

Dental caries experience of rural and urban school children in Ninevah province . A comparative study

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ABSTRACT

The aim of the study was to determine the prevalence of dental caries in an urban and a rural area in Mosul city , a sample of 240 school children aged 6-14 years was examined . The sample was divided into 3 age groups 6-8 , 9-11 and 12-14 years .

The WHO methodology (1997) was used to assess the individual tooth status , results of dental caries in the primary dentition revealed that the mean dmft was decreasing with increasing age as it was 3.5 , 2.12 and 0.57 for age groups 6-8 , 9 11 and 12-14 years respectively with no sex variation but with statistically significant difference in location (1.69 in the rural and 2.44 in the urban area) .

For the permanent dentition the mean DMFT was increasing with increasing age with a statistically significant age difference , as it was 0.2 , 1.34 and 2.45 for age groups 6-8 , 9-11 and 12-14 years respectively , results also showed a statistically significant sex difference 1.12 for total males and 1.53 for total females , in addition to significant difference in location 1.68 for urban and 0.98 for rural areas .

Key words: Dental caries, urban, rural, tooth status, school children.

الخلاصة

ان الهدف من الدراسة هو التعرف على انتشار ظاهرة تسوس الاسنان والمقارنة بين منطقة ريفية واخرى حضرية في مدينة الموصل . لقد تم فحص عينة مكونة من 240 طفلاً في مرحلة الدراسة الابتدائية تتراوح اعمارهم بين 6 - 14 سنة ، تم تقسيم العينة الى 3 فئات عمرية 6 - 8 ، 9 - 11 و 12 - 14 سنة.

لقد استخدمت توصيات منظمة الصحة العالمية لسنة 1997 لبيان حالة الاسنان ، دلت نتائج البحث بأن التسوس في الاسنان اللبنية باحتساب مؤشر dmft للعينة بأن التسوس يقل بازياد العمر حيث كان 3.5 ، 2.12 و 0.57 للمراحل العمرية 6 - 8 ، 9 - 11 و 12 - 14 سنة على التوالي وبدون فروقات معنوية بالنسبة للجنس ووجود فرق معنوي احصائي بالنسبة للمنطقة (حيث كان 1.69 بالنسبة للمنطقة الريفية و 2.44 بالنسبة لمنطقة الحضرية) .

اما بالنسبة للاسنان الدائمة فان معدل DMFT كان يزداد بازياد العمر بفرق معنوي احصائي ، حيث كان 0.2 ، 1.34 و 2.45 للفئات العمرية 6 - 8 ، 9 - 11 و 12 - 14 سنة على التوالي ، اظهرت الدراسة وجود فرق معنوي احصائي بالنسبة لانتشار التسوس في الذكور والاناث بالنسبة للاسنان الدائمة حيث كان 1.53 لمجموع الاناث و 1.12 لمجموع الذكور بالاضافة الى وجود فرق احصائي بالنسبة للمنطقة حيث كان 1.68 للمنطقة الحضرية و 0.98 للمنطقة الريفية .

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INTRODUCTION

Dental caries is one of the most common oral diseases, it is a major problem in dentistry and should receive significant attention from a restorative and preventive stand point⁽¹⁾.

Oral health has considerably improved in industrialized countries mainly due to the wide spread use of fluorides and a change in dietary habits^(2,3,4), while developing countries have experienced a deterioration in oral health due to a change in socioeconomic conditions, dietary habits and lack of education⁽⁵⁾.

In fact dental caries has arisen in many developing countries at an alarming rate⁽⁶⁾. Furthermore, there have been many studies that reported variations in dental caries prevalence with in the same country, where as caries was less in rural areas compared to urbanized ones^(7,8,9,10). There have been several studies in Mosul on caries experience in rural areas alone^(11,12,13) and other studies that determined the caries experience in urban areas alone^(14,15,16). However, this present study is a comparative study that deals with caries experience in both rural and urban areas.

MATERIALS AND METHODS

The sample of the study was composed of 240 primary school children aged 6-14 years taken from one rural primary school in Al-Busaff district (which is a rural area that lies nearly 10 km South of Mosul city on the right bank of the river Tigris) and 2 urban schools from the center of Mosul city (one school for boys and one for girls, both schools represented the middle socioeconomic class in the city). 120 children were examined from each of the 2 areas (60 males and 60 females). The sample was divided into 3 age groups 6-8, 9-11 and 12-14 years, 20 children in each group were examined for both sex in both urban and rural areas.

Oral Examination

Examination of the teeth was performed according to the basic method of the Oral health survey of WHO for the year 1997⁽¹⁷⁾ DMFT and dmft indices were used.

The examination for dental caries was carried out using plane mouth mirrors and sharp sickle shaped dental caries explorers.

Radiography for detection of approximal caries was not used because of the impracticability of using the equipment. The examination was performed in classrooms, children chosen randomly from the list were examined, each child was seated on a chair with his head backward, examination was performed under natural day light, all the teeth present in the mouth were examined in a systematic approach starting from the last upper right molar and proceeding in an orderly manner from one tooth or tooth space to the adjacent tooth or tooth space till the last lower right molar. The condition was registered in a special case sheet, information regarding name, age and sex of the students was registered prior to examination.

Statistical Analysis

The Complete Randomized Design (CRD) was used for analysis. Means were tested for their significant difference at 0.05 level using Duncans multiple range test.

RESULTS

Table (1) shows the distribution of the sample by age and sex. The sample was composed of 240 children, 120 male (50%) and 120 females (50%) equally divided among three age groups 6-8, 9-11 and 12-14 years, each group formed about 33.3% of the total sample.

Table (1) : Distribution of the Sample by Age and Sex

Age Years	Urban				Rural				Total			
	Male		Female		Male		Female		Male		Female	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
6 - 8	20	8.33	20	8.33	20	8.33	20	8.33	40	16.66	40	16.66
9 - 11	20	8.33	20	8.33	20	8.33	20	8.33	40	16.66	40	16.66
12 - 14	20	8.33	20	8.33	20	8.33	20	8.33	40	16.66	40	16.66
Total	60	25	60	25	60	25	60	25	120	50	120	50

Table (2) shows the mean dmft for the total sample . There was a statistically significant difference in dental caries between urban and rural areas 2.44 and 1.69 respectively . No significant difference was found between total males and females 1.84 and 2.29 respectively , table (3) displays the mean DMFT for the total sample . There was a statistically significant difference in mean DMFT for urban and rural areas 1.68 and 0.98 respectively also females had more caries than males with a significant difference 1.53 and 1.12 respectively .

Table (2) : Mean dmft and its components \pm S.E by age and Sex Means with the same letters are statistically not different ($p \geq 0.05$)

Age	Location	Sex	dmft		dt		mt		Ft	
			mean	S.E	mean	S.E	mean	S.E	mean	S.E
6-8 Y	Rural	Male	2.60bc	0.45	2.55 b	0.44	0.05bc	0.05	0.00b	0.00
		Female	2.60bc	0.61	2.60 b	0.61	0.00 c	0.00	0.00b	0.00
	Urban	Male	3.30 b	0.49	2.50 b	0.41	0.40bc	0.20	0.40a	0.27
		Female	5.50 a	0.74	4.80 a	0.78	0.45ab	0.18	0.25ab	0.20
Total			3.50(a)	0.32	3.11(a)	0.31	0.23(a)	0.07	0.16(a)	0.08
9-11 Y	Rural	Male	1.70cd	0.38	1.65bc	0.38	0.05bc	0.05	0.00b	0.00
		Female	2.10cd	0.48	1.90bc	0.45	0.20bc	0.16	0.00b	0.00
	Urban	Male	2.75bc	0.54	2.10cd	0.39	0.65a	0.26	0.00b	0.00
		Female	1.95bc	0.38	1.65bc	0.34	0.30abc	0.18	0.00b	0.00
Total			2.12(b)	0.18	1.82(b)	0.19	0.30(a)	0.09	0.00(b)	0.00
12-14 Y	Rural	Male	0.30f	0.18	0.30f	0.18	0.00c	0.00	0.00b	0.00
		Female	0.85def	0.25	0.85def	0.25	0.00c	0.00	0.00b	0.00
	Urban	Male	0.40ef	0.17	0.40ef	0.17	0.00c	0.00	0.00b	0.00
		Female	0.75def	0.28	0.70def	0.26	0.05bc	0.00	0.00b	0.00
Total			0.57(c)	0.11	0.56(c)	0.11	0.01(b)	0.01	0.00(b)	0.00
Total Males			1.84A	0.19	1.58A	0.16	0.19A	0.06	0.07A	0.05
Total Females			2.29A	0.24	2.08A	0.23	0.17A	0.05	0.04A	0.03
Total Rural			1.69(B)	0.18	1.64(A)	0.18	0.05(B)	0.03	0.00(A)	0.00
Total Urban			2.44(A)	0.24	2.02(A)	0.22	0.31(A)	0.07	0.11(A)	0.06

Table (3) : Mean DMFT and its components \pm S.E by age and Sex Means with the same letters are statistically not different ($p \geq 0.05$)

Age	Location	Sex	DMFT		DT		MT		FT	
			mean	S.E	mean	S.E	mean	S.E	mean	S.E
6-8 Y	Rural	Male	0.05c	0.04	0.05c	0.04	0.00a	0.00	0.00a	0.00
		Female	0.10c	0.07	0.10c	0.07	0.00a	0.00	0.00a	0.00
	Urban	Male	0.15c	0.11	0.15c	0.11	0.00a	0.00	0.00a	0.00
		Female	0.50c	0.20	0.50c	0.20	0.00a	0.00	0.00a	0.00
	Total		0.20(c)	0.06	0.20(c)	0.06	0.00(a)	0.00	0.00(a)	0.00
9-11 Y	Rural	Male	0.45c	0.17	0.30c	0.15	0.10a	0.02	0.05a	0.02
		Female	1.70b	0.33	1.45b	0.28	0.20a	0.02	0.05a	0.02
	Urban	Male	1.30b	0.27	1 b	0.22	0.20a	0.03	0.10a	0.02
		Female	1.90b	0.32	1.4b	0.25	0.20a	0.03	0.30a	0.04
	Total		1.34(b)	0.15	1.04(b)	0.12	0.18(a)	0.01	0.12(a)	0.01
12-14 Y	Rural	Male	1.55b	0.39	1.3b	0.31	0.2a	0.10	0.05a	0.04
		Female	2.00b	0.37	1.7b	0.37	0.25a	0.12	0.05a	0.02
	Urban	Male	3.25a	0.31	3a	0.28	0.05a	0.05	0.20a	0.15
		Female	3.00a	0.41	2.7a	0.37	0.10a	0.08	0.20a	0.13
	Total		2.45(a)	0.20	2.18(a)	0.16	0.15(a)	0.11	0.12(a)	0.09
Total Males		1.12A	0.14	0.97B	0.11	0.09A	0.10	0.06A	0.04	
Total Females		1.53B	0.18	1.3A	0.13	0.13A	0.12	0.10A	0.01	
Total Rural		0.98(A)	0.11	0.8(B)	0.09	0.14(A)	0.12	0.04(A)	0.02	
Total Urban		1.68(B)	0.16	1.46(A)	0.12	0.09(A)	0.05	0.13(A)	0.09	

DISCUSSION

The study showed that the mean dmft for the total sample was decreasing with increasing age, this may be attributed to the exfoliation of the primary teeth at older ages the mean dmft for 6-8 years old was 3.5, it decreased to 2.12 for 9-11 years old and it became 0.57 for 12-14 years old. Differences between the three age groups was statistically significant, this is in agreement with results of other studies^(7,8,16). The study also showed that caries was higher in urban children 2.44 than rural ones 1.69 with a statistically significant difference. Although the mean dmft for the total females 2.29 was higher than that for total males 1.84, there was no statistically significant difference in sex for the primary dentition. In this study as in many studies the caries experience in the primary dentition was more than that recorded for the permanent dentition, this is in agreement with other studies^(10, 16, 18).

The greater caries experience reflects the unawareness of the importance of the primary teeth or a negative attitude of the parents towards dental treatment, and in turn lack of cooperation of the children, creating a situation that will certainly endanger the erupting permanent teeth.

The mean DMFT for the total sample was 1.33, mean DMFT appeared to be increasing with age with a statistically significant age difference 0.2, 1.34 and 2.45 for the 3 age groups respectively, this is attributed to the irreversibility of the caries process and accumulative nature of the disease. The study also showed a greater caries experience in females 1.53 than in males 1.12 with a statistically significant sex difference, this is in agreement with other studies^(10, 16, 19).

There was also a statistically significant difference of dental caries between the urban children (1.68) and the rural ones (0.98). This may be attributed to the reason that urbanized populations are more likely to consume more refined sugars, in

addition to the availability of the sugary products in urban areas is more than rural ones . In Sudan Emslie⁽²⁰⁾ found seven times more caries in 15-19 years old urban individual , where the annual per capita sugar consumption was over 100 lbs , than in rural individual living in areas where the sugar consumption was below 5 lbs per year per person . Similar results were found in Uganda⁽²¹⁾ , Mozambique⁽²²⁾ , Iraq⁽²³⁾ , Africa⁽²⁴⁾ , Swaziland⁽²⁵⁾ , Tanzania⁽²⁶⁾ , and Madagascar^(7,8) .

The decayed portion was the major component in the DMFT and dmft values for the primary and permanent dentition in both areas , this is in agreement with other studies^(15, 16, 27) which may be explained by lack of access to formal dental care , there was no significant differences in the F and M components in both areas .

The use of restorative dentistry has proved it to be unsuccessful in reducing the prevalence of dental disease^(28,29) . It is therefore totally wrong to use this approach of dental care in developing countries with their shortages of wealth , communications and trained personnel , instead , the emphasis must be on education and the application of preventive methods , the caries experience of both urban and rural areas can be managed by providing oral health education to the children , parents and family , which represents the children's primary source of information about oral health , more information about reducing amounts of refined sugars consumed , in addition to other preventive methods such as the use of fluoride is needed . Also primary schools have great potential for influencing oral health behavior of the children , that spend a considerable time in the schools and can be reached at a life stage when their health habits are being formed⁽³⁰⁾ , health education programmes in the schools may be conducted internally by the teachers and the advantages of using school personnel are the potentials for reaching all the children , for continuity in the instruction and it is low in cost . Finally an oral health policy that emphasizes prevention will be more advantageous and cheaper than the establishment of curative and restorative programmes .

REFERENCES

- 1.Mcdonald RE , Avery DR: Dental caries in the child and adolescent , 4th Edn. St. Louis , Toronto , London , C. V. Mosby Company 1983 , pp. 159-200 .
- 2.Burt BA : Trends in caries prevalence in North American children. *Int Dent J* 1994; 44 : 403-413 .
3. Downer MC: Caries prevalence in the United Kingdom . *Int Dent J* 1994; 44 : 365-370 .
- 4.Sheiham A: Future strategies for Oral health care . The international meeting to commemorate the 18th Anniversary of Dental Faculty , Khon Kaen University , Khon Kaen , Thailand 1997.
- 5.Mautsch W , Sheiham A: The oral health alliance . Promoting oral health in deprived communities . International Seminars 22-27 July 1991 , 14-19 September 1992 . Berlin 1995 .
- 6.Heloe LA, Haugejorden O: The rise and fall of dental caries : Some global aspects of dental caries epidemiology . *Comm Dent Oral Epidemiol* 1981; 9 : 294-299 .
- 7.Petersen PE, Steengaard M: Dental caries among urban school children in Madagascar . *Comm Dent Oral Epidemiol* 1988; 16 : 163 - 166 .
- 8.Petersen PE , Poulsen VJ , Ramahaleo J , Ratsifaritara C: Dental caries and dental health behaviours situation among 6 and 12 year old urban school children in Madagascar . *African Dent J* 1991; 5 : 1-7 .

9. Kubota K, Hollist NO, Olusile AO, *et al.* : Joint epidemiological longitudinal dental survey in Nigeria . Especially in comparison with that of Japanese . The Bulletin of Tokyo Medical and Dental University 1993; 40 : 59-78 .
10. Petersen PE, Razanamihaja N: Oral health status of children and adults in Madagascar . *Int Dent J* 1996; 46 : 41-47 .
11. Khamrco TY , Al-Salman KA , Abdal AK : Dental health status in Humaidat village . *Iraqi Dent J* 1998; 23 : 3 – 22
12. Khamrco TY, Abdal AK, Al-Salman KA: Dental health status in Kasa Fakra and Shamsiat village . *J of College of Dentistry* 2000; 7 : 5-17 .
13. Khamrco TY, Al-Obadi H: Oral health status in Al-Kuba village . *J of College of Dentistry* 1999; 4 : 1-21 .
14. Khamrco TY, Al-Salman KA: Dental health status among 4th –8th school children in the center of Mosul . *Iraqi Dental J* 1998; 23 : 77 – 88 .
15. Al-Naimi RJ, Khamrco TY : Oral health status and treatment needs in 13-15 year old students in Mosul city , Iraq . *J of College of Dentistry* 1999; 5 : 90 – 100 .
16. Khamrco TY, Salman FD: Prevalence of dental caries among primary school children age 6-12 years old in Mosul city center / Ninevah . Accepted in the *Iraqi Dent J* 2000 .
17. World Health Organization : Oral health surveys , basic methods , 4th ed. World Health Organization , Geneva , Switzerland 1997 .
18. Fejerskov O , Baelum V, Luan W-M , Manji F: Caries prevalence in Africa and the peoples Republic of China . *Int Dent J* 1994; 44 : 425-433 .
19. Vrbic V , Vulovic M , Rajic Z , *et al.*: Oral health in SFRY Yugoslavia in 1986 . *Comm Dent Oral Epidemiol* 1987; 16 : 286 – 288 .
20. Emslie , RD: A dental health survey in the Republic of Sudan . *Br Dent J* 1966; 120 : 167-178 .
21. Jensen K , Kizito EK , Langebek J, Nyika TA : Dental caries gingivitis and oral hygiene among school children in kampala , Uganda . *Comm Dent Oral Epidemiol* 1973; 1 : 74-83 .
22. Hobdell MH, Cabral JR: Dental caries and gingivitis experience of the peoples Republic of Mozambique . *Odont Stom Trop* 1980; 3 : 111 – 126 .
23. Legler DW, Al-Alousi W, Jamison H: Dental caries prevalence in secondary school students in Iraq . *J Dent Res* 1980; 59 : 1936 – 1940 .
24. Enwonwu CO: Review of oral disease in Africa and the influence of socioeconomic factors . *Int Dent J* 1981; 31 : 29 – 38 .
25. Klausen B, Fonoe JG: An epidemiologic survey of oral health in Swaziland . *Comm Dent Oral Epidemiol* 1983; 11 : 63 – 68 .
26. Frencken EF, Truin GJ, Koning KG, *et al.*: Prevalence of caries plaque and gingivitis in an urban and rural Tanzanian child population . *Comm Dent Oral Epidemiol* 1986; 14 : 161 – 164 .
27. Mahmood MS: Oral health status and treatment needs among Iraqi school children age 6-12 years . M. Sc. thesis . College of Dentistry . University of Baghdad . 1995 .
28. Mjor IA, Jokstad A, Qvist V: Longevity of posterior restorations . *Int Dent J* 1990; 40 : 11-17 .
29. Mjor IA: Problems and benefits associated with restorative materials : Side effects and long term cost . *Advances in Dental Research* 1992; 6 : 7-16 .
30. Makani L, Al-Dabbagh S, Khamrco TY: Evaluation of three methods of dental health education in changing dental knowledge , attitude , behavior and improving gingival health . *J of College of Dentistry* 1999; 5 : 45 – 53 .