Dental caries changes between (1989) and (2001) in children aged (3–14) years in Kasa Fakhra and Al-Shamsiat villages, Ninevah Governorate, Iraq

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ABSTRACT

This study was designed to assess the trend of dental caries among children aged (3–14) years in Kasa Fakhra and Al-Shamsiat rural areas and compare the results with those obtained from the first study that conducted (12) years ago.

The study comprised (255) child aged (3–14) years, 117 (45.88%) males and 138 (54.12%) females. The sample was divided into four age groups (3–5), (6–8), (9–11) and (12–14) years. The numbers of children for each group were (31, 62, 92 and 70) respectively. Clinical examination was carried out in the village school in good natural daylight using plane mouth mirror and sickle-shaped caries explorer. The index used was based on the WHO criteria and examination was done for both primary and permanent teeth.

The results indicated that the mean DMFT for children aged (6–12) years regarding the total sample was (1.55), whereas the previous study recorded (3.06). The general mean for boys in this study (1.54) was nearly similar to the girls (1.56), while the boys in the previous study recorded a lower mean than girls (2.44) and (3.52), respectively.

Through the results, it could be noted that the mean dmft for primary teeth was (1.96) regarding the age group (3–5) years, increased with increase age to (2.43) for the age group (6–8) years, and decreased due to normal shedding of primary teeth and eruption of permanent teeth to (1.27) and (0.59) regarding age groups (9–11) and (12–14) years, respectively. All these means were lower than those in the previous study which were (3.7), (4.5), (2.6) and (0.9) respectively. The boys recorded lower mean of dental caries than girls (1.35) and (1.85) respectively.

The results, therefore, confirmed that the trend of dental caries for this young age group was decreased gradually throughout this period (1989–2001) due to the sharp decrease in the quantity of sugar consumed in the previous years because of the unfair embargo on Iraq. This lowered percentage of dental caries could be maintained so and further decreased in the future.

Key Words: Dental caries trend, permanent teeth, primary teeth, rural area

الخلاصة

تهدف هذه الدراسة إلى معرفة مدى الإصابة بتسوس الأسنان للأطفال من عمر (٣-١٤) سنة في قريتي قزة فخرة والشمسيات ومقارنتها مع الدراسة السابقة التي جرت قبل اثنتي عشرة سنة في نفس القريتين.

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شملت الدراسة (٢٥٥) طفل وطفلة بلغت أعمارهم (٣-١٤) سنة؛ كان عدد الذكور ١١٧ (٤٥,٨٨%) وعدد الإناث ١٣٨ (٥٤,١٢%). تم تقسيم العينة إلى أربعة مجاميع وهي (٣-٥) و(٦-٨) و(٩-١١) و(١٢-١٤) سنة وكان عدد الأطفال في كل مجموعة كما يلي (٣١ و٦٢ و٩٢ و٧٠) على التوالي. جرى الفحص السريري في مدرسة القرية في ضوء النهار الطبيعي باستعمال المرآة المستوية والمسبر المعقوف. استُخدِمَت الدلالة الخاصة بتسوس الأسنان طبقاً لمنظمة الصحة العالمية وتم فحص الأسنان اللبنية والدائمية.

أظهرت النتائج أن معدل نخر الأسنان الدائمية (DMFT) للأطفال من (٦-١٢) سنة للمجموع الكلي للعينة هو (١,٥٥) بينما سجلت الدراسة السابقة (٣,٠٦)؛ وكان المعدل العام للذكور في هذه الدراسة (١,٥٤) مقارب للإناث (١,٥٦)، بينما في الدراسة السابقة سجل الذكور معدل أقل من الإناث (٢,٤٤ و ٣,٥٢) على التوالي.

من خلال النتائج تبين أن معدل نخر الأسنان اللبنية (dmft) هو (١,٩٦) للفئة العمرية (٣-٥) سنة ويزداد مع زيادة العمر ليصبح (٢,٤٣) للفئة العمرية (٦ ٨) سنة؛ ثم يبدأ بالتناقص وذلك لفقدان الأسنان اللبنية طبيعياً وظهور الأسنان الدائمية ليصبح (١,٢٧ و ٠,٥٩) للفئتين العمريتين (٩-١١) سنة و(١٢-١٤) سنة على التوالي. وكانت جميع المعدلات لهذه الدراسة أقل من الدراسة السابقة فقد كانت (٣,٧ و ٤,٥ و ٢,٦ و ٠,٩) على التوالي. كما سجل الذكور معدل لنخر الأسنان أقل من الإناث (١,٣٥ و ١,٨٥) على التوالي.

لقد أثبتت نتائج هذه الدراسة أن تسوس الأسنان في هذه الفئة العمرية الصغيرة والشابة أخذ بالتناقص بنسبة كبيرة خلال هذه الفترة الزمنية في نفس القرية (١٩٨٩-٢٠٠١) وذلك بسبب الحصار الظالم على العراق. ويمكن الحفاظ على هذا المعدل الواطئ ثم العمل مستقبلاً على تقليله.

INTRODUCTION

For the last twenty years, rapid changes have occurred in the pattern of oral diseases, especially dental caries prevalence across different countries in the world. In the Western Industrialized Countries, a decline in caries prevalence among children and adolescents had been reported [1-5]. The factors to be considered in relation to the decline in caries are changing patterns of sugar consumption, fluoride in toothpastes, fluoride rinsing, improved oral hygiene and other school-based preventive programs. However, many Third World Countries reported an alarming increase in dental caries prevalence [6-8] during the 1970s and 1980s. One of them is Iraq because of the changes in matter and type of diet [9-10].

Many surveys were carried out on the prevalence of dental caries for the children across the different Governorates in Iraq [11-15]. No one evaluate the changes in caries over a long period of time, except one which carried out for nursery children in Mosul that evaluated the changes in deft after (10) years [16].

So, in order to study the trend of dental caries among children, this study was carried out in 2001, after (12) years from the first study [17] in the same rural area (Kasa Fakhra and Al-Shamsiat villages).

MATERIALS AND METHODS

The study was conducted in a rural area in two villages (Kasa Fakhra and Al-Shamsiat) in province of Ninevah Governorate. A sample of (255) children, aged (3-14) years, was selected using random cluster sampling from the population of the two villages. Each village was divided into four zones; two zones were then randomly selected and their whole children aged (3-14) years were examined. The examination of the teeth was carried out in the village school using a portable dental chair and adequate light.

According to the WHO's oral health survey basic methods [18], diagnosis of dental caries was performed using plane mouth mirrors and sickle-shaped explorers. Means of decayed, missing and filled teeth (dmft / DMFT) were calculated according to the DMF Index [19].

The statistical analysis of the data included the classification of data and calculation of the mean, standard deviation and frequencies. The differences between males and females were tested statistically using t-test. One way analysis of variance (ANOVA), followed by Duncan's Multiple Range Test were used to determine the significant difference among the age groups for DMFT and dmft indices. The differences were considered significant when the probability was less than (5%) level ($p<0.05$).

RESULTS

The sample comprised 117 (45.88%) boys and 138 (54.12%) girls and was divided into four age groups (table 1).

Table (1): Distribution of the sample by age and sex

Age Group	Boys	Girls	Total
3-5	15	16	31
6-8	33	29	62
9-11	40	52	92
12-14	29	41	70
Total	117	138	255

Table (2) shows the number and percentage of caries free children according to the age and sex. Of the total children examined, there were (22.3%) whom reported to be caries free (DMFT, dmft = 0). The total boys reported high percentage of caries free (26.5%) than girls (18.8%).

Table (2): Number and percentage of caries free children according to age and sex

Age Group	Boys		Girls		Total	
	No.	%	No.	%	No.	%
3–5	5	33.3	3	18.7	8	25.8
6–8	11	33.3	10	34.5	21	33.9
9–11	8	20.0	8	15.4	16	17.4
12–14	7	24.1	5	12.2	12	17.1
Total	31	26.5	26	18.8	57	22.3

Table (3) displays the mean and standard deviation for primary teeth (dmft) according to age and sex. The mean dmft was (1.96) for age group (3–5) years and then increased significantly to (2.34) at age group (6–8) years, then decreased significantly with increase of age to be (0.59) at age group (12–14) years. The total boys reported lower mean (1.31) than girls (1.53), with no significant difference between them.

Table (3): Mean ± standard deviation of dmft by age and sex

Age Group	Mean ± Standard Deviation		
	Boys	Girls	Total
3–5	1.80 ± 0.34	2.12 ± 0.39	1.96^{C} ± 0.35
6–8	1.95 ± 0.37	2.80 ± 0.46	2.34^{D} ± 0.43
9–11	1.13 ± 0.30	1.36 ± 0.35	1.27^{B} ± 0.33
12–14	0.56 ± 0.13	0.62 ± 0.15	0.59^{A} ± 0.14
Total	1.31 ± 0.34	1.53 ± 0.39*	1.42 ± 0.37

Means with different letters are statistically significant ($p<0.05$).
*No significant difference between total males and females ($p>0.05$).

Table (4) illustrates the mean and standard deviation for permanent teeth (DMFT) according to age and sex. The mean DMFT for the total sample was (1.55). the mean DMFT for age group (6–8) years was (0.64) and increased significantly with increase the age to be (2.74) at age group (12–14) years. the mean in boys and girls was similar.

Table (4): Mean ± standard deviation of DMFT by age and sex

Age Group	Mean ± Standard Deviation		
	Males	Females	Total
6–8	0.62 ± 0.12	0.65 ± 0.13	0.64 ^{A} ± 0.13
9–11	1.47 ± 0.29	1.65 ± 0.32	1.55 ^{B} ± 0.30
12–14	2.70 ± 0.41	2.78 ± 0.46	2.74 ^{C} ± 0.43
Total	1.54 ± 0.33	1.56 ± 0.32 *	1.55 ± 0.33

Means with different letters are statistically significant ($p<0.05$).
*No significant difference between total males and females ($p>0.05$).

Of all the "d", "m" and "f" components for primary teeth, "d" component contributed (96.7%), the "m" contributed (3.3%), while no any filling was recorded for all the sample. For permanent teeth, also "D" component contributed the high percentage (98.9%) and the "m" contributed (1.1%).

According to Black classification, dental caries for primary teeth in pits and fissures account (54.1%), proximal caries in posterior teeth account (43.4%) and proximal caries in anterior teeth recorded only (2.5%). For permanent teeth in pits and fissures dental caries account (95.9%), proximal caries in posterior teeth account (3%) and proximal caries in anterior teeth recorded only (1.1%).

Table (5) demonstrates the percentage of DMFT and dmft for each type of teeth separately. The results showed that (89.3%) of permanent teeth affected are first molars and the lower teeth are more affected than upper. Also the teeth in the right side are more affected than those in the left side; then the second molars recorded (8.8%) of affected teeth. While the premolars and anterior teeth were recorded (0.7%) and (1.2%) respectively. For the primary teeth, the most affected teeth were second molars (58.3%), followed by first molars (39.2%). Also the lower teeth are more affected than upper teeth.

Table (5): Percentage of DMFT and dmft for each individual teeth

Type of Tooth		Upper		Lower		Total
		Left	Right	Left	Right	
Permanent	First Molars	19.2	18.5	23.5	28.1	89.3
	Second Molars	1.8	2.0	2.5	2.5	8.8
	Premolars	/	/	/	/	0.7
	Anterior Teeth	/	/	/	/	1.2
Primary	First Molars	5.8	5.5	14.6	13.2	39.2
	Second Molars	12.1	12.7	14.1	19.3	58.3
	Cuspids	/	/	/	/	1.4
	Anterior Teeth	/	/	/	/	1.1

DISCUSION

This is the first study that carried out in Iraq to evaluate the trend of dental caries in children for the same age group after (12) years of the first study in the same area. The trends call to integrate planning of preventive and treatment services.

The sample in this study (255 children) is comparable with that in the previous study (278 children). The study revealed that (22.3%) of the total sample are caries free, while in previous study only (5.4%) are caries free; that means an improvement of (17%) in percentage of caries free children over the previous (12) years was achieved. The percentage of caries free children in age group (3–5) years for primary teeth was (25.8%), and for age group (6–8) years for mixed dentition was (33.9%) and then decreased to half (17.4%) for age group (10–12) years. The boys reported high percentage of children who are caries free (26.5%) than girls (18.8%).

The mean DMFT for the total sample in this study was (1.55), while in the previous study was (3.06). The mean for total boys and girls was comparable (1.54 and 1.56) respectively, and it was noticed that the mean was less than the previous study (2.44 and 3.52) respectively.

The results revealed no significant difference in mean DMFT between boys and girls. This was in accordance with other studies [11, 14, 20, 21].

According to the age group, the mean of DMFT was (0.64) for (6–8) years old and it increased significantly to (1.55) for (9–11) years old. Also, it increased significantly to (2.74) for (12–14) years old. However, these means were less than the previous study (1.4, 2.7 and 5) respectively.

The results have shown that the mean of DMFT increased with age, and there was significant difference between the three ages, which indicates that dental caries prevalence and severity increased with advancing age. This is in agreement with other studies [12, 22–24].

The mean DMFT for age group (12–14) years was (2.74). It is considered a moderate level according to WHO classification and it meets the goal which was developed jointly be the WHO and FDI, that the average of no more than (3) DMFT at the age of (12) years by the year (2000).

The mean dmft for the total sample in this study was (1.42), while in the previous study it was (2.79). According to the age groups, the mean of dmft was (1.96) for the age group (3–5) years and it increased to (2.34) for the age group (6–8) years, then decreased significantly to (1.27) and (0.59) for the age groups (9–11) and (12–14) years respectively. Caries experience in the primary dentition appears to be decreasing with age as the primary teeth exfoliate at older ages. The mean dmft for boys (1.31) was lower than girls (1.53) with no significant difference between them. This is in accordance with the other studies [14, 16, 25].

The study indicated that the decayed component of the DMFT score had the greatest value (96.7%), while there was no filled teeth. This means the presence of high percentage of carious teeth not treated. This is in accordance with other studies in developing countries as South Africa [26], Southern Sudan [27], Tanzania [28] and Iraq [11, 12, 29]; in contrast to the results reported in developed countries where the majority of DMFT index was formed of filled teeth [30–32]. Also the study indicated a very high proportion of decayed primary teeth (98.9%). This may reflects an unawareness of importance of the primary teeth or negative attitude of the parents towards dental treatment and, in turn, lack of cooperation of children.

There was no any filling tooth among children. This indicated that the therapeutic dentistry for children was very restricted. This reflects the limited dental awareness in addition to limited utilization of dental services due to unavailability of dental clinics in the area and the cost of the treatment.

The study indicated that the type of decay was almost in pits and fissures for permanent teeth (95.9%) and the molar teeth account (98.1%), and especially the first molars (89.3%), to be affected by caries. This is in accordance with many studies [11, 14, 33, 34]. Also caries experience was found to involve more mandibular posterior teeth than maxillary teeth. This is in agreement with other studies in Iraq [11, 12, 35]. These differences in caries susceptibility may be related to difference in the morphology of the teeth. most of the carious lesions are strictly fissures and pits, which are present frequently in the mandibular molars. Therefore, the most effective preventive method is the use of pit and fissure sealant [36-38].

From these findings comparing with the previous study, it can be noticed that there was decrease in proximal caries of posterior teeth.

For primary teeth, also molar teeth account high percentage to be affected by dental caries (97.5%). The primary second molar reported high percentage (58.3%), then the first molar (39.2%). The high prevalence of caries was in pits and fissures (54.1%), followed by proximal caries of posterior teeth (43.4%), while only (2.5%) of caries were reported in anterior teeth.

In conclusion from the findings of this study, there was an increase of caries free children (17%) and reduction in the prevalence of dental caries. There was a reduction in mean dmft about (50%) and DMFT about (50%) and decrease in the proximal caries in posterior teeth comparing with the previous study before (12) years, using the same criteria. This difference may be due to change in dietary habits

due to the decrease in sugar availability due to unfair embargo imposed on Iraq since (1990). In addition to that, this difference may be due to the alteration in diet after the embargo that having an important pre-eruptive resulting in a change in the caries susceptibility of the teeth [39]. Other reason may be due to increase the number of children who brush their teeth and the availability of the fluoride dentifrice in the market [40], which may have an effect in reducing dental caries.

There is a continuing need for monitoring the trends of dental caries and other dental health measures to involve large scale of population in different Governorates of Iraq.

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