Nutritional status in relation to oral health status among patients attending dental hospital

Eman K. Chaloob, B.D.S., M.Sc. [1]
Alhan A. Qasim, B.D.S., M.Sc. [1]

ABSTRACT

Background: Good Nutrition is essential for oral and dental health in children. Good eating habits and food preferences are established early in childhood. Oral health problems can effect dietary quality and nutrient intake in another side increase the risk of several systemic diseases., The aim of the present study was to investigate the relation or the effect the of nutritional status in children at age of 5 to16 on the oral health status and dental caries .

Materials and Methods: the total sample composed of 153 patients attending the Pedodontic and Preventive Department/College of Dentistry/University of Baghdad, the assessment of nutritional status was performed by using Body Mass Index specific for age and gender according to Chronic Disease and Prevention Center (CDC) growth chart (2000). Ramfjord index teeth were applied to assess oral cleanliness and gingival condition, Dental plaque and Gingival health condition was assessed by using plaque index of Silness and Loe(1964),and gingival index of Loe and Silness(1963), Calculus index assessment was according to Ramfjord criteria (1959). Dental caries measurement was according to World Health Organization criteria (1997).

Results: this study showed no significance in the nutritional status (BMI) of children at 5-16 years of age and plaque index, gingival index, and calculus index, as well as the correlation of significant differences was not found between the nutritional status (BMI) and caries experience.

Conclusion: this study reflected that the oral hygiene, gingival health and dental caries were not affected by nutritional status of children at age of 5-16years.

Keywords: nutrition status, oral health status, dental caries, gingival health. (J Bagh Coll Dentistry 2013; 25(Special Issue 1):114-119).

INTRODUCTION

Oral health problems continues to be one of the most common infectious disease known, despite widespread preventive measure, this disease exerts a social, physical, mental and financial burden on a global scale especially in developing countries [1,2]. Epidemiological studies in different parts of the world agree that this disease is the most prevalent dental problem in childhood and adolescent [3]. It is becoming increasingly evident that food and nutrient intake throughout the life exerts a profound influence on the level of health as well as the susceptibility to a wide variety of disease, including those of oral cavity [4]. Tooth calcification and development could be affected by nutritional imbalance, nutrition could have a strong impact on oral health and there is no question about the importance of childhood nutrition on children's health [5].

The body mass index has always been considered a simple method for analysis of the nutritional status, Recently, studies have been conducted to assess the association of the body mass index and periodontitis. Kumar et al [6] and study by Willershausen et al [7] observed a significant association between oral health status and the BMI, whereas Moreira et al study found no correlation[8].

Though no definite mechanism of association between BMI and periodontitis is identified, it has been ascribed to unhealthy dietary patterns with insufficient micronutrients and excess sugar and fat content. These dietary patterns could thus pose a risk both for periodontal disease and obesity [9]. Studies by Ekuni et al. [10] and Reeves et al [11], have included either young or old subjects or data from those studies on both the young and adult individuals had suggested that periodontal status deteriorates with BMI.

Several Iraqi studies were conducted concerning the assessment of nutritional status among different age groups of children and different geographical location, results showed that nutritional status may affect the oral health [12-19].

The aim of the present study was to investigate the effect of nutritional status on the oral hygiene, gingival health and dental caries among patients at age of 5 to 16 years old attending dental hospital in Preventive and Pedodontic Department.

MATERIALS AND METHODS

The final sample size comprised of 153 patients aged 5 to 16 years, attending Dental Hospital / University of Baghdad /Pedodontic and Preventive Department.

Body Mass Index (BMI) reflected the nutritional status of the sample collected, it is a number calculated from child's weight and height

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

name as Anthropometric Measurement included measurement of weight and height according to Trowbidge [20].

The height of the participants was measured in centimeters, using a hard ruler installed vertically and secured with a stable base, while weight was assessed in kilograms using a mechanical scale. The BMI was calculated as the ratio of the subject's body weight (in kg) to the square of their height (in meters), according to this formula;

Bodyweight / (Height)^2=BMI (kg)/m^2 [21]

Three categories were defined: underweight (BMI < 5th), normal weight (BMI 5-85th), overweight risk (BMI > 85th) [22]. Oral Examination was performed by a single examiner using mouth mirror and dental explorer for each subject, caries experience was recorded according to WHO criteria ,decayed ,missing ,filled index (DMFS, dmfs for permanent and primary teeth respectively) [23]. Dental plaque was assessed by using plaque index (Pll) of Silness and Loe [24], gingival health condition was assessed by Loe and Silness [25], Calculus was scored utilizing the criteria set by Ramfjord (1959) [26], Ramfjord index teeth were examined to represent the whole dentition.[26]. The severity of oral hygiene was assessed according to the classification introduced by Loe and Silness (1963) in to negative, mild, moderate and severe condition. Data analysis was computer aided. P value less than the 0.05 level of significance was considered statistically significant. For normally distributed variables the significance of difference between more than 2 groups was assessed by ANOVA, while independent sample t-test was used to assess the statistical significance of difference in mean between 2 groups. The statistical significance, strength and direction of linear correlation between 2 quantitative variables (one of which being non-normally distributed) was assessed by Spearman's rank linear correlation [27].

RESULTS

Table (1) illustrates the distribution of the total sample according to age, gender, and percentiles, a total sample of (153) 5-16 year- old children attending Dental Hospital was examined in this study. The distribution according to age group was divided in three groups (5-8) years old, (9-12) and (13-16) years old. Gender was distributed as a male represent highest than female, the distribution according to the BMI percentile the majority of the patients was under the category of normal weight.

Table (2) shows that the severity of PlI, GI, CALI in the present study divided in to negative, mild, moderate and severe conditions, the calculus index was negatively recorded represent 116(75.8%).

The significance difference between age and gender with Body Mass Index (BMI) is shown in Table (3), the age group (9-12) years old was represent the highest number of underweight, for all age groups the significant difference was not found. In the same table the relation of Body Mass Index (BMI) to gender was illustrated, the majority of males and females were under the category of normal weight ,but the difference was not significantly related. Table (4) shows the difference in mean oral hygiene (PlI, GI, CALI) by Body Mass Index(BMI) the significant difference was not found, the highest mean difference in plaque, gingival and calculus index was recorded in relation to overweight risk(> 85th).

Table (5) was demonstrates the difference in mean oral hygiene (PlI, GI and CALI) by age groups the significant difference was not found. Mean difference of PLI was represent the highest number was at age of 13- 16 years old, while the mean difference of GI was represent the highest number at age of 5-8 years .The CALI represent the highest mean difference at age of 9-12 years old. The same table illustrates that the mean difference of oral hygiene (PlI, GI, CALI) for the female and male was not significant, the highest mean difference of plaque index was 1.1 in male.

Table (6) shows that the mean difference of caries experience in relation to age, gender and Body Mass Index (BMI), the significant difference was not found, in relation to age group the mean DMFs was recorded the highest at age of 13-16 years old, while the mean dmfs recorded the highest at age of 5-8 years old. The highest mean difference of DMFS according to gender for female, while the highest mean difference of dmfs was for male. In the same table the overweight risk (>85th) represent the highest mean difference of DMFS and dmfs but the significant was not found.

DISCUSSION

This study was designed to investigate the oral health status of children aged 5-16 year-old attending Peadodontic and Preventive Department Dental Hospital /University of Baghdad in order to provide a reliable data. This sample has been chosen to explore the dental health of primary and permanent teeth as there is many previous epidemiological study concerning oral health status and dental caries in relation to nutritional status. In Iraq, several previous studies were

conducted on oral health condition, particularly in relation to nutritional status [13,15-18].

Childhood nutrition is known to have a considerable impact on children's health, and the most important on growth and energy provision [28,29].Oral health status is the commonest diseases in the world, it could be related to diet in many way however, the most significant effect of nutrition on teeth is the local action of diet in the mouth on the development of oral diseases [30] .The body mass index is a number calculated from child's weight and height. BMI is an inexpensive and easy perform method of screening for weight categories [31].This study showed the distribution of the PlI, GI and CALI according to severity, the majority of the sample had mild and moderate PlI and GI while the CALI commonly represent the negative, this could be related to the age group of sample was selected was coming to treat their oral health problems.

Several previous epidemiological Iraqi studies concerning the oral hygiene with different age group and different geographic area [15, 18, 32-38].

In this study the majority of children had normal weight according to age and gender groups this could be related to the nutritional source of Iraqi people. As well as the age group of 9-12 years old represent the majority of normal weight this could be related to the sample size was commonly at this age group distributed.

The effect of the nutritional factors in the development of periodontal diseases still unclear, so numerous studies carried out to compare the prevalence of gingivitis between well and malnourished children produced different results [41,42]. The present study showed no significance in the nutritional status in according to plaque, gingival and calculus indices this may be attributed to oral health problems are multifactorial disease, dealing with tooth brush, brushing teeth, visiting the dentist and could be the diet. Other researchers reported the significant was not found between the oral health and nutritional status [15,16,18,].On the other hand others who reported that malnutrition can cause a rise in the prevalence of oral health problems [1, 13, 14] .

In the present study the oral hygiene not affected by the age and gender, the age and gender factors could not affect the oral health status as only one factor, and the age range of the present study was higher in compare to the sample size. Many studies were concluded that the oral health status is directly correlated with age and gender [23,38]. Other studies showed no statistical difference in the prevalence of oral health status with age and gender [32, 33, 35].

Dental caries are known to be multifactorial disease involving several elements, oral microflora (acidogenic bacteria), dietary exposures (fermentable carbohydrates), as well as susceptible host (physio chemical, composition of saliva, quality of the tooth), and sufficient time [39,40].The significant was not found between age, gender, nutritional status and caries experience, as a result of this study, this could be explain by that the collection of sample in this study was came from different part of Iraq community, so they well differ in their habit, knowledge and behavior. Other studies found that caries scores are reported to increase with age [32,34,37]. Many studies found that malnourished individuals were more susceptible to dental diseases, as it interacts with dental composition, morphology and eruption time of tooth [41, 42].

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Table 1: Frequency distribution of the study sample by age, gender and BMI for age and gender percentiles

		N	%
Age group (years)	(5-8)	50	32.7
	(9-12)	88	57.5
	(13-16)	15	9.8
Gender	Female	74	48.4
	Male	79	51.6
BMI percentile-groups	Underweight (<5th)	35	22.9
	Normal (5th-85th)	102	66.7
	Overweight risk (>85th)	16	10.5
Total		153	100

Table 2: Distribution of oral hygiene according to severity

Severity	Plaque		Gingivitis		Calculus	
	N	%	N	%	N	%
Negative	10	6.5	15	9.8	116	75.8
Mild	60	39.2	50	32.7	19	12.4
Moderate	76	49.7	76	49.7	17	11.1
Severe	7	4.6	12	7.8	1	0.7
Total	153	100	153	100	153	100

Table 3: The distribution of patients by age and gender according to nutritional status

		BMI percentile								BMI z score(<-2)		
		Underweight ($<5^{th}$)		Normal (5^{th} -85^{th})		Overweight risk ($>85^{th}$)		Total				
		N	%	N	%	N	%	N	%	Range	Mean	SE
Age group (yeas)	(5-8)	12	24	36	72	2	4	50	100	(-4.4 to 2.6)	-0.8	0.2
	(9-12)	20	23	54	61.4	14	15.9	88	100	(-4 to 2.6)	-0.5	0.2
	(13-16)	3	20	12	80	0	0	15	100	(-2.4 to 0.9)	-0.5	0.3
Difference		[NS]										
Gender	Female	20	27	44	59.5	10	13.5	74	100	(-3.7 to 2.6)	-0.6	0.2
	Male	15	19	58	73.4	6	7.6	79	100	(-4.4 to 2.6)	-0.6	0.2
Difference		[NS]										

Table 4: The difference in mean plaque, gingival and calculus indices by BMI percentile groups

		Plaque index	Gingival index	Calculus index
Underweight (<5th)	Range	(0 - 2.1)	(0 - 2)	(0 - 1.87)
	Mean	1.06	0.91	0.17
	SE	0.09	0.1	0.08
	N	35	35	35
Normal (5th-85th)	Range	(0 - 2.12)	(0 - 2.6)	(0 - 2)
	Mean	1.05	0.99	0.21
	SE	0.05	0.06	0.05
	N	102	102	102
Overweight risk (>85th)	Range	(0 - 1.9)	(0 - 1.9)	(0 - 1.2)
	Mean	1.07	1.19	0.24
	SE	0.15	0.12	0.11
	N	16	16	16
Difference		[NS]	[NS]	[NS]

Table 5: The difference in mean plaque, gingival and calculus indices by age and gender groups

			Plaque index	Gingival index	Calculus index
Age group (years)	(5-8)	Mean	1.05	0.98	0.17
		SE	0.07	0.09	0.06
		N	50	50	50
	(9-12)	Mean	1.05	1	0.23
		SE	0.06	0.07	0.05
		N	88	88	88
	(13-16)	Mean	1.09	0.96	0.17
		SE	0.14	0.13	0.13
		N	15	15	15
	Differences		[NS]	[NS]	[NS]
Genders	Female	Mean	1.01	0.99	0.27
		SE	0.06	0.08	0.06
		N	74	74	74
	Male	Mean	1.1	0.99	0.15
		SE	0.07	0.06	0.04
		N	79	79	79
	Differences		[NS]	[NS]	[NS]

Table 6: The difference in mean DMFS and dmfs by age group, gender and BMI percentile

		DMFs					dmfs				
		Range	Mean	SE	N	P	Range	Mean	SE	N	P
Age group (Years)	(5-8)	(0 to 17)	2.8	0.6	50	[NS]	(0 to 30)	9.7	1	50	[NS]
	(9-12)	(0 to 19)	6.5	0.5	88		(0 to 25)	8.9	0.7	88	
	(13-16)	(1 to 20)	9.9	1.3	15		(0 to 18)	3.5	1.5	15	
Genders	Female	(0 to 20)	5.8	0.6	74	[NS]	(0 to 30)	8.6	0.8	74	[NS]
	Male	(0 to 19)	5.5	0.6	79		(0 to 25)	8.7	0.8	79	
BMI percentile-group	Underweight (<5th)	(0 to 20)	5.5	0.9	35	[NS]	(0 to 30)	9.9	1.3	35	[NS]
	Normal (5th-85th)	(0 to 19)	5.5	0.5	102		(0 to 25)	8	0.7	102	
	Overweight risk (>85th)	(0 to 14)	7.1	1.2	16		(0 to 25)	10.3	1.9	16	