevalence of DC has been decreased during the last few decades in developed countries due to many factors including changes in diet, hygiene procedures, raised awareness about dental health, the widespread use of fluoride and preventing care programs. While, in developing countries the prevalence of DC is increasing, and that is related to many factors as sugar consumption, poor oral hygiene

habits, limited access to oral health services, limitation in preventing care program, *et al.* [5]

In the case of oral health status of Libyan population, there is a general paucity in literature. Little work has been done on determining the prevalence of DC amongst Libyan school children and few studies related to DC have been published. For example, little epidemiological studies in Benghazi /Libya found the prevalence of DC was 61.9% amongst 321 school children [6] and 57.8 % amongst 12 year-old school children [7].

Literature review has shown a lack of studies about the prevalence of DC amongst children in Tripoli-Libya. So, some evidence as well as some media and official documents suggests many children suffer from DC every year and the effects of pain exert a financial burden on health care costs, the emotional and financial impact it places on patients and their families.

Unfortunately after Libya's revolution in 2011, the new health care authority is facing a reconstruction challenge; this information may indeed justify an inference of poor dental services including preventative dental health programs in Libya.

Now the Libyan Health Care System is improving and theoretically health care is free for all Libyan. However, people usually complain about the public sector and use a growing private health centres.

This study will help to improve prevention and treatment of DC in Libya children with the potential to reduce the cost to the Libyan National Health Services.

The aim of present study was to estimate the prevalence of DC amongst children in age from 6 to 12 years old in Tripoli city-Libya by the DMFT index and to investigate the relationship between: DC in school children and different characteristics including sex, age, parents' education etc.

METHODOLOGY

Study design

A cross-sectional survey was used to estimate the prevalence of DC in children aged between 6 to 12 years old at Tripoli, which is the largest city in Libya. The study was approved by the Research Ethics Committees of Jordan University and Ministry of Health in Libya.

Sample size

The number of children required to be screened from the study was calculated according to Cochran's formula ($n_0 = Z^2pq/d^2$) considering 95% confidence interval ($z = 1.96$), 5% margin of error, expected prevalence of DC (p) of children with dental caries was estimated to be 60% as (8).

This gave sample size total of 370. Therefore; an increase of 10% in the calculated sample size was aimed to cover defaulters and to increase the probability of collecting such sample size, so the total sample size calculated to be 407 participants.

$$n = \frac{Z^2 p(1 - p)}{d^2}$$

Study sample and sampling technique

A total of 392 school children (183 boys and 209 girls) were screened from May- August 2016 from summer schools, 3 dental public health centers, and one of the biggest public health hospitals in Tripoli and charity for orphans. The children selected by convenient sampling technique, so each child ages between 6 to 12 years, who has been found at the same time that the investigator (first author) is present in the same place were taken after one of the parent's acceptance.

Data collection and examination procedure

The first author herself carries out all dental examination and data collection; she is a dentist with 9 years' experience as a general dental practitioner. Only one examiner to avoid inter-examiner variability did the examination of child, and a trained person who assisted throughout the study did the recoding of data.

During the study period each of the public hospitals and public health centers were instructed to transfer every child within age group between 6 to 12 years old to the researcher's office before providing the intended services. Participants, whose mothers or fathers agreed to participate in the study, were asked to prepare him/her for dental examination and fill the demographic questions.

Between 5 -15 children were examined each day. Clinical examination had been taken for each child by using artificial light using a dental mirror. Instruments used during data collection were sterilized before dental examination and at the end of the data collection. Disposable gloves and masks were used during the data collection.

The diagnosis of DC was primarily based on visual and clinical criteria, by running the dental probe on tooth surface where any stained and cavitation lesion on dental hard tissues, or a breakdown of enamel resulting in cavitation, or opacity beneath enamel is recorded. The examiner started dental examination with upper right anterior teeth and continue the dental examination distally in the same quadrant, the same steps of dental examination was followed for the other three quadrants (upper left quadrant, lower left quadrant, lower right quadrant).

Also examination of teeth surfaces was done with lingual surface, labial surface, mesial and distal for anterior teeth and with occlusal surface, lingual surface,

and buccal surface, mesial and distal for posterior teeth. The data collected had been registered in a dental diagnostic chart for each child by trained person.

At the end of examination, every child gained a toothbrush and toothpaste. The investigator (first author) gives instructions about teeth cleaning and advice about their dental health.

Statistical analysis

Necessary statistical analysis is carried out. Data collected is entered in Statistical Package for Social Sciences Software (SPSS), version 24.

The severity of dental caries was recorded using DMFT scores with the mean. The decay-missing-filled (DMFT) index, which is one of the most common methods in oral epidemiology, has three parts which are the numbers of (D) teeth decay, (M) teeth missing, and teeth filling (F), and it is a diagnostic criterion of World Health Organization [9]. The prevalence of DC was calculated as the frequency and proportion of subjects with DC experience in the primary and permanent teeth. The DMFT index is examined in relation to demographic variables. Chi square test was employed to test the statistical significance of any observed association.

A total of 392 school children aged between 6 to 12 years were examined. More than half of children were girls 209 (53.3%). Two thirds of them (60.2%) aged more than 8 years. 62.7% live with family members, having 5 members and below. About one third was the first-born child in the family. More than one third of participant's mothers were at the university graduate level of education (38.5%) and (57.1%) of the mothers were housewives. The family income: (41.4%) where poor, while the majority of participants (78.4%) lives in houses they own (Table 1).

Prevalence of dental caries

The prevalence of DC amongst children was 74.7% (Figure 1). The prevalence of DC in primary teeth using dmft index was (63.5%) and the mean of dmft was 2.72 ± 3.078 , while the prevalence of DC in permanent teeth using DMFT was (32.7%) and the mean of DMFT was 0.882 ± 1.68 . The prevalence of decay teeth (DT) in permanent teeth was 31.3% (0.81 ± 1.63), and the prevalence of the missing (MT) and filled (FT) teeth in permanent dentation was 1.3% (0.0153 ± 0.142) and 3.6% (0.0510 ± 0.290), respectively.

Prevalence of oral hygiene among children

The majority of oral hygiene level for the children was in fair level (56.6%), while (16.3%) was in the poor oral hygiene level and 27% of them were in good oral hygiene level. Children with good oral hygiene had a significantly lower prevalence of DC (60.4%), while poor oral hygiene had the higher prevalence of DC (82.8%) ($P = 0.000$) (Figure 2).

Prevalence of DMFT index in relation to different socio demographic variables

The prevalence of the DMFT index was higher in girls (37.9%) than boys (26.8%), which was statistically significant ($P=0.02$). The prevalence of DMFT in the group of 12 years of age was 67.7%, while in the group of 6-7 years of age was 9.7%. This difference was statistically significant ($P= 0.00$). A higher number of siblings were found to be insignificantly associated with higher prevalence of DMFT ($P=0.062$). The highest prevalence of DMFT was found in children living with more than five members in the family (40.7%), while the lowest prevalence was in the children with three family members (21.1%). Higher levels of DMFT were noticed in children who are fourth and more than fourth in order (44.0%, 43.6%) respectively; but the difference was not statistically significant ($P= 0.06$).

Children of highly educated mothers have the lowest prevalence of DMFT (13.1%), while children whose mothers in preparatory level have the highest prevalence of DMFT (47.5%). The association between mother's educational level and DMFT were highly significant ($P=0.000$). The prevalence of DMFT in children whose mothers are employed was 24.1%, while the prevalence of DMFT in children whose mothers are housewife was 38.8% and the relationship was statistically significant ($P=0.002$).

Children who live with high family income had the lowest value of DMFT (21.0%). While children who live in low income families had the highest values of the DMFT 45.0%. There was significant relationship between the DMFT and family income ($P= 0.000$). There were no significant relationships between the prevalence of DMFT and its components and the house ownership ($P > 0.05$) (Table 2).

Prevalence of DT index in relation to different socio demographic variables

The prevalence of DT according to sex of children was significant ($P=0.017$). The prevalence of the DT index was higher in girls (36.4%) than boys (25.1%). The prevalence of DT in the group of 12 years of age was 64.6%, while in the group of 6-7 years of age was 9.0%. This difference was statistically significant ($P= 0.00$).

A higher number of siblings were found to be insignificantly associated with higher prevalence of DT ($P= 0.049$). The highest prevalence of DT was found in children living with more than five members in the family (38.6%), while the lowest prevalence was in the children with three family members (18.4%). Higher levels of DT were noticed in children who are fourth and more than fourth in order (42.0%, 43.6%) respectively, which was no statistically significance ($P= 0.06$). Children with highly educated mothers have the lowest prevalence of DT (21.4%), while children whose

mothers in preparatory educational level have the highest prevalence of DT (47.5%). The association between mother's educational level and DMFT were highly significant ($P= 0.000$). The prevalence of DT in children whose mothers are employed was 22.9%, while the prevalence of DT in children whose mothers are housewife was 37.1% and the relationship was statistically significant ($P= 0.003$). Children who live with high family income had the lowest value of DT (18.5%). While children who live in low income families had the highest values of the DT 43.0%. There was significant relationship between the DT and family income ($P= 0.000$). There were no significant relationships between the prevalence of DT and its components and the house ownership with ($P= > 0.05$) (Table 3).

Prevalence of MT index in relation to different socio demographic variables

The prevalence of the MT was higher in girls (1.9%) than boys (0.5%) but the difference was not statistically significant ($P=0.299$). The prevalence of MT in age group of 12 years was (3.3%), while in age group of 8-9 years was 0%. This difference was statistically insignificant ($P= 0.151$). A higher number of siblings were found to be insignificantly associated with higher prevalence of MT ($P= 0.838$). The highest prevalence of MT was found in children living with more than five members in the family (2.1%), while the lowest prevalence was in the children with two and three family members (0%). Higher levels of MT were noticed in children who are fourth in order (3.6%), the analysis of this variable presented statistically insignificance ($P= 0.254$). Children whose mothers in preparatory level have the highest prevalence of MT (3.8%). The association between mother's educational level and MT were highly insignificant ($P= 0.200$).

Table-1: Socio-demographic characteristics of school children

Characteristic	Number	Percentages (%)
Sex		
Boy	183	46.7
Girl	209	53.3
Age		
6-7	155	39.5
8-9	108	27.9
10-11	64	16.3
12	65	16.3
Number of family members		
Two	5	1.3
Three	38	9.7
Four	87	22.2
Five	115	29.5
More than five	145	37.2
Order of the child in the family		
First	116	30.1
Second	99	25.6
Third	66	17.1
Fourth	50	13.0
More than forth	55	14.2
Educational level of mother		
Primary school	47	12.5
Preparatory school	80	21.2
Secondary school/ Diploma	91	24.1
University graduate	145	38.5
Postgraduate studies	14	3.7
Mother's occupation		
Employed	166	42.3
Housewife	224	57.1
Monthly family income		
High	81	22.5
Medium	130	36.1
Low	149	41.4
House ownership		
Rent	83	21.6
Ownership	301	78.4

The prevalence of MT in children whose mothers are employed was 0.6%, while the prevalence of MT in children whose mothers are housewife was 1.8% and the relationship was statistically insignificant with ($P= 0.304$). There was insignificant relationship between the value of MT and family income ($P=0.981$). There was insignificant relationship between the MT and family income with ($P=0.930$) (Table 4).

Prevalence of FT index in relation to different socio demographic variables

The prevalence of FT according to sex of children was insignificant ($P= 0.770$). The prevalence of FT in the group of 12 years of age was (10.8%), while in the group of 6-7 years of age it was 0.6%. This difference was statistically significant ($P= 0.0.03$). A higher number of siblings were found to be insignificantly associated with high prevalence of FT ($P= 0.479$). The highest prevalence

of FT was found in children living with three members in the family (7.9%), while the lowest prevalence was in the children with two family members (0%), but the difference was not statistically significant ($P= 0.997$). Children whose mother's educational level with high school or diploma have the highest prevalence of FT (5.5%). The association between mother's educational level and FT were highly insignificant ($P= 0.629$). The relationship between Mother's occupation and FT was statistically insignificant ($P= 0.598$).

There was insignificant relationship between the MT and family income ($P= 0.219$).

The prevalence of FT was higher among children who live in rented house (6.0%), and there was insignificant relationship between the value of MT and family income ($P= 0.192$) (Table 5).

Table-2: Prevalence of DMFT index in relation to different socio demographic variables

Characteristic	DMFT Index		P-value
	Yes No (%)	No No (%)	
Sex			
Girl	79 (37.8)	130 (62.2)	0.02*
Boy	49 (26.8)	134 (73.2)	
Age in years			
6-7	15 (9.7)	140 (90.3)	0.000*
8-9	37 (34.3)	71 (65.7)	
10-11	32 (50)	32 (50.0)	
12	44 (67.7)	21 (32.3)	
Number of family members			
Two	2 (40.0)	3 (60.0)	0.062**
Three	8 (21.1)	30 (78.9)	
Four	22 (25.3)	65 (74.7)	
Five	36 (31.3)	79 (68.7)	
More than five	59 (40.7)	86 (59.3)	
Order of the child in the family			
First	35 (30.2)	81 (69.8)	0.06**
Second	27 (27.3)	72 (72.7)	
Third	17 (25.8)	49 (74.2)	
Fourth	22 (44.0)	28 (56.0)	
More than forth	24 (43.6)	31 (56.4)	
Educational level of mother			
Primary school	20 (42.6)	27 (57.4)	0.000*
Preparatory School	38 (47.5)	42 (52.5)	
High school /diploma	40 (44.0)	51 (56.0)	
University graduate	19 (13.1)	126 (86.9)	
Postgraduate studies	3 (21.4)	11 (78.6)	
Mother's occupation			
Employed	40 (24.1)	126 (75.9)	0.002*
Housewife	87 (38.8)	137 (61.2)	
Monthly family income			
High	17 (21.0)	64 (79.0)	0.000*
Medium	37 (28.5)	93 (71.5)	
Low	67 (45.0)	82 (55.0)	
House ownership			
Rent	31 (37.3)	52 (62.7)	0.320**
Ownership	95 (31.6)	206 (68.4)	

Chi square test was used. *Significant, ** Not significant

Table-3: Prevalence of DT values in relation to different socio demographic variables

Characteristic	DT Values		P-value
	Yes No (%)	No No (%)	
Sex			
Girl	76 (36.4)	133 (63.6)	0.017**
Boy	46 (25.1)	137 (74.9)	
Age in years			
6-7	14 (9.0)	141 (91.0)	0.000*
8-9	34 (31.5)	74 (68.5)	
10-11	32 (50)	32 (50.0)	
12	42 (64.6)	23 (35.4)	
Number of family members			
Two	1 (20.0)	4 (80.0)	0.049**
Three	7 (18.4)	31 (81.6)	
Four	20 (23.0)	67 (77.0)	
Five	36 (31.3)	79 (68.7)	
More than five	56 (38.6)	89 (61.4)	
Order of the child in the family			
First	33 (28.4)	83 (71.6)	0.06**
Second	25 (25.3)	74 (74.7)	
Third	16 (24.2)	50 (75.8)	
Fourth	21 (42.0)	29 (58.0)	
More than forth	24 (43.6)	31 (56.4)	
Educational level of mother			
Primary school	18 (38.3)	29 (61.7)	0.000*
Preparatory School	38 (47.5)	42 (52.5)	
High school /diploma	38 (41.8)	53 (58.2)	
University graduate	17 (11.7)	128 (88.3)	
Postgraduate studies	3 (21.4)	11 (78.6)	
Mother's occupation			
Employed	38 (22.9)	128 (77.1)	0.003*
Housewife	83 (37.1)	141 (62.9)	
Monthly family income			
High	15 (18.5)	66 (81.5)	0.000*
Medium	36 (27.7)	94 (72.3)	
Low	64 (43.0)	85 (57.0)	
House ownership			
Rent	30 (36.1)	53 (63.9)	0.277**
Ownership	90 (29.9)	211 (70.1)	

Chi square test was used. *Significant, ** Not significant

Table-4: Prevalence of MT values in relation to different socio demographic variables

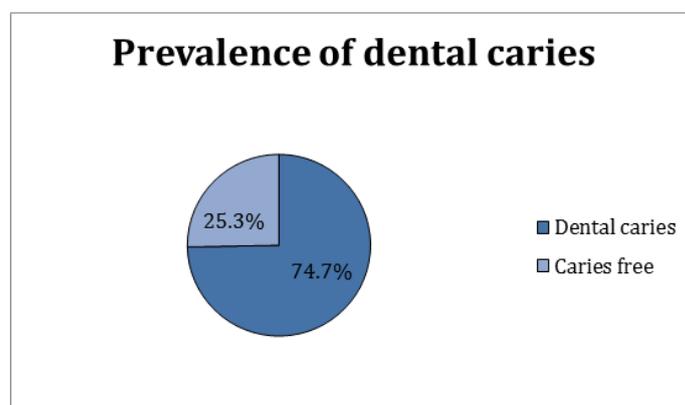
Characteristic	MT Values		P-value
	Yes No (%)	No No (%)	
Sex			
Girl	4 (1.9)	205 (98.1)	0.299**
Boy	1 (0.5)	182 (99.5)	
Age in years			
6-7	1 (0.6)	154 (99.4)	0.151**
8-9	0 (0.0)	108 (100)	
10-11	2 (3.1)	62 (96.9)	
12	2 (3.3)	63 (96.6)	
Number of family members			
Two	0 (0.0)	5 (100)	0.838**
Three	0 (0.0)	38 (100)	
Four	1 (1.1)	86 (98.9)	
Five	1 (0.9)	114 (99.1)	
More than five	3 (2.1)	142 (97.9)	
Order of the child in the family			
First	0 (0.0)	116 (100)	0.254**
Second	2 (2.0)	97 (98.0)	
Third	0 (0.0)	66 (100)	
Fourth	1 (2.0)	49 (98.0)	
More than forth	2 (3.6)	53 (96.4)	
Educational level of mother			
Primary school	1 (2.1)	46 (97.9)	0.200**
Preparatory School	3 (3.8)	77 (96.3)	
High school /diploma	1 (1.1)	90 (98.9)	
University graduate	0 (0.0)	145 (100)	
Postgraduate studies	0 (0.0)	14 (100)	
Mother's occupation			
Employed	1 (0.6)	165 (99.4)	0.304**
Housewife	4 (1.8)	220 (98.8)	
Monthly family income			
High	1 (1.2)	80 (98.8)	0.981**
Medium	2 (1.5)	128 (98.5)	
Low	2 (1.3)	147 (98.7)	
House ownership			
Rent	1 (1.2)	82 (98.8)	0.930**
Ownership	4 (1.3)	297 (98.7)	

Chi square test was used. *Significant, ** Not significant

Table-5: Prevalence of FT values in relation to different socio demographic variables

Characteristic	FT Values		P-value
	Yes No (%)	No No (%)	
Sex			
Girl	8 (3.8)	201 (96.2)	0.770**
Boy	6 (3.3)	177 (96.7)	
Age in years			
6-7	1 (0.6)	154 (99.4)	0.003*
8-9	4 (3.7)	104 (96.3)	
10-11	2 (3.1)	62 (96.9)	
12	7 (10.8)	58 (89.2)	
Number of family members			
Two	0 (0.0)	5 (100)	0.479**
Three	3 (7.9)	35 (92.1)	
Four	3 (3.4)	84 (96.6)	
Five	2 (1.7)	113 (98.3)	
More than five	6 (4.1)	139 (95.9)	
Order of the child in the family			
First	4 (3.4)	112 (96.6)	0.997**
Second	4 (4.0)	95 (96.0)	
Third	2 (3.0)	64 (97.0)	
Fourth	2 (4.0)	48 (96.0)	
More than fourth	2 (3.6)	53 (96.4)	
Educational level of mother			
Primary school	2 (4.3)	45 (95.7)	0.629**
Preparatory School	3 (3.8)	77 (96.3)	
High school /diploma	5 (5.5)	86 (94.5)	
University graduate	3 (2.1)	142 (97.9)	
Postgraduate studies	0 (0.0)	14 (100)	
Mother's occupation			
Employed	5 (3.0)	161 (97.0)	0.598**
Housewife	9 (4.0)	215 (96.0)	
Monthly family income			
High	4(4.9)	77 (95.1)	0.219**
Medium	2 (1.5)	128 (98.5)	
Low	8 (5.4)	141 (94.6)	
House ownership			
Rent	5 (6.0)	78 (94.0)	0.192**
Ownership	9 (3.0)	292 (97.0)	

Chi square test was used. *Significant, ** Not significant

**Fig-1: The prevalence of DC among children**

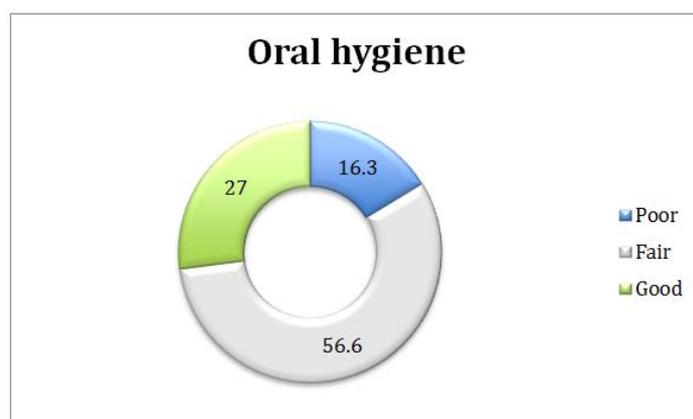


Fig-2: The percentage of oral hygiene level among children

DISCUSSION

The WHO mention that DC is considered as a public health problem amongst children between the ages of 6-7 years when the prevalence is 50% and higher and the number of teeth affected from DC amongst children at the age of 12 years exceed 1.5 teeth [5]. The overall prevalence of DC in both dentitions primary and permanent teeth was 74.7% amongst the total number of children examined for the present study and the prevalence of DC in primary dentation was 63.5%, which is considered a high prevalence of DC. Similar findings were reported from studies done in other countries for example in Palestine a study found that the prevalence of DC in children was 75% [10] and a cross sectional study carried on 711 school children in Damam/ KSA found the prevalence of DC was 73.3% [11]. The prevalence of DC in the present study was lower than the prevalence of DC in other studied conducted in Qatar found that the prevalence of DC in children was 85% [12] and in KSA found the prevalence of DC was 83.13% [13]

The prevalence of DC in the present study was higher than the prevalence of DC among children in United Kingdom was 17% [14] in Nepal was 52% [15] and in Rajasthan was 61.1% [16]. Furthermore, another study conducted on Libyan children in klang valley, Malaysia found that the prevalence of DC in children was 56.9%; which was also higher than the current study [17] and lower than the prevalence of DC in 685 preschool children was 60% in similar city in Libya [18]. This wide variation in the prevalence of DC could be due to the different settings, diagnostic and population socio-demographic and nutritional style and oral hygiene habits that have been utilized in the previous studies.

However, there have been relatively very few data reported in literature concerning the prevalence of dental caries among Libyan children, particularly in mixed dentition period using DMFT, so the present study was conducted in schoolchildren of 6–12 years found the prevalence of DC in primary dentation using (dmft) was 63.5% with a mean of (2.72± 3.078), and the

prevalence of (DMFT) among 12 years-olds was 32.7% with a mean of (0.882± 1.68), which is lower than the study done in Benghazi/ Libya was 57.8% with mean of DMFT as (1.68 ± 1.86)[7].

Also lower compared with the results of study done by [19] on 2496 children aged 6 years and 2560 children aged 12 years to assess the oral health status in Jordan found the mean of dmft was 3.3 and the DMFT was 1.1. According to the current study, the proportions of the decayed teeth for all children (dt, DT) were (58.9%, 31.1%) respectively, while the proportions of the missed teeth for all children (mt, MT) were (12.2%, 1.3%) respectively and the proportions of the filled teeth for all children (ft, FT) were (7.9%, 3.6%) respectively.

This is consistent with the findings of a cross sectional study done at Dammam, KSA, the finding revealed that mean of (dt, DT) components (3.28±2.92, 1.76±1.85) higher than (ft, FT) components (0.26±0.9, 0.15±0.73) (11). Among 9387 participants in Kosovo found the mean of DT component was (3.15 ± 3.31), while the mean of the FT component was (2.05 ± 2.86) (20).

The high proportion rates of (dt, DT) component over the (ft, FT) and (mt, MT) components may be attributed to increased costs of dental treatment, decreased mother's knowledge about dental health, increase dental fear and anxiety.

Prevalence of dental caries in relation to sex

According to the results of this study, the prevalence of the DMFT value was higher in females than males (37.9% Vs 26.8%) respectively. There was significant difference in DC prevalence between the two sexes. Similar findings were reported by Alshehri *et al.* [21] in Saudi Arabia, Mulu *et al.* [22] in Ethiopia, Al-Darwish [12] in Qatar, Okoye LO and Ekwueme [23] in Nigeria. On contrary, Mohammadi *et al.* [24] in India and Zafer *et al.* [10] in Palestine.

On the other hand, many studies showed no significant difference in prevalence of DMFT with sex of the children. This is similar to cross sectional study carried out on 378 children in Riyadh [13] a cross sectional study in Mangalore city/ India [25] and in KSA [26]. The possible reason for the higher prevalence among females in this study could be due to the earlier eruption of teeth in females than males.

Prevalence of dental caries in relation to age

The highest prevalence of DMFT values (67.7%) was found amongst the group of 12 year-old children and the lowest prevalence (9.7%) was found amongst group of 6-7 year-old children, the association between DMFT and the age of children was statistically significant. The possible explanation for the higher prevalence DC according to the increased age of children may be due to the fact that the number of primary teeth in ages between 6 to 9 years more than permanent teeth.

Which similar to many studies with almost, a study conducted in Sabah/ Libya by [27] found that prevalence of DMFT increased with the age, the percentages of DMFT score in children with 12 years old higher than children with 6 years old. In India, a cross sectional study conducted among 1140 school children to assess the prevalence of DC, found that prevalence of DC among 12 years old children was higher than 6 years old children [24].

In contrary, a cross sectional study conducted in Karnataka state /India, found that the prevalence of DC is higher among 6 years old children (50.5%), than 12 years old children (37.75%) [28]. However, in another cross sectional study carried at Mangalore city, the prevalence of DC among 5-7 years old children was 94.3%, while the prevalence of DMFT among 11-13 years old children was 82.5% [25].

The strong association between the prevalence of DMFT and increased age of the children can be explained by the fact that the number of permanent teeth in ages between 6 to 7 years is less than the number of primary teeth and DC in primary teeth will not be calculated by DMFT, while the number of permanent teeth increases with age and the number of primary teeth decreases with age due to normal exfoliation, and also the increased age means increased exposure times to carbohydrates and acids which leads to an increase in DMFT.

CONCLUSION

In conclusion, the overall prevalence is really high (74.7%) and this reflects a considerable defect on oral health care at home and at school. So, comprehensive oral health educational programs for both children and their parents are needed in order to reduce dental caries among children.

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