Oral health status among kindergarten children in Karbala city\Iraq

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ABSTRACT

Back ground: Dental caries and periodontal disease followed by enamel defect were the most common and widely spread diseases affecting children. Aim of this study is the assessment of the occurrence and severity of dental caries, dental plaque, gingivitis and enamel anomalies among 4-5 years old children in Karbala city-Iraq.

Materials and methods: A sample of 658 children (350 males, 308 females) aged four and five years old was selected randomly from the fourteenth kindergartens in Karbala city. Diagnosis and recording of dental caries and enamel anomalies were followed the criteria of WHO 1987, WHO1997 respectively. Dental plaque was assessed using plaque index of Silness and Loe,1964. Gingival health condition was assessed using gingival index of Loe and Silness, 1963.

Results: : Caries prevalence was found to be 83% of the total sample. the mean rank value of dmfs was higher among boys in comparison to girls with statistically no significant difference(P>0.05). The value of dmfs increased with age with statistically highly significant difference (p<0.01). Recording of this study demonstrated that 100% of children had dental plaque and gingival inflammation. The mean rank values of dental plaque and gingival indices for total boys were found to be higher than total girls with statistically highly significant differences (P<0.01). Positive highly significant correlations were recorded between dental caries with dental plaque and gingival indices. In general, the percentage of enamel anomalies was found to be (39.8%). The mean rank values of any type of enamel defect were found to be higher among boys than girls with statistically significant differences (P<0.05). The most prevalent type of enamel defect was found to be hypoplasia followed by diffused opacities and then demarcated opacities.

Conclusion: High prevalence of dental caries and gingivitis was recorded indicating the need of public and preventive programs among kindergarten children.

Keywords: Dental caries, Oral hygiene, Gingivitis, Enamel defect and Karbala city. **(J Bagh Coll Dentistry 2017; 29(4): 82-88)**

INTRODUCTION

Dental caries is an irreversible infectious disease of the hard tissue of the tooth described by demineralization of inorganic portion and destruction of organic matter of the tooth lead to cavitation, it affects persons of every age group, in all races and both gender [(1)]. Dental caries is considered as a multifactorial disease of several factors, diet, microflora, host and time [(2,3)]. The caries process can develop as soon as the tooth erupt in the oral cavity [(4)]. High prevalence and severity of dental caries were reported in different geographical locations and in different age groups that conducted with previous epidemiological studies [(5,6)].

The most common type of periodontal disease in children is gingivitis which may start early in life and increase in severity with age [(7)].

Gingivitis is a reversible condition, if it is not treated, it may progress later in life to periodontitis and if periodontitis developed, it may end with loss of teeth [(8)].

Previous epidemiological studies were conducted concerning the prevalence and severity of gingivitis and reported a high prevalence of gingivitis among different ages [(6,9)].

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Enamel defect is a disorder that may cause problems with teeth structure during the period of the enamel matrix formation [(10)], that clinically appeared in one or more of three forms; demarcated opacities (well bounded), diffuse opacities (have no boundaries) and hypoplasia (partially or complete lack of enamel surface)[(11)]. In Iraq, several studies were conducted among kindergarten children regarding the oral health status in different geographical areas [(6,9)]. Yet, no previous epidemiological study conducted among kindergarten children in Karbala city in Iraq, therefore, this study was designed and conducted.

MATERIALS AND METHODS

This study was conducted among kindergarten children during the period between the middle of December (2015) till the end of March (2016) in Karbala city, Iraq.

The sample consisted of kindergarten children aged four and five years old. The age was taken according to criteria of World Health Organization [(11)] according to last birthday. According to Ministry of Education, the estimated number of 4 and 5 years kindergarten children living in urban areas of Karbala city/Iraq was (3333) including (1765) males and (1568) females. The sample of this study consisted of (658) randomly selected kindergarten children (350) males and (308) females.

In urban area of Karbala, there were fourteen sections according to division of the General Direction of Education and in each section, there was one kindergarten, all the kindergartens were included in this study and from each kindergarten, 47 children were selected randomly [12]. Children who cooperative and without medical disease were included only. Diagnosis and recording of dental caries was according to the criteria described by WHO [13]. Plaque index of Silness and Loe [14] was used for plaque assessment, gingival index of Loe and Silness [15] was followed for recording gingival health condition. Enamel anomalies index of WHO [11] was used to assess enamel anomalies. The statisticwere used in this study Mann-Whitney, Z-test and P-value.

RESULTS

Table (1) illustrates the distribution of the total sample by age and gender. Results showed that the prevalence of dental caries was (83%) for the total sample, total boys recorded a higher percentage of dental caries (84%) compared to total girls (81.8%). The children at 5 years were found with higher percentage of dental caries compared to boys at 4 years of age (Table 2). Table (3) describes caries experience (Median, Mean Rank of ds, ms, fs, dmfs) among children by age and gender. Dental caries was found to be higher in boys compared to girls in the total sample with statistically significant difference for the ds component (Z=-1.981, Mann-Whitney=0.048, p<0.05), the mean rank values of dmfs for five years old boys and girls were higher than those values among boys and girls of four years old with statistically highly significant differences between them (Z=-4.927, Mann-Whitney=0.001, p<0.01), (Z=-3.288, Mann-Whitney=0.001, p<0.01) respectively. also, dental caries was higher at five years than at four years with statistically highly significant difference for the ds, ms and dmfs (Z=-4.906,Mann-Whitney=0.001,p<0.01),(Z=-5.163, Mann-Whitney=0.001,p<0.01),(Z=-5.918,Mann-Whitney=0.001, p<0.01) respectively.

Concerning plaque and gingival indices, the total boys were found with higher plaque and gingival indices than among total girls with statistically highly significant differences (Z=-4.063, Mann-Whitney=0.001,P<0.01), (Z=3.507, Mann-Whitney=0.001, p<0.01) respectively. At five years old, the plaque and gingival indices were found to be higher than four years old with statistically no significant differences (p>0.05) as shown in Table (4). The prevalence of gingival index was found to be 100%, the same result was reported with plaque index. The correlations between dental plaque and gingivitis with dental caries were positive and highly significant (p<0.01). A very positive strong and highly significant correlation was recorded between plaque and gingival indices (r=0.915, p<0.001). Prevalence of enamel anomalies was (39.8%) of total sample (Figure 1). Furthermore, the enamel defect was higher among boys than girls for the all three types of defects with statistically significant differences for demarcated opacities (Z=-2.007, Mann-Whitney=0.045, p<0.05) and hypoplasia (Z=-2.506, Mann-Whitney=0.012, p<0.05) (Table 5). For the total sample, the only three types of enamel defect were recorded. The most prevalent type was hypoplasia (22.2%) followed by diffused opacities (14.7) and demarcated opacities (9.9%) as showed in figure (2).

Table 1: The distribution of total sample by age and gender.

Age (year)	Gender					
	Boys		Girls		Total	
	No.	%	No.	%	No.	%
4	140	52.6	126	47.4	266	40.4
5	210	53.6	182	46.4	392	59.6
Total	350	53.2	308	46.8	658	100

Table 2: Prevalence of dental caries among children by age and gender.

Age in year	Boys		Girls		Total	
	No.	%	No.	%	No.	%
4	108	77.1	100	79.4	208	78.2
5	186	88.6	152	83.5	338	86.2
Total	294	84.0	252	81.8	546	83.0

Table 3: Caries experience (Median, Mean Rank of ds, ms, fs, dmfs) among children by age and gender

Age in year	Gender	ds		ms		fs		dmfs	
		Median	Mean Rank	Median	Mean Rank	Median	Mean Rank	Median	Mean Rank
4	Boys	3	287.6	0	305.7	0	328.7	3	279.1
	Girls	4	283.3	0	300.9	0	324	4	273.6
	Total	4	285.6	0	303.4	0	326.5	4	276.5
5	Boys	8	380.3**	0	348.8**	0	330.3	10	383.1**
	Girls	6	335.1*	0	345.4**	0	333	8	345.2**
	Total	8	359.3**	0	347.2**	0	331.6	9	365.5**
Total	Boys	7	343.2*	0	331.5	0	329.6	8	341.5
	Girls	5	313.9	0	327.2	0	329.3	6	315.9

*Significant p<0.05
**Highly significant p<0.01

Table 4: plaque and gingival indices among children (Median and Mean rank) by age and gender

Age (year)	Gender	PlI		GI	
		Median	Mean Rank	Median	Mean Rank
4	Boys	0.583	360.1	o.666	354.2
	Girls	0.416	270.5	0.458	275.6
	Total	0.5	317.7	0.541	317
5	Boys	0.583	356.1	0.683	353.6
	Girls	0.5	316.1*	0.562	320*
	Total	0.5	337.5	0.625	338
Total	Boys	0.583	357.7**	0.666	353.9**
	Girls	0.458	297.4	0.521	301.8

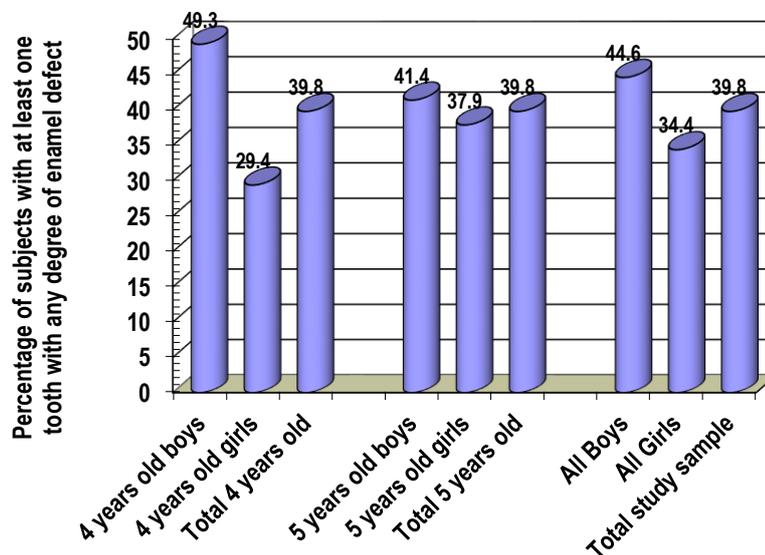***Significant p<0.05**
**Highly significant p<0.01

Figure 1: The distribution of children with enamel anomalies by age and gender.

Table 5: Median and mean rank teeth with enamel anomalies by age and gender.

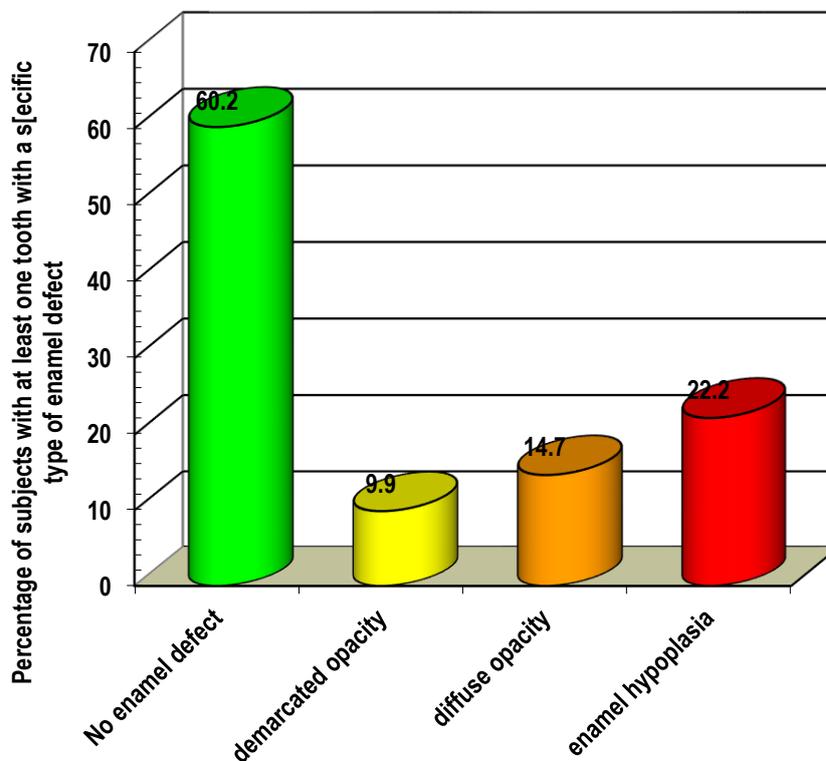| Age (year) | Gender | Type of defect | | | | | |
| | | Demarcated opacities | | Diffused opacities | | Hypoplasia | |
		Median	Mean Rank	Median	Mean Rank	Median	Mean Rank
4	**Boy**	0	337.6	0	344.3	0	347.2
	Girl	0	317.7	0	331.5	0	300.6
	Total	0	328.1	0	338.3	0	325.1
5	**Boy**	0	326.2	0	325.3	0	338.8
	Girl	0	323.8	0	321.6	0	325.2
	Total	0	330.4	0	323.6	0	332.5
Total	**Boys**	0	336.7*	0	332.9	0	342.2*
	Girls	0	321.3	0	325.6	0	315.1

*Significant p<0.05

Figure 2: Distribution of the sample according to types of enamel defect

DISCUSSION

The present study was designed to evaluate oral health status among kindergarten children in Karbala city in Iraq. The collected data are intended to be used as a data in evaluating the future efforts to improve oral health preventive program among preschool children in this country.

The percentage of dental caries in the present study was 83% that it was higher than that recorded by previous studies [6,9] and lower than that reported by others [5,16]. Differences in dietary habits, oral hygiene measurements as well as dental health services among governorates in addition to differences in geographical location [17] may explain the variation in the caries prevalence between the present study and others. The relatively high prevalence of dental caries recorded in this study may be an indication of the poor preventive [6] and educational programs [5] in the studied area. In the present study, boys showed higher caries experience than girls for the total sample. The same finding was reported by previous studies [6,9]. The variation between boys and girls in caries experience could be related to difference in oral cleanliness in the present study as a higher plaque index was recorded among boys. Bacterial plaque is regarded essential for

the initiation of dental caries [16]. The relation between dental caries and oral cleanliness (dental plaque) was reported also by previous Iraqi study [6]. The present study also reported the same correlation which was positive highly significant correlation. Regarding age, caries experience was found to be higher among five years children than among four years children. The same result was reported by previous studies [6,9]. This result could be attributed to accumulative and irreversible nature of dental caries [7].

In this study, boys showed a higher plaque index than girls with statistically highly significant difference, the same result was reported by previous Iraqi studies [6,9], while an opposite result was reported by Jabber [18]. This finding may be due to better oral hygiene among females rather than males because females are more oriented toward dental hygiene behavior like visiting the dentist and tooth brushing [6], however, this need to be confirmed in further studies regarding oral hygiene practices among children.

Concerning age, plaque index of 5 years old children was higher than that of 4 years old children. The same result was recorded by previous studies [5,19], while an opposite result was recorded by others [6,9], this could be explained by that older children feel more independent, and with inefficient tooth brushing [20] Additionally, the amount of plaque accumulation in children varies in accordance to their tooth brushing [21] and diet [22], However, this need to be confirmed in further studies regarding oral hygiene practices and dietary analysis among kindergarten children.

In this study, the prevalence of gingivitis was 100%, it was higher than that reported by previous studies [5,9], while the same result was reported by others [6,18]. The high percentage of dental plaque (100%) could explain the high percentage of gingivitis (100%) as dental plaque is a prime inducer of gingivitis [23] and this is supported by the statistically positive highly significant correlation between dental plaque and gingivitis in the present study. The gingival index was higher among boys compared to girls. This result could be attributed to higher plaque index among boys than among girls. The same finding was reported in previous studies [5,9].

Concerning age, gingival index of 5 years old children was higher than that among 4 years old children. The same finding was reported by previous studies [5,6], while an opposite finding was reported by other study [9]. The increase in gingivitis with advancing age could be explained by the increase in the amount of dental plaque with age and it was proven by different observational and experimental studies that dental plaque is the main cause of gingivitis [23] and both conditions get worse with age [24].

In this study, the prevalence of enamel anomalies was 39.8% which was higher than that reported by previous studies [6,18], While it was lower than that found by other studies [25,26]. It is important to mention that these studies differed in sample size, age of the group under study and location of the study. In the present study, the percentage of enamel defect was found to be higher among boys than girls. The same result was found in previous studies [6,27], while an opposite result was reported by others [18,28]. Definitive reason for this result is not documented but it may be partly explained by the inherent male vulnerability to stress, male on stressful environments would be expected to exhibit higher enamel anomalies than female [25]. In the present study, hypoplasia was the most common type of enamel defects. The same finding was reported by previous studies [29,30]. Enamel hypoplasia is a defect in tooth result when matrix formation is affected, the quantity of enamel is less than normal. Both quantity and quality of teeth may be affected [31]. Environmental stress [32], early childhood infectious disease and socio-economic status of the family have been associated with increased enamel defects in the primary teeth [33]. Furthermore, oxygen deprivation which occur as a result of a complication of difficult delivery and respiratory disease could influence the mineralization of enamel matrix [34].

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حالة صحة الفم بين اطفال رياض الاطفال في محافظة كربلاء/العراق

الخلاصة

المقدمة: تسوس الاسنان وامراض اللثة تليها تشوهات المينا هي اكثر الامراض انتشارا وعلى نحو واسع تؤثر على الاطفال.هدف البحث هو اجراء هذه الدراسة لحساب وجود وشدة تسوس الاسنان, الصفيحة الجرثومية, التهاب اللثة وتشوهات المينا للاطفال بعمر 4-5 سنوات في مدينة كربلاء-العراق.

المواد والطرق: العينة تتكون من (658) طفل (350 ذكر, 308 انثى) للاعمار اربعة و خمسة سنوات تم اختيارهم بصوره عشوائية من رياض الاطفال الحكومية في محافظة كربلاء المتكونة من اربعة عشر روضة. تشخيص وتسجيل تسوس الاسنان وتشوهات المينا كان وفقا لمعايير منظمة الصحة العالمية عام 1987, 1997 على التوالي. الصفيحة الجرثومية تم تقييمها باستخدام Loe and Silness (1964). حالة صحة اللثة تم تسجيلها باستخدام Loe and Silness (1963).

النتائج: نسبة انتشار التسوس وجدت 83% من اجمالي العينة. قيمة مؤشر متوسط تسوس الاسنان اللبنية (dmfs) كانت اعلى لدى مجموع الذكور مقارنة الى مجموع الاناث مع عدم وجود فروق معنوية (P>0.05). قيمة (dmfs) تزداد مع الاعمار مع وجود فروق معنوية عالية (p<0.01).

قيم رتب متوسط الرقم القياسي للصفيحة الجرثومية والتهاب اللثة لمجموع الذكور كانت اعلى من مجموع الاناث مع وجود فروق معنوية عالية (p<0.01). اظهر تسجيل هذه العينة بانه 100% من الاطفال مصابين بترسبات الاسنان والتهاب اللثة. لقد سجلت علاقة ايجابية وارتباط كبير للغاية بين التسوس, مؤشرات اللثة والصفيحة الجرثومية.

ان نسبة تشوهات المينا كانت 39,8%. وجد ان قيمة رتبة متوسط اي نوع من خلل المينا كان اعلى بين الاطفال الذكور من الاناث مع وجود فروق معنوية(P<0.05). النوع الاكثر انتشارا من خلل المينا كان (نقص التنسج) تليها (عتامه منتشرة) ومن ثم (عتامه محدده).

الاستنتاج: لقد سجلت نسبة عالية من التسوس والتهاب اللثة مبينا الحاجة الى برنامج وقائي وعام بين اطفال الروضة.