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Oral Health Status in Relation to Nutritional Status among 9 years old school Children in Dewanyiah City/Iraq

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Abstract

Background: Although they are not life threatening, dental caries and periodontal disease are the most predominant and widely spread oral diseases throughout the world. The aims of the study included the investigation of the prevalence and severity of dental caries, gingivitis and dental plaque in relation to gender, furthermore, nutritional status was assessed in relation to oral health condition (dental caries).

Materials and Methods: This oral health survey was conducted among primary school children aged 9 years old in Dewanyiah city in Iraq. The total sample composed of 600 child (320 males and 280 females) selected randomly from different school in Dewanyiah city. Diagnosis of dental caries was according to the criteria described by WHO (1987). Plaque index of Silness and Loe (1964) was used for plaque assessment, gingival index of Loe and Silness (1963) was followed for recording gingival health condition. Nutritional status was assessed according to body mass index (BMI) indicator using anthropometric measurement (height and weight).

Results: Results showed that the prevalence of dental caries was 85% for 9 year-old school children. Regarding primary and permanent dentition, dental caries was higher among females compared to males with statistically significant difference ($P<0.05$) for primary dentition, on the other hand, males showed higher values of filled surfaces compared to females with statistically significant difference ($P<0.05$) for primary dentition and highly significant difference ($P<0.01$) for permanent dentition. Finding of this study revealed that 100% of the children had gingival inflammation. Furthermore, the values of plaque and gingival indices were higher among males compared to females with statistically highly significant differences ($P<0.01$). In current study, the prevalence of malnutrition described by the BMI indicator was 5.3%. For total samples no significant difference was recorded in dmfs /DMFS values among wasting and well nourished children ($P>0.05$).

Conclusion: A high prevalence of dental caries and gingivitis were recorded. Improvement in the prevention educational programs is needed among school children.

Keywords: Dental caries, periodontal disease, gingivitis, nutrition.

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Introduction

Dental caries is a localized, progressive destructive, microbial based disease of multifactorial nature, affecting the calcified tissue of the teeth characterized by dissolving the tooth minerals (inorganic portion) in a process called demineralization and destruction of the organic portion leading to tooth cavitation [1]. The disease is a chronic irreversible in nature, untreated lesions may progress to cause pain, infection and discomfort to the subject, and finally it might end with the loss of the tooth [2].

Periodontal disease, a preventable and treatable disease and considered to be second prevalent after dental caries in children and adolescents [3]. It has been defined as an infectious disease affecting the teeth in their sockets. The majority of periodontal diseases can be classified as either gingivitis or periodontitis, which affecting the periodontium, but the most common type of periodontal disease that can seen in children is gingivitis, which may start early in life and may increase in severity with advancing age [4, 5]. Gingivitis is a reversible condition, however, if not treated may progress later in life to periodontitis and if this progress, it may end with loss of teeth [6].

Level of health as well as the susceptibility to wide variety of disease including those of oral cavity are influenced by food and nutrient intake throughout the life [4]. Nutrition was reported to be one of the factors affecting the severity of oral diseases, it was thought that provision of good nutrition early in life helps to prevent dental caries by systemic effect. It is now known that the diet has a much greater effect locally in the mouth on erupted teeth than it does pre-eruptively, while the teeth are still forming [5].

Malnutrition is an inadequate intake of nutrients or it is an imbalance between what the body need to maintain health and the intake of nutrient to meet those need [7].

As there are no previous epidemiological studies concerning school children aged 9 years old in Dewanyiah city, therefore, this study was designed.

Materials and methods

This oral health survey was conducted among Primary school children aged 9 years old living in urban areas in Dewanyiah governorate, Iraq. The data collection extended between November (2015) till the end of the March (2016). Permission was obtained from the General Direction of Education of Dewanyiah governorate to conduct the survey without obstacles, the aims of this study were explained to school authority to obtain cooperation as much as possible and that was done by a formal document, also an informed consent prepared and distributed before doing the oral examination, it was given to the student's guardian (parents for example) to get permission for including their students in the study and to have their full cooperation.

The sample consisted of (600) children including (320) males and (280) females, schools were chosen by systematic random sampling design. For each school, (20) children were selected randomly [8].Children who looked healthy and without any medical disease were included in the study. Diagnosis of dental caries were assessed according to the criteria described by WHO [9]. Plaque index of Silness and Loe [10] was used for plaque assessment, gingival index of Loe and Silness [11] was followed for

recording gingival health condition. Nutritional status was assessed according to body mass index (BMI) indicator by using anthropometric measurement (height and weight).

Results

A total sample of (600) consisted of 320 (53.3%) males and 280 (46.7%) females examined in this study. They were randomly selected from different primary school children in Dewanyiah city. Results showed that the prevalence of dental caries was found to be 85%.

Caries-experience in primary dentition (dmfs) and its components (ds, ms and fs) are illustrated in Table (1). Caries-experience (dmfs) was found to be higher in females compared to males, the difference was found to be statistically significant (P<0.05), decayed surfaces (ds) was found to be higher in females compared to males, difference were statistically significant (P<0.05).

Table (2) demonstrates the DMFS and its components (DS, MS, FS) in permanent dentition. Caries-experience (DMFS) was found to be higher in females compared to males, the difference was found to be statistically not significant (P>0.05), decayed surfaces (DS) was found to be higher in females compared to males, difference was found to be statistically not significant (P>0.05), on the other hand, mean rank values of (fs/ Fs) component was higher among males compared to females and the difference was statistically significant (P<0.05) for primary dentition and statistically highly significant (P<0.01) for permanent dentition.

Table (3) shows the median and mean rank values of plaque and gingival indices of children by gender. The mean rank values of plaque and gingival indices for males were higher than females with statistically highly significant difference (P <0.01). The prevalence of gingivitis was found to be (100%). The correlation coefficient between plaque and gingival index was very strong and statistically highly significant in a positive direction (r=0.93, P<0.01).

The distribution of children according to nutritional status described by Body Mass Index (BMI) indicator is shown in Table (4).

Regarding deciduous and permanent dentition, the values of dmfs/ DMFS according to BMI indicator of nutritional status are seen in Tables (5) and (6) respectively. Dental caries was higher among well nourished children in both deciduous and permanent dentition with statistically not significant differences (P>0.05).

Discussion

In this study, the prevalence of dental caries was found to be 85% for 9 year-old school children. This was higher than that reported by others [12-14]. On the other hand, the prevalence of dental caries was lower than that reported by others [15-18]. Differences in caries prevalence among studies could be attributed to variation in sample size, geographic areas, differences in dietary habits, oral hygiene measurements as well as dental health services among governorates in addition to cultural, social, environmental and genetic variation [19]. In Iraq, the fluoride concentration in drinking water is considered very low [20] that may explain a relatively high prevalence of dental caries.

Regarding primary and permanent dentition, females in this study had a statistically higher caries-experience than males, the same finding was reported by previous studies [12, 21, 22, 18], and this is probably because of

earlier tooth eruption pattern in females than in males of the same age, thus, exposed more to environmental factors for caries to occur [23]. This study showed that the decayed fraction (ds/DS) was the major component of dmfs/DMFS indices and this may reveal the poor demand for dental treatment for both primary and permanent dentition. Furthermore filled surfaces (fs/FS) found to be higher among males compared to females, this may give an indication that parents were more concerned about treatment of the teeth of the boys rather than those of the girls.

Males showed a higher mean rank value of plaque index than females with statistically highly significant difference, and this may partly be explained by better oral hygiene among females because they are more oriented towards dental hygiene behavior like brushing and visiting the dentist. The same finding was reported in previous studies [21, 22], While other studies showed that there is no significant difference between males and females [24, 25, 18].

Result in this study showed that the prevalence of gingivitis was 100%, which was higher than that reported by others in different part in Iraq [26, 18], variation among studies could be attributed to variation in oral hygiene measure among governments.

The very high prevalence of gingivitis reported in present study may be attributed to the poor oral hygiene of those students which is represented by high prevalence of dental plaque (100%) and this is supported by the result of present study in which a positive, highly significant correlation was found between plaque and gingival indices.

The prevalence of malnutrition according to BMI indicator in the present study was found to be 5.3% which is lower than that reported by others [13, 18]. The differences in criteria, indicators, cut-off point in addition to differences in the classification of malnutrition was used to assess the nutritional status among different studies may explain the differences in the prevalence of malnutrition among them. The largest number of children was found to have normal weight, so the percentage of well nourished children was higher than malnourished one, an indication of improvement in the nutritional status among Iraqi children in the current years. In the present study males showed well nutritional status than females, the differences between males and females may be attributed to the growth was controlled to great extent by the environmental factors [27]. Furthermore, the eastern society males are still preferable over females and the total amount of protein intake among females is less than among males [12]. Additionally, nutritional deprivation and low intake of good quality diet might explain the higher percentage of malnutrition among females. In current study, weight status had no significant effect on dental health as a statistically no significant correlation was recorded between BMI and dmfs /DMFS. Dental caries is a multifactorial disease and the prevalence and incidence of it in the population is influenced by many etiological factors (susceptible tooth, cariogenic substrate and cariogenic microorganisms [28]. the inorganic and organic salivary compositions and its physicochemical functions also play an important role concerning caries pathogenicity [19], additionally, risk factors like: gender, sugar rich diet, incorrect feeding, ethnic group and oral hygiene [29]

Finally, one important observation of the present study is the relatively high prevalence of both chronic diseases (dental caries and gingivitis). Thus, improvement in the prevention

and educational programs are needed among school children.

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Table (1): Caries- experience (dmfs) and its components (ds, ms, fs) among 9 year-old school children by gender.

Gender	Ds		Ms		Fs		Dmfs	
	Median	Mean rank	Median	Mean rank	Median	Mean rank	Median	Mean rank
Males	9	282.5	0	293.0	0	308.6*	10	284.0
Females	11	321.1*	0	309.0	0	291.2	13	319.4*

* statistically significant **(P<0.05)**

Table (2): Caries -experience DMFS and its components (DS, MS, FS) among 9 year-old school children by gender.

Gender	DS		MS		FS		DMFS	
	Median	Mean rank	Median	Mean rank	Median	Mean rank	Median	Mean rank
Males	2	291.0	0	300.8	0	316.8**	3	296.5
Females	3	311.3	0	300.2	0	281.9	3	305.0

** statistically highly significant **(P<0.001)**

Table (3): Plaque and gingival indices by gender.

Gender	PlI.		GI	
	Median	Mean Rank	Median	Mean Rank
Males	2	350.3**	2	357.3**
Femalse	1	243.5	1	234.3

** statistically highly significant **(P<0.001)**

Table (4): Distribution of children according to different grades of the BMI indicator by gender.

BMI for age z score (BMIZ)-categories	Gender					
	Males		Females		Total	
	N	%	N	%	N	%
Severe wasting (<-3)	4	1.3	2	0.7	6	1
Wasting (-3 to -2)	8	2.5	18	6.4	26	4.3
Acceptable/Possible risk of overweight (>-2 to 2)	288	90	256	91.4	544	90.7
Overweight (>2 to 3)	20	6.3	3	1.1	23	3.8
Obese (>3)	0	0	1	0.4	1	0.2
Total	320	100	280	100	600	100

Table (5): Caries-experience (dmfs) according to BMI indicator by gender.

Dmfs	BMI			
	Wasting		Well nourished	
Gender	Median	Mean rank	Median	Mean rank
Males	7	150.2	10	160.9
Females	12	132.4	13	141.1
Total	12	290.6	12	301.1

Table (6): Caries-experience (DMFs) according to BMI indicator by vgender.

DMFS	BMI			
	Wasting		Well nourished	
Gender	Median	Mean rank	Median	Mean rank
Males	2	147.5	3	161
Females	3	129.3	3	141.4
Total	2	278	3	301.8