

Prevalence, Severity and Pattern of Early Childhood Caries in Two-to Five-Year-Old Pre-School Children in Jeddah, Saudi Arabia

Anas Shabra^{1*}, Hala AlKattan², Wejdan AlSaiari³, Bushra Alsolami³, Alaa Sanari³ and Doaa Banaamah²

¹Dental Department, Jeddah, Saudi Arabia

²Private Practice, Jeddah, Saudi Arabia

³Ministry of Health, Saudi Arabia

*Corresponding Author: Anas Shabra, Private Practice, Jeddah, Saudi Arabia.

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Abstract

Aim: The purpose of this study was to determine the prevalence, severity, and pattern of Early Childhood Caries (ECC) in two- to five-year old preschool children in Jeddah, Saudi Arabia.

Methods: A total of 332 preschool children were randomly selected from ten private kindergartens from four different regions based on tuition fees in Jeddah.

Results: 228 (68.7%) children out of a total of 332 children were diagnosed with caries. The mean dmft for the 332 children was (3.90 ± 4.16) and the mean dmfs was (7.28 ± 11.44). There was no significant difference in caries prevalence in relation to gender. However, the prevalence of caries increased with age. Caries distribution among individual teeth was higher in maxillary teeth (20.55%) than in mandibular teeth (18.46%). Caries prevalence according to school tuition level was higher in low and middle fees schools as compared to high fees schools (P < 0.05). However there was no significant difference in frequency of dental caries in relation to the four different Jeddah's regions (North, East, West, South) (P. value 0.122). Besides, there were no significant differences between the means of mt, ft and dmft except for dt which showed a significant difference between Jeddah's regions which was higher in Northern and Eastern regions than in Western and Southern regions (P.value 0.007). Moreover, there were no significant differences between the means of ms, fs and dmfs except for ds that showed significant differences between regions which was higher in Northern than other regions (P value 0.003).

Conclusion: Prevalence of ECC in our study was (68.7%). Therefore, dentists should raise oral health awareness among parents or guardians especially during pregnancy as early as possible and emphasize the value of early dental visits in maintaining good oral health.

Keywords: Early Childhood Caries; Prevalence; Severity; Dental Caries; Primary Schools

Introduction

Dental caries of primary teeth is a major health problem among the population and the cause of tooth mortality [1]. Early Childhood Caries (ECC) or nursing bottle caries is defined as presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces which are affecting primary teeth in children from two- to five- years and eleven months. Also known as nursing bottle syndrome [2].

Decay missed filled (dmfs/t) (DMFS/T) is used to estimate the prevalence of caries among the population [3,4]. In number of studies carried out in Saudi Arabia showed an increase in the prevalence of decay missed filled tooth/ surface (dmft), (dmfs) and the patterns of disease among primary school children [5-9].

Studies that were conducted in Jeddah city showed the presence of ECC in Saudi population [8,10-12]. In 1996 Alamoudi reported (20%) prevalence of nursing bottle syndrome among preschool children [8]. In another study, done by Al-Malik, *et al.* in 1998 showed a prevalence of (73%) of caries in preschool children aged from two to five years old, with mean (dmft) score of 4.80. Moreover, 256 (26%) of children had caries on posterior teeth, while 54 (6%) had caries only in anterior teeth and 382 (39%) of the children had caries affecting both the anterior and posterior teeth [10]. The most recent study was published in 2010 by Farsi reported (61%) prevalence of caries among four years old and (67%) among five years old preschool children [12].

Studies conducted by Wyne in Al-Ahsa 2000 and Riyadh 2008 showed the prevalence of caries was (62.7%) and (74.8%) respectively three- to five- years old in preschool children [5,1]. In another study conducted in Al-Dawadmi in 2014 reported a prevalence of (72.77%) of ECC [9]. A recent published study in 2016, by Al-Meedani stated that the caries prevalence was (69%) among preschool children in Riyadh [7].

Prevalence of caries is not exclusively high among school age children. Moreover, it is considerably high among preschool children in Saudi Arabia [11]. Dental caries will not merely affect primary dentition, but it can affect children socially, behaviorally, medically, psychologically and economically. Also, dental caries can cause problems that affect the quality-of-life. However, if it left untreated, it can cause oral pain, acute infection and tooth loss leading to many absent days from school for children and waste of resources [13].

Few studies have been done in Jeddah with the same purpose as our study. The purpose of this study was to determine the prevalence, severity, and pattern of Early Childhood Caries (ECC) in two- to five- years old preschool children in Jeddah, Saudi Arabia.

Materials and Methods

A cross sectional study was conducted during 2018 in four different regions of Jeddah, Saudi Arabia. A total of 383 children were selected by convenient sampling technique and only 332 children were subjected to teeth examination for caries. Out of these 164 were boys and 168 were girls.

A list of all private kindergarten schools in Jeddah city were obtained based on the social standard (School tuition fees) and divided into three categories: high fees (16000 SR and above), middle fees (10000-15000 SR), and low fees (9000 SR and below). Ten kindergarten schools were randomly selected from each geographical region within Jeddah city, three private kindergarten in each region (North, South, East and West) depending on the fee levels (high, middle and low). However, two high fee schools were withdrawn out of the list; as a result of scabies and lack of high fee schools category in the Northern and Eastern region respectively.

The eligibility criteria for selection of the students were all children of two to five years of age and the exclusion criteria were uncooperative during the examination, absent, and any child whose parents refused to participate in the study. Therefore, fifty-one of the children were excluded.

The schools had been informed of the research, and a positive consent form was obtained from guardians of the children prior to the clinical examination. In addition, general information regarding the child's oral health was given to the parents after the examination. All children were given an educational presentation and each child was rewarded with a packed toothpaste and brush.

Clinical examination

All selected children with approved consent form were clinically examined in classrooms. Each classroom had two examiners and two data collectors. Examination was done by the examiner who was sitting on the chair and a child was sitting in front. Whilst, the data collector was sitting next to the examiner. Diagnosis was carried out visually, using disposable examination kit containing mirror, probe, and tweezer along with a cotton roll to remove any plaque and to obtain a dried field. Masks and gloves along with a flash light were used as

well. A probe was used for doubtful surfaces to detect any cavity and no radiographs were taken. All primary teeth were clinically examined using decayed (d), missed (m), and filled (f) (dmf) index for both teeth and surfaces [14]. All findings were recorded in the dental chart form according to the dmft or dmfs criteria [3,4] (Table1).

d	Primary molars and canines (or surfaces) that are carious.
m	Primary molars and canines (or surfaces) that are missing. A primary molar or canine is presumed missing because of dental caries when it has been lost before normal exfoliation.
f	Primary molars and canines (or surfaces) that have restoration but are without caries.

Table 1: dmfs rating criteria.

Questionnaire

A questionnaire was sent to parents before the dental examination. The questionnaire included general, demographic and socioeconomic information of the child and parents, also questions on the child's oral habits.

Statistics

Data analysis was done using the statistical package of social science version 24 (SPSS 24) to determine the descriptive and analytic statistics. The one-way ANOVA and independent t-test were used to test the mean dmft and mean dmfs differences between groups. Chi-square test was also used to test the relationship of gender, age, Jeddah areas, and social standards with dental caries prevalence. A p-value of less than 0.05 was considered statistically significant.

Results

The study was done on 383 preschool children. They were subjected to a questionnaire form which was answered by their parents or close relatives. 332 of them were subjected to teeth examination for caries, and the remaining fifty one children were not examined. Forty One of them were absent at the time of examination and ten were uncooperative during examination.

Dental caries in primary teeth in relation to gender and age

Out of the 332 examined children, 168 (50.6%) were females and 164 (49.4%) were males. 109 (64.9%) of female children and 119 (72.6%) of males children showed teeth caries. There was no significant difference between males and females regarding the prevalence of teeth caries ($P = 0.131$) (Table 2 and figure 1). The mean dmft in males was 3.91 ± 3.76 which was not significant in relation to the mean dmft in females (3.90 ± 4.53) (P value = 0.983). Similarly, the difference in the mean dmfs and the gender was not statistically significant (P value = 0.852) (Table 3 and 4). The mean dmft for the 332 children was (3.90 ± 4.16), while the mean dmfs was (7.28 ± 11.44). The mean dmfs was significantly higher than the mean dmft (p . value < 0.001). As for the decay component, it was the major contributor in the dmft (3.23 ± 3.76) and dmfs (5.15 ± 9.08) scores (Table 5 and 6).

Frequency of caries in primary teeth				
Caries and Gender	Males	Females	Total	Sig. (p. value)
Caries Free	45 (27.4%)	59 (35.1%)	104 (31.3%)	0.131
With Caries	119 (72.6%)	109 (64.9%)	228 (68.7%)	
Total	164	168	332 (100%)	

Table 2: Frequency of caries between males and females.

The Means of teeth decay (dt), missing (mt), filled (ft) and dmft in relation to gender and age								
Caries Experience	Gender			Age				Total
	Males	Females	P. value	2 years	3 years	4 years	5 years	
Number	164	168	-	10	39	96	187	332
Decay (dt)	3.22 ± 4.41	3.24 ± 4.07	0.953	1.10 ± 1.45	2.33 ± 2.43	3.44 ± 3.87	3.43 ± 3.96	3.23 ± 3.76
Missing (mt)	0.12 ± 0.62	0.10 ± 0.52	0.668	0.00 ± 0.00	0.08 ± 0.48	0.06 ± 0.24	0.14 ± 0.70	0.11 ± 0.57
Filled (ft)	0.57 ± 1.71	0.56 ± 1.50	0.966	0.20 ± 0.63	0.03 ± 0.16	0.49 ± 1.37	0.73 ± 1.87	0.56 ± 1.60
Dmft	3.91 ± 3.76	3.90 ± 4.16	0.983	1.30 ± 1.70	2.44 ± 2.48	3.99 ± 4.29	4.30 ± 4.37	3.90 ± 4.16
No significant differences between males and females regarding dt, mt, ft, or dmft				The mean dmft was significantly higher in 4- and 5- years old children than in 2- and 3-years old children (p . value = 0.014)				

Table 3: The means of dt, mt, ft and dmft in primary teeth according to age and gender.

The Means of teeth surfaces decay (ds), missing (ms), filled (fs) and dmfs in relation to gender and age								
Caries Experience	Gender			Age				Total
	Males	Females	P. value	2 years	3 years	4 years	5 years	
Number	164	168	-	10	39	96	187	332
Decay (ds)	4.92 ± 7.38	5.38 ± 10.50	0.645	1.20 ± 1.62	3.08 ± 5.6	5.08 ± 7.59	5.83 ± 10.48	5.15 ± 9.08
Missing (ms)	0.61 ± 3.07	0.48 ± 2.58	0.668	0.00 ± 0.00	0.38 ± 2.40	0.31 ± 1.22	0.72 ± 0.3.5	0.54 ± 2.83
Filled (fs)	1.69 ± 6.21	1.54 ± 5.33	0.8.9	1.00 ± 3.16	0.03 ± 0.16	1.45 ± 5.02	2.06 ± 6.73	1.61 ± 5.78
Dmfs	7.16 ± 10.06	7.39 ± 12.67	0.852	2.20 ± 3.80	3.49 ± 5.52	6.84 ± 9.78	8.56 ± 13.07	7.28 ± 11.44
No significant differences between males and females regarding ds, ms, fs, or dmfs				The mean dmfs was significantly higher in 5 years old children when compared with 3 years old children. (p. value = 0.011)				

Table 4: The means of ds, ms, fs and dmfs in primary teeth according to age and gender.

The Mean (± SD) teeth decay, missing, filled and dmft in primary teeth (2-5 years)						
	Number	dt	mt	ft	dmft	Sig. (p. value)
Males	164	3.22 (4.41)	0.12 (0.62)	0.57 (1.71)	3.91 (3.76)	0.983
Females	168	3.24 (4.07)	0.10 (0.52)	0.56 (1.50)	3.90 (4.53)	
Total	332	3.23 (3.76)	0.11 (0.57)	0.56 (1.60)	3.90 (4.16)	

Table 5: The means of dt, mt, ft and dmft between males and females.

The Mean (± SD) teeth surface decay, missing, filled and dmfs in primary teeth (2-5 years)						
	Number	ds	ms	fs	dmfs	Sig. (p. value)
Males	164	4.92 (7.38)	0.61 (3.07)	1.69 (6.21)	7.16 (10.06)	0.852
Females	168	5.38 (10.50)	0.48 (2.58)	1.54 (5.33)	7.39 (12.67)	
Total	332	5.15 (9.08)	0.54 (2.83)	1.61 (5.78)	7.28 (11.44)	

Table 6: The means of ds, mt, fs and dmfs between males and females.

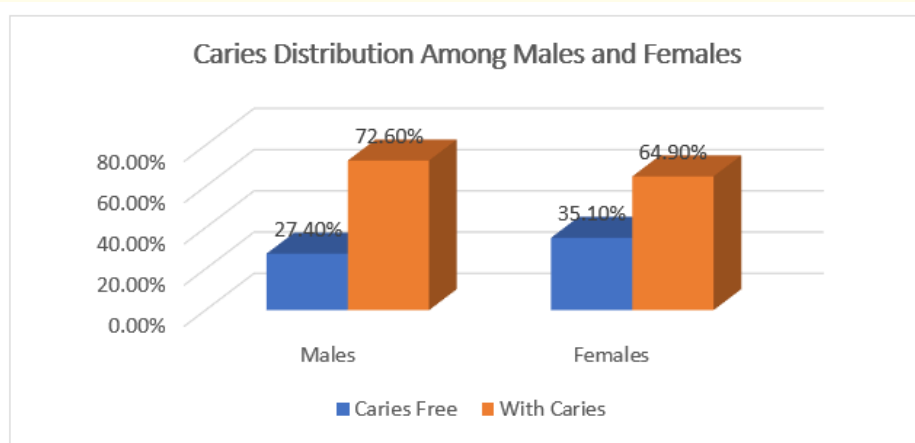


Figure 1: Frequency of caries between males and females.

The correlation between dental caries in primary dentition at different age group (2, 3, 4, and 5 years) was carried out through this study. Even though the sample sizes between the age groups are not equal, however, we found the following differences in the age group. The prevalence of caries increased with age, from the 332 examined children, 131 were 5 years old, 65 were 4 years old, 27 were 3 years old, and 5 were 2 years old, had caries at the time of examination. However, the relationship between the prevalence of dental caries and different age groups (2, 3, 4, and 5 years) were not significant (P value = 0.608) (Table 7). The mean dmft was significantly higher in 4- and 5- years old children than in 2- and 3- years old children (p. value = 0.014) (Table 3). The mean dmfs was significantly higher in 5 years old children when compared with 3 years old children (p. value = 0.011) (Table 4). The mean dmfs for all children was significantly higher than their mean dmft (Figure 2).

Frequency of primary teeth caries in relation to age							
		Age 2 yrs.	Age 3 yrs.	Age 4 yrs.	Age 5 yrs.	X ²	Sig. (P. value)
Caries free Teeth	Count	5	12	31	56	1.834	0.608
	Expected Count	3.1	12.2	30.1	58.6		
Teeth with Caries	Count	5	27	65	131		
	Expected Count	6.9	26.8	65.9	128.4		
Total	Count	10	39	96	187		
	Expected Count	10.0	39.0	96.0	187.0		

Table 7: Frequency of caries between different age groups.

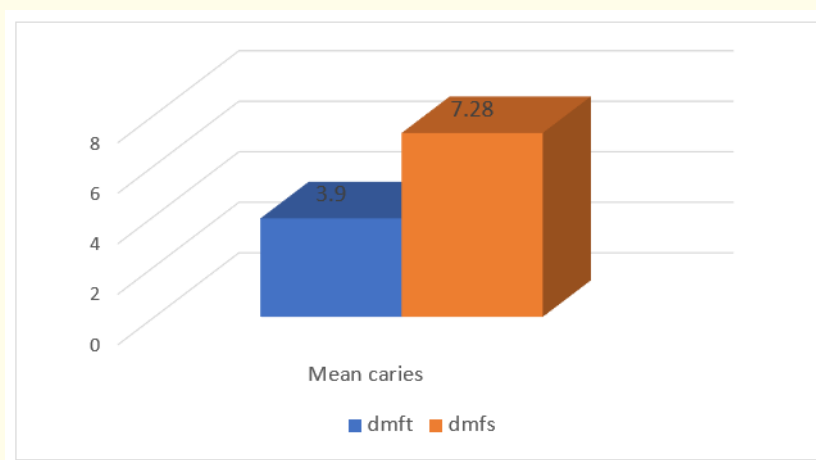


Figure 2: The mean dmft and dmfs in primary teeth caries.

Caries distribution among individual teeth

The distribution of dental caries according to the jaw and among individual teeth is shown in table 8. The prevalence of caries was slightly higher in maxillary teeth (20.55%) than in mandibular teeth (18.46%), it was higher in molars than in incisors and canines, especially in left mandibular 2nd molar tooth (46.1%), followed by left mandibular first molar tooth (39.8%). The lowest prevalence was in lateral incisors especially right mandibular (2.1%). The mean dmft was significantly high in molars (2.88 ± 2.83) than in incisors (0.86 ± 1.57) and canines (0.17 ± 0.57) with p. value less than 0.001 (Table 9).

Prevalence of caries among individual teeth										
Primary teeth	Maxillary					Mandibular				
	Right		Left		Total	Right		Left		Total
	Freq.	%	Freq.	%	%	Freq.	%	Freq.	%	%
Central Incisor	78	23.5	85	25.6	24.6	10	3	10	3	3
Lateral Incisor	43	13	49	14.8	13.9	6	1.8	7	2.1	1.95
Canine	17	5.1	16	4.8	4.95	7	2.1	13	3.9	3
First Molar	87	26.2	85	25.6	25.9	124	37.3	132	39.8	38.55
2 nd Molar	111	33.4	111	33.4	33.4	151	45.5	153	46.1	45.8
Total percent	20.55%					18.46%				

Table 8: Caries distribution among individual teeth.

The Mean (\pm SD) teeth decay, missing, filled and dmft in primary teeth.				
	Incisors	Canines	Molars	Sig. (p. value)
Decayed (dt)	0.79 (1.54)	0.15 (0.54)	2.30 (2.51)	0.001
Missing (Mt)	0.05 (0.37)	0.01 (0.11)	0.04 (0.28)	0.090
Filled (Ft)	0.02 (0.23)	0.01 (0.11)	0.54 (1.54)	0.000
Dmft	0.86 (1.57)	0.17 (0.57)	2.88 (2.83)	0.001

Table 9: The mean dt, mt, ft and dmft among individual teeth.

Dental caries according to social standard (school tuition level)

The frequency of dental caries was significantly low in high social standards (school tuitions) (49.3%) as compared to middle (72.8%) and low (75.4%) social standards (Figure 3). In comparison, the mean dmft was significantly low in high social standard (high school tuitions) to middle (p. value = 0.003) and low social standard (p. value = 0.001) (Table 10). There were no significant differences between the means of dmfs based on the social standards (school tuitions) except the significant difference between the high mean dmfs of children of low social standards (8.34) and the low mean dmfs of children of high social standard (4.71) in which the p-value was 0.029 (< 0.05) also mean ds were significantly higher in children of low and middle tuition schools in relation to children of high tuition schools (p. value = 0.004 (Table 11 and figure 3).

The Means of teeth decay (dt), missing (mt), filled (ft) and dmft in relation to school tuitions and Jeddah regions									
Caries Experience	School Tuitions				Jeddah Regions				
	Low	Middle	High	P. value	North	East	West	South	p. value
Patients' N	134	125	73	-	26	116	102	88	-
Decay (dt)	3.86 \pm 4.12	3.62 \pm 3.70	1.42 \pm 2.41	0.001	4.77 \pm 4.97	3.75 \pm 3.98	3.03 \pm 3.74	2.33 \pm 2.72	0.007
Missing (mt)	0.16 \pm 0.67	0.04 \pm 0.20	0.14 \pm 0.75	0.225	0.04 \pm 0.20	0.07 \pm 0.41	0.14 \pm 0.65	0.15 \pm 0.70	0.650
Filled (ft)	0.51 \pm 1.39	0.49 \pm 1.53	0.79 \pm 2.04	0.377	0.46 \pm 0.99	0.41 \pm 1.46	0.47 \pm 1.39	0.90 \pm 0.07	0.152
Dmft	4.52 \pm 4.55	4.14 \pm 4.03	2.36 \pm 3.22	0.001	5.27 \pm 5.16	4.23 \pm 4.20	3.64 \pm 4.35	3.38 \pm 3.46	0.147
The mean dmft was significantly higher in children of low and middle tuitions schools in relation to children of high tuition schools (p. value = 0.001)					The mean dt was significantly higher in north and east Jeddah than in west and south Jeddah (p. value = 0.007)				

Table 10: The means of ds, ms, fs and dmft in primary teeth according to school tuitions and Jeddah regions.

(I) Codes	(J) Codes	Mean Difference (I-J)	Sig. (P. Value)
dmfs in low tuitions' schools	dmfs in Middle tuitions' schools	0.696	0.623
	dmfs in high tuitions' schools	3.623*	0.029
dmfs in middle tuitions' schools	dmfs in high tuitions' schools	2.928	0.082

Table 11: Significance of mean dmfs between different schools' levels (low, middle and high).

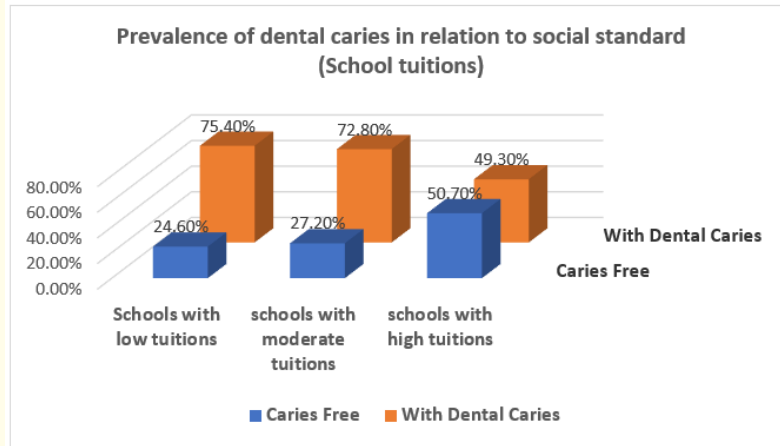


Figure 3: Prevalence of dental caries in relation to social standard (School tuitions).

Dental caries according to jeddah regions

Results indicate that dental caries prevalence among schools in different regions in Jeddah showed no significant difference in the frequency of dental caries in relation to different Jeddah regions (North, East, West, South) (p. value = 0.122) (Table 12 and figure 4). However, there were no significant differences between the means of mt, ft, and dmft except for dt that showed significant difference between different Jeddah regions which was high in North and East of Jeddah than in West and South of Jeddah (p. value = 0.007) (Table 10). There were no significant differences between the means of ms, fs, and dmfs except for ds that showed significant difference between different Jeddah regions which was high in North than East, West and South of Jeddah (p. value = 0.003) (Table 12-14 and figure 4).

Jeddah Regions and Frequency of Dental Caries						Pearson Chi-Square		
		North J	East J	West J	South J	df	X ²	Sig.
Caries Free	Count	4	33	39	28	3	5.79	0.122
	Expected Count	8.1	36.3	32.0	27.6			
With Caries	Count	22	83	63	60			
	Expected Count	17.9	79.7	70.0	60.4			
Total	Count	26	116	102	88			
	Expected Count	26.0	116.0	102.0	88.0			

Table 12: Frequency of dental caries in relation to different Jeddah Regions.

The Means of teeth decay (dt), missing (mt), filled (ft) and dmft in relation to school tuitions and Jeddah regions									
Caries Experience	School Tuitions				Jeddah Regions				
	Low	Middle	High	P. value	North	East	West	South	p. value
Patients' N	134	125	73	-	26	116	102	88	-
Decay (dt)	3.86 ± 4.12	3.62 ± 3.70	1.42 ± 2.41	0.001	4.77 ± 4.97	3.75 ± 3.98	3.03 ± 3.74	2.33 ± 2.72	0.007
Missing (mt)	0.16 ± 0.67	0.04 ± 0.20	0.14 ± 0.75	0.225	0.04 ± 0.20	0.07 ± 0.41	0.14 ± 0.65	0.15 ± 0.70	0.650
Filled (ft)	0.51 ± 1.39	0.49 ± 1.53	0.79 ± 2.04	0.377	0.46 ± 0.99	0.41 ± 1.46	0.47 ± 1.39	0.90 ± 0.07	0.152
Dmft	4.52 ± 4.55	4.14 ± 4.03	2.36 ± 3.22	0.001	5.27 ± 5.16	4.23 ± 4.20	3.64 ± 4.35	3.38 ± 3.46	0.147
The mean dmft was significantly higher in children of low and middle tuitions schools in relation to children of high tuition schools (p. value = 0.001)					The mean dt was significantly higher in north and east Jeddah than in west and south Jeddah (p. value = 0.007)				

Table 13: The means of ds, ms, fs and dmft in primary teeth according to to school tuitions and Jeddah regions.

The Means of teeth surfaces decay (ds), missing (ms), filled (fs) and dmfs in relation to school tuitions and Jeddah regions									
Caries Experience	School Tuitions				Jeddah Regions				
	Low	Middle	High	P. value	North	East	West	South	p. value
Patients' N	134	125	73	-	26	116	102	88	-
Decay (ds)	6.25 ± 11.02	5.78 ± 8.36	2.05 ± 4.67	0.004	10.62 ± 17.58	5.53 ± 8.58	5.03 ± 8.79	3.19 ± 5.00	0.003
Missing (ms)	0.78 ± 3.35	0.20 ± 0.98	0.68 ± 3.76	0.225	0.19 ± 0.98	0.34 ± 2.06	0.69 ± 3.23	0.74 ± 3.52	0.650
Filled (fs)	1.37 ± 4.55	1.66 ± 6.38	1.97 ± 6.70	0.772	0.81 ± 2.12	1.35 ± 5.88	1.37 ± 5.13	2.47 ± 6.95	0.419
Dmfs	8.34 ± 12.82	7.64 ± 10.67	4.71 ± 9.65	0.084	11.62 ± 17.81	7.14 ± 10.33	7.09 ± 11.92	6.40 ± 9.70	0.231
The mean ds were significantly higher in children of low and middle tuitions schools in relation to children of high tuition schools (p. value = 0.004)					The mean ds was significantly higher in north than east, west and south Jeddah (p. value = 0.003)				

Table 14: The means of ds, ms, fs and dmfs in primary teeth according to to school tuitions and Jeddah regions.

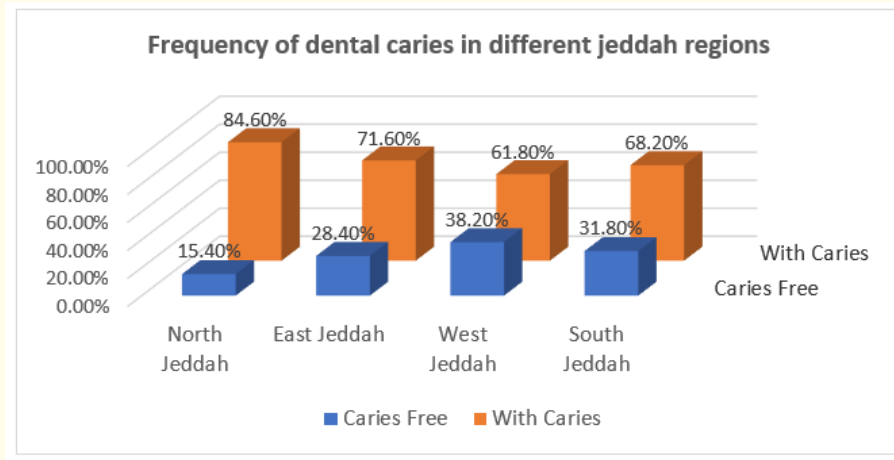


Figure 4: Prevalence of dental caries in different Jeddah regions.

Discussion

The present study demonstrated the prevalence of dental caries, severity, pattern and caries distributions in the teeth and surfaces on a sample of two- to- five years old children from different regions in Jeddah, Saudi Arabia. The present study was done as a result of a limited number studies around the past twenty years that evaluated the prevalence and severity of caries among this age group in Jeddah. This type of studies need to be conducted regularly to examine the time trends in caries status over the period of time, to help authorities utilization in designing of future preventive strategies, and promoting oral health among the population.

Sampling was based on schools that had been stratified into those privately funded. The study was applied as an oral health promotion program in these schools to encourage oral health in this particular group of children. Many studies carried out in Saudi Arabia have demonstrated caries as a problem amongst children in this country [1,5,7-12,15].

ECC in our study was (68.7%) as compared to Alamoudi (20%) done in 1996, and Al-Malik (73%) done in 2003 [8,10]. There is a need for immediate action to be commenced by the authorities. Less increase in caries from 1998 to this date maybe due to the fact of the increase in the awareness of parents about dental hygiene.

Similar recent studies was conducted in Saudi Arabia found to have similar findings, in Riyadh (69%), Dawadmi (72.77%), and in Al-Ahsaa (62.7%), while the lowest ECC prevalence was found in Riyadh (27.3%) in 2001 [5,7,9,15].

There was no significant difference in caries prevalence in relation to gender. The dmft and dmfs score increased with age. The major part of dmft and dmfs was the decay component, which results in a high percentage of untreated caries and a high number of treatments required for these children. The mean dmft was significantly higher in four- and five- years old children by (3.99 ± 4.29) and (4.30 ± 4.37) respectively, than in two- and three- years old children. The mean dmft was (3.90 ± 4.16) in this study and the dmfs was (7.28 ± 11.44) which is similar to Al-Malik study (4.80 ± 4.87) and (12.67 ± 15.46) respectively [10].

In our study, caries distribution according to the jaw and among individual tooth was found to be slightly higher in maxillary teeth (20.55%) than in mandibular teeth (18.46%), the second mandibular molars had the highest prevalence of caries (45.8%) followed by mandibular first molars (38.55%). While the mandibular lateral incisors had the least caries prevalence by (1.95%) respectively, similar to a previous study in Saudi Arabia [1]. Whereas, Al-Malik have found that the most commonly affected teeth with caries were the mandibular first molars (61.2%) followed by the second molars (60%) but the least affected were the mandibular lateral incisors (7.7%). In our study and Al-Malik study, the mandibular lateral incisors were the least affected [10]. While, in this study the second molars was mostly affected.

Wyne stated that among the anterior teeth, the highest caries prevalence was the maxillary central incisors (27.9%) and the mandibular lateral incisors had the lowest caries prevalence (3.0%). These findings are similar to our study in which maxillary central incisors had a caries prevalence of (24.6%) while mandibular incisors had a caries prevalence of (3%). In general, caries affecting the maxillary central incisors more than mandibular incisors [1].

There were no significant differences between the means of mt, ft and dmft except for dt that showed a significant difference between Jeddah's regions which was higher in Northern and Eastern regions than in Western and Southern regions (P value 0.007). There were no significant differences between the means of ms, fs, and dmfs except for ds that showed significant differences between regions which was higher in Northern than other regions (P value 0.003).

When social class was based on school tuition level, the lowest frequency of dental caries was seen in children from high school tuition level (49.3%) as compared to low and middle level which was (75.4%) and (72.8%) respectively. In this selected population, caries at its high levels due to poor dental awareness, poor oral hygiene, and improper dietary habits. It can be also related to delaying first dental routine checkups. In Saudi Arabia it is common for children to start brushing at late age which can be correlated to the high levels of caries [16,17].

Regardless of free availability of dental care in Saudi Arabia and considerable governmental spending on the dental services, a high dmft and decayed component still exists. This could be related to either failure to go for dental treatment or the incapability to see the dentist. Regular dental checkups are not common in Saudi Arabia because children usually visits the dentist in dental emergency or pain [16].

To achieve good outcomes in oral health, it is essential to raise awareness by promoting oral health campaigns among parents and their children. Health care providers should emphasize the importance of maintaining a healthy habit. The high rate of untreated carious teeth among preschool children showed an absence of community awareness and understanding that prevention and treatment of caries which should begin in early childhood. It is also important for the dentists, to change their services from restorative to preventive and it is recommended to emphasize the importance of limiting cariogenic snacks and drinks. Therefore, dental awareness of the children and their parents by dental professionals will play an important role in prevention of dental caries in their permanent dentition. Starting a preschool dental service is recommended and the needs to include guardians and preschool teachers of these children in caries prevention programs. Moreover, it is advised to improve the training of dental auxiliaries including dental therapists, dental hygienists, and dental educators to promote dental caries control.

Limitations of this study were that the public schools were not approached due to the authorization policy difficulties. However, the sample in this study was concentrated mainly around the private schools and unbiased conclusion was not possible in terms of comparing of private schools with public schools. Though, further investigation needs to be commenced among the public schools. It is recommended to follow up the studies with a bigger sample size in the future.

Conclusion

The epidemiological data of many countries shows an increase in the prevalence of dental caries as also concluded by our study in Jeddah. It is important to prepare preventive programs for preschool children and strong primary health care system to achieve the WHO goal for oral health. Therefore, dental care providers should be emphasized to provide knowledge and skills of brushing in the clinic to the parents especially when dealing with children of five years or less as early as possible.

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