

Dentition status in relation to nutritional condition among a group of intermediate school students in Al-Najaf city / Iraq

Noor M. Hadi Laith, B.D.S., M.Sc. ⁽¹⁾

Nadia A. Al-Rawi, B.D.S., M.Sc., Ph.D. ⁽²⁾

ABSTRACT

Background: Nutrition can affect the development and integrity of the oral cavity as well as the progression of oral diseases such as dental caries which was the most predominant and wide spread not life threatening human diseases especially in developing countries as in Iraq. This study was conducted to assess the occurrence, prevalence and severity of dental caries condition and their relations to nutritional status among intermediate schools females in Al-Najaf city in Iraq.

Materials and methods: This study was conducted among intermediate schools females aged 13, 14 and 15 years old and the total sample consisted of 754 students. The assessment of nutritional status was performed using body mass index (BMI) following Centers for Disease Control and Prevention growth chart (2000). Diagnosis and recording of dental caries was according to the criteria of WHO 1987.

Results: The percentage of well-nutrition was (96.2%) while the prevalence of malnutrition was (3.8%). Result showed that only 5.17% of the total sample was caries-free. The mean dmft for deciduous teeth was equal to (1.77±0.15) and dmfs (3.92±0.39), while concerning permanent teeth the mean DMFT was equal to (4.68±0.10) and DMFS (6.22±0.16), significant differences were seen between DMFT, DMFS and age while opposite was found with nutritional status, and no significant differences were seen between caries experience of primary teeth and age and this similar was found with nutritional status

Conclusion: This study revealed that a higher prevalence of dental caries among well-nourished females students aged 13-15 years. Therefore, there is need for an improving public and school preventive programs, and encouraged to orient health knowledge in a positive direction.

Key words: Dental caries, nutrition. (J Bagh Coll Dentistry 2017; 29(4): 89-95)

INTRODUCTION

Adolescents are tomorrow's adult population, adolescence may represent a window of opportunity in which to prepare nutritionally for a healthy adult life ⁽¹⁾. This crucial period of transition is identified by a range of age of 10-19 years by the World Health Organization. Early adolescence after the first year of life is the critical period of rapid physical growth and changes in body composition, physiology and endocrine ⁽²⁾. Adolescent girls health covers nutritional status, morbidity, and reproductive health. During the period of adolescence the nutrient needs are the greatest ⁽³⁾.

Nutrition is considered as one of the most important factors influencing the quality of human life worldwide, also nutritional deficiency is directly related to the retardation of growth and development, decrease resistance to infection and environmental hazards ⁽⁴⁾. Adequate nutrition and healthy eating and physical exercise habits at this age are foundations for good health in adulthood ⁽⁵⁾. Nutrition is an integral component of oral health. There is a continuous synergy between nutrition and the integrity of the oral cavity in health and disease ⁽⁶⁾.

Diet and nutrition affects the integrity and developing of the oral cavity in addition to the evolution of oral diseases ⁽⁷⁾. The World Health Organization defines malnutrition as a number of condition with specific etiology derived from the cellular imbalance between supply of one or more nutrients, energy and the body's demand for them to ensure growth, maintenance, reproduction and specific functions ^(8,9).

Dental caries is a demineralization of the inorganic part of the tooth with the dissolution of the organic substance depending on interaction of several factors: oral micro flora (acidogenic bacteria) diet (fermentable carbohydrate), time and host ^(10,11).

Iraqi studies showed a high prevalence and severity of dental caries ^(12,13,14). According to age, in this study caries experience was discovered to be increase with age, with highly significant difference, this finding is in agreement with previous Iraqi studies among different age groups ^(12,15) this may be related to accumulative and irreversible nature of dental caries ⁽¹⁶⁾. There was no significant differences between DMFT, DMFS and its components with nutritional status This finding was similar to studies ^(17,18).

(1) Master Student. Department of Pedodontics and Preventive Dentistry, College of Dentistry, University of Baghdad.

(2) Assistant Professor, Department of Pedodontics and Preventive Dentistry, College of Dentistry, University of Baghdad.

MATERIALS AND METHODS

This survey was conducted among urban intermediate school females students aged 13-15 years old in AL-Najaf city governorate in Iraq. The study was conducted during the period between the beginnings of January 2016 till the end of March 2016.

According to the General Directorate of Education reports (2015), there was (12347) females students aged 13-15 years old distributed among (25) intermediate schools in Al-Najaf city, they are consisted of (4569), (3890) and (3888) for age 13, 14 and 15 years old respectively. The sample representative 16 an intermediate females school were distributed in AL-Najaf city which were randomly selected from 25 intermediate females school in different areas of the city, adolescents who are healthy and without any systemic disease were examined. The age was taken according to the criteria of World Health Organization⁽¹⁹⁾ and according to the last birth day, and the cross sectional random sample was calculated for prevalence studies by the formula as $n = ZP^2(1-P)/d^2$ ⁽²⁰⁾.

Body Mass Index (BMI): This index is a number calculated from the child's weight and height, according to this formula⁽²¹⁾:

$$\text{Body weight} / (\text{height})^2 = \text{BMI Kg/m}^2$$

According to specific chart⁽²²⁾. The values of nutritional indicators were compared with international reference values using CDC growth charts (Center for Disease and Control and Prevention, 2000).

Diagnosis and recording of dental caries was assessed according to the criteria described by WHO⁽²³⁾. For primary and permanent dentition, if primary and permanent teeth occupied the same tooth space, the status of permanent tooth only was considered⁽¹⁹⁾. Data description, analysis and presentation were performed using computer software program (SPSS version 18).

RESULTS

In the present study, the total sample consisted of (754) female students, they were 223, 267 and 264 students for 13, 14 and 15 years age group respectively.

Table (1) illustrates the distribution of the total sample by age groups. The table shows 14 years age group exhibited the high number among the total sample followed by 15 years age group, while 13 years age group the lowest.

Table (2) illustrates the distribution of students according to nutritional status by age groups. This study revealed that for the total sample the percentage of total of well-nourished girls was

higher than malnourished students among three age groups. Regarding malnourished the table shows that 13 year age students exhibited the low percentage compared with other two age groups.

Table (3) shows the distribution of caries free among students in regarding to the age groups. High percentage of caries free was recorded among 14 years age group, followed by age 15 years till reach the lowest at the age 13 years.

Table (4) shows the distribution of caries free among students in regarding to the nutritional status. Regarding malnourished students very low percentage was recorded of caries free compared with the well-nourished students.

Table (5) demonstrates the mean values and standard errors of caries experience by fractions in primary dentition, concerning three age groups students. Caries experience was found to be higher in the 13 years age students followed by students with 14 years age while the lowest among the 15 years age group. Differences was statistically no significant excited between age groups ($p > 0.05$). Decayed surface was found to be the largest fraction of dmfs value compared to ms and fs among all age groups.

Table (6) illustrates the mean values and standard errors of caries experience by fractions in primary dentition among students in regarding to nutritional status. Caries experience was found to be higher in the well-nourished students than malnourished group. Statistically no significant differences were recorded among both groups ($P > 0.05$). Decayed surface was found to be the largest fraction of dmfs value compared to the ms and fs among both groups.

Table (7) demonstrates the mean values and standard errors of caries experience by fractions in permanent dentition, concerning three age groups students. Caries experience was found to be higher in the 15 years age students followed by students with 14 years age while the lowest among the 13 years age group. Differences was statistically highly significant excited between age groups ($p = 0.000$). Decayed surface was found to be the largest fraction of DMFS value compared to MS and FS among all age groups.

Table (8) illustrates the mean values and standard errors of caries experience by fractions in permanent dentition among students in regarding to nutritional status. Caries experience was found to be higher in malnourished than well-nourished groups students. Statistically no significant differences were recorded among both groups ($P > 0.05$). Decayed surface was found to be the largest fraction of DMFS value compared to the MS and FS among both groups.

Table 1: Distribution of the total sample by age.

Age (year)	No.	Percentage
13	223	29.6
14	267	35.4
15	264	35.0
Total	754	100

Table 2: Distribution of the students according to the nutritional status by age groups.

Age (year)	Descriptive	Nutritional status		Total
		Malnourished	Well-nourished	
13	N	6	217	223.0
	% within age	2.7	97.3	100.0
	% within Nutritional status	20.7	30.0	29.6
	% of Total	0.8	28.8	29.6
14	N	13	254	267.0
	% within age	4.9	95.1	100.0
	% within Nutritional status	44.8	35.0	35.4
	% of Total	1.7	33.7	35.4
15	N	10	254	264.0
	% within age	3.8	96.2	100.0
	% within Nutritional status	34.5	35.0	35.0
	% of Total	1.3	33.7	35.0
Total	N	29	725	754.0
	% within age	3.8	96.2	100.0
	% within Nutritional status	100.0	100.0	100.0

Table 3: Distribution of caries free among students by age groups.

Age Year	No.	Caries free	
		No.	%
13	223	12	1.59
14	267	14	1.86
15	264	13	1.72
Total	754	39	5.17

Table 4: Distribution of caries free among students by nutritional status.

Nutritional status	No.	Caries free	
		No.	%
Malnourished	29	1	0.13
Well-nourished	725	38	5.04
Total	754	39	5.17

Table 5: Caries experience of the primary teeth (mean and standard errors) among students by age.

Age (Years)	Variables	Mean	SE	F	df	P-value
13	ds	4.10	0.51	1.785	2	0.176
14		2.79	0.43			
15		2.00	0.91			
Total		3.63	0.37			
13	ms	0.10	0.10	0.234	2	0.792
14		0.00	0.00			
15		0.00	0.00			
Total		0.07	0.07			
13	fs	0.27	0.21	0.440	2	0.646
14		0.00	0.00			
15		0.50	0.50			
Total		0.21	0.15			
13	dmfs	4.48	0.54	2.217	2	0.117
14		2.79	0.43			
15		2.50	0.65			
Total		3.92	0.39			
13	dmft	2.02	0.21	3.011	2	0.056
14		1.26	0.13			
15		1.25	0.25			
Total		1.77	0.15			

Table 6: Caries experience of the primary teeth (mean and standard errors) among students by nutritional status.

Variables	Nutrition				T-test	df	P-value
	Well-nourished		Malnourished				
	Mean	SE	Mean	SE			
ds	3.65	0.39	3.33	1.45	0.167	69	0.868
ms	0.07	0.07	0.00	0.00	0.209		0.835
fs	0.22	0.15	0.00	0.00	0.302		0.763
dmfs	3.94	0.41	3.33	1.45	0.308		0.759
dmft	1.78	0.15	1.67	0.67	0.151		0.880

Table 7: Caries experience of the permanent teeth (mean and standard error) among students by age groups.

Age (Years)	Variables	Mean	SE	F	df	P-value	Tukey-kramer post hoc
13	DS	4.81	0.23	7.900	2	0.000	13x14=0.0187
14		5.78	0.25				13x15=0.0003
15		6.22	0.26				14x15=0.4156
Total		5.65	0.15				
13	MS	0.31	0.09	0.171	2	0.843	-----
14		0.26	0.07				
15		0.32	0.08				
Total		0.30	0.05				
13	FS	0.20	0.06	2.353	2	0.096	-----
14		0.23	0.05				
15		0.37	0.07				
Total		0.27	0.03				
13	DMFS	5.33	0.27	7.879	2	0.000	13x14=0.0187
14		6.27	0.26				13x15=0.0003
15		6.91	0.29				14x15=0.4156
Total		6.22	0.16				
13	DMFT	4.00	0.17	12.422	2	0.000	13x14=0.0096
14		4.72	0.17				13x15<0.0001
15		5.22	0.18				14x15=0.0810
Total		4.68	0.10				

Table 8: Caries experience of the permanent teeth (mean and standard error) among students by nutritional status.

Variables	Nutrition				T-test	df	P-value
	Well-nourished		Malnourished				
	Mean	SE	Mean	SE			
DS	5.65	0.15	5.69	0.73	-0.058	752	0.953
MS	0.28	0.05	0.69	0.41	-1.699		0.090
FS	0.27	0.04	0.21	0.15	0.369		0.712
DMFS	6.20	0.16	6.59	0.97	0.458		0.647
DMFT	4.69	0.10	4.45	0.43	0.461		0.645

DISSCUSSION

This oral health survey was designed to evaluate the nutritional status and its relation to dentition status among urban intermediate school females students aged 13-15 years-old in Al-Najaf city in Iraq. It was achieved because there was no previous epidemiological Iraqi study concerning intermediate school female students in Al-Najaf city. The comparison of data with other studies, however, may not be completely valid due to variation in methods of examination used by different researchers and variation in the environment of other countries while comparison with other Iraqi epidemiological studies^(13,15) may give more accurate results because the majority of studies follow criteria of WHO in the diagnosis and dental health recording and living opportunity in the same environment.

Nutritional status of this study malnourished of the studied sample which was very low in comparison with other studies^(14,17), and higher than reported by others^(18,24). The largest numbers of the students have normal weight and the percentage of well-nourished was higher than malnourished and this may be due to improvement in the nutritional status in Iraq⁽²⁴⁾.

In the present study, the prevalence of caries free adolescents in Al-Najaf city, this was lower than that reported by others^(17,25). Systemic fluoridation can reduce the prevalence and severity of dental caries in both primary and permanent dentition^(26,27,28). Al-Azawi mentioned that the concentration of fluoride in the communal water supply in different governorates of Iraq ranged from 0.12-0.22 ppm⁽¹²⁾. This level of fluoridation is less than the optimal level recommended for maximum reduction of dental caries (0.7-1.2 ppm)⁽²⁶⁾. That may be the reason for high prevalence of dental caries illustrated in this study and other previous Iraqi studies. The mean DMFT in this study for the total sample of Al-Najaf city, compared to other Iraqi studies, the DMFT was higher than that reported by other studies^(14,,29), while less than that reported by others^(25,30).

The mean DMFS in this study for the total sample of Al-Najaf city was higher than that reported by others^(12,13). While less than that other studies^(25,30). In general variation in caries-experience between the present study and other Iraqi studies may be related to variation in dietary habits, oral hygiene measures in addition to dental health services between governorates, geographical location and racial factors as regarded to be an effective factor on the prevalence and severity of dental caries to a degree that it includes cultural, social and economic differences in addition to genetic variation⁽²⁶⁾. Differences in operational definition of dental caries affected by type of survey instrument used in addition to availability of radiology services have an obvious effect on rates of caries experience reported in different studies. The decayed fraction "Ds" was the major component of DMFS index. This may reveal the poor utilization of dental health services for permanent dentition. The mean "Ms" was greater than "Fs". This may indicate that even when dental services are available they were directed towards extraction rather than preserving permanent teeth, which may reflect a poor knowledge and attitude on the part of patients and their parents and miss concepts deeply rooted in their behavior and loss governorates oral health services on the part of regional health affairs. This result was in agreement with many studies^(14,25).

According to age, in this study caries experience for permanent teeth was recoded to be increase with age, it was higher among 15 years followed by 14 years then 13 years students with highly significant difference, this finding is in agreement with previous Iraqi studies in different age groups^(12;15). This may be related to accumulative and irreversible nature of dental caries⁽¹⁶⁾. There were no significant differences between DMFT, DMFS and its components with nutritional status since DS component was higher than FS and MS mean value. This finding was similar to that reported with other studies^(17,18).

In the present study the magnitude of caries experience in the very few remaining deciduous

teeth was assessed by dmft and dmfs. The mean dmft of this study was higher than that reported by other studies^(18,30), and lower than that reported by Al-Khaza'ali⁽³¹⁾. Differences in nutritional and environmental conditions between the two populations as well as method of examination among these studies may explain these small differences in dmft.

In the current study dmfs was less than that reported by other studies^(14,32), but higher than that reported by others⁽¹⁸⁾. The figures reported in these studies do not signify a higher caries experience, since the age of study sample was older (i.e. less deciduous teeth were available for examination). The differences concerning life type, dietary habits and dental services could be the cause of these variations in the results obtained.

The components of dmfs: namely ds, ms and fs were evaluated in the current study. The mean of "ds" fraction for the total sample was found to be the highest followed by that of "fs" and "ms". Reason can be given is the accumulative nature of dental caries in deciduous teeth as it earlier than permanent teeth concerning time of eruption, so the exposure to dental caries will be higher in primary dentition, so that give attention to treatment need more than permanent teeth. In the present study dmft, dmfs, ds, ms and fs mean values were higher among well-nourished than malnourished. The differences observed between mal and well-nourished individuals failed to reach the level of statistical significance. Opposite findings were obtained by other studies^(14,17).

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الحالة الصحية للفم والأسنان وعلاقتها بالحالة الغذائية لطالبات المدارس المرحلة المتوسطة في مدينة النجف الأشرف-العراق

الخلاصة

خلفية الموضوع: التغذية و النظام الغذائي يمكن ان يؤثر على التنمية و سلامة تجويف الفم و كذلك تطور امراض الفم مثل تسوس الاسنان تليها امراض اللثة فهي بالرغم من انها ليست بامراض تهدد الحياة البشرية لكنها سائدة و واسعة الانتشار خاصة بالبلدان النامية كما هو الحال بالعراق.

هدف الدراسة: و قد اجريت هذه الدراسة لتقييم مدى شيوع و انتشار تسوس الاسنان و علاقتهم بالحالة الغذائية بين فتيات المدارس المتوسطة في مدينة النجف في العراق .

المواد و الطرق: اجريت هذه الدراسة بين فتيات المدارس المتوسطة اللواتي تتراوح اعمارهن بين 13 , 14 و 15 سنة و تالفت العينة الكلية من 745 طالبة . تم اجراء تقييم الحالة الغذائية باستخدام القياسات الجسميه وفقا للرسم البياني للنمو تابعه لمراكز السيطرة

عن الامراض والوقايه منها (2000). وكان تشخيص وتسجيل تسوس الاسنان وفقا لمعايير منظمة الصحة العالميه عام 1987

النتائج: بلغت نسبة انتشار التغذية الجيدة (96.2%) باستخدام مؤشر كتلة الجسم (BMI) . اظهرت النتائج ان 5.17% من اجمالي العينة لم يصابوا بالتسوس . و كان قيمة مؤشر متوسط الاسنان اللبنية dmft تساوي (1.77 ± 0.15) و (3.92 ± 0.39) dmfs في حين كان قيمة مؤشر متوسط الاسنان الدائمة DMFT (4.68 ± 0.10) و DMFS (6.22 ± 0.16) شوهدت فروق معنويه بين

DMFS, DMFT والعمر في حين وجد العكس مع الحالة الغذائية.

الاستنتاج: ان هذه الدراسة اظهرت ان نسبة عاليه من تسوس الاسنان لدى الطالبات الاناث جيدي التغذية بعمر 13-15 سنة وبالتالي

من الضروري وضع الحاجه الى تحسين برامج الصحة العامه الوقائيه والتشجيع على المعرفه الصحيه باتجاه ايجابي.