

Oral health condition among overweight children aged 6-11 year old in Baghdad/ Iraq

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ABSTRACT

Background: The overweight and obesity have serious health consequences including the health of oral cavity. The aims of the present study were to assess the oral health condition among the overweight children and compare them with the normal weighted children of the same age and gender.

Materials and Methods: The total sample composed of 478 children aged 6-11 years that were selected from (4650) children selected randomly from 12 primary schools. Two hundred and thirty nine normal weighted and 239 overweight children were included. The assessment of nutritional status was performed using Body Mass Index specific for age and gender. The diagnosis and recording of dental caries was according to Manji et al ⁽¹⁾ plaque index of Silness and Loe ⁽²⁾ was used for plaque assessment, gingival index of Loe and Silness ⁽³⁾ was used for gingival health condition, Ramfjord index teeth ⁽⁴⁾ were applied to assess oral cleanliness and gingival condition.

Results: The results showed that the caries experience among the overweight for the primary and permanent dentition were significantly lower than that among the normal weighted children, while the mean of plaque and gingival indices were found to be higher among the overweight children.

Conclusion: The weight status affects the oral health by decreasing the dental caries among the overweight children and higher plaque and gingivitis.

Key words: Overweight, dental caries, gingival health condition, nutritional status. (J Bagh Coll Dentistry 2009; 21(2): 100-104)

INTRODUCTION

Increases in childhood overweight and obesity have become an important public health problem in industries nation, the prevalence of overweight children is increased by time in all over the world⁽⁵⁾.

The oral cavity is considered to be a mirror of nutritional status of the body, the relationship among oral health condition nutritional status and general health are complex with many interrelating factors⁽⁶⁾. Dental caries is considered as one of the most prevalent oral health problems especially among children⁽⁷⁾. The diet and nutrition have a local and systemic effect in the etiology and pathogenesis of dental caries⁽⁸⁾. There is controversy concerning relation of dental caries with overweight and obesity which is defined by body mass index (BMI), Wilkrshansan et al⁽⁹⁾, Kentovitz et al⁽¹⁰⁾, and Pinto et al⁽¹¹⁾ found that the dental caries was decrease with increase of body weight on the other hand Hilgers et al⁽¹²⁾ showed that the elevation of body weight is associated with increase the incidence of permanent molar interproximal caries while Macek et al⁽¹³⁾ found during their study that there was no significant association between overweight and prevalence of dental caries in either dentition but Dorota and Kedierawski⁽¹⁴⁾

found that no difference in caries experience at 2-5 years in all weight range while the children ages 6-18 years who where considered overweight showed decreased risk of caries compared to their normal peers.

Periodontal disease is considered to be the second prevalent oral disease however and the most common type of periodontal disease that can be seen in children is gingivitis which may start early in life and may increase in severity in advancing age⁽¹⁵⁾. Many controversies concerning the role of nutrition in periodontal disease are present because the disease and nutritional biochemistry are complex problems depending upon many interacting parameters⁽¹⁶⁾. The mechanisms by which the nutrients may affect periodontal disease include the following:-

1. Many nutrients have antimicrobial activity. These may alter the quantity and/or quality of dental plaque and thus be associated with reduction in gingival inflammation.
2. The nutrient may work by affecting the enzymes involved in the production of the anti-inflammatory compounds.
3. Some nutrients are thought to act as immune system modifiers in that they optimize the host's immune response this could be accomplished by alteration of permeability of the gingival epithelium thus changing host resistance to bacterial products.
4. The antioxidant action help maintain cell integrity by reducing the free-radical damage to

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host tissue also they serve to protect the host from bacterial damage⁽⁸⁾.

It was the observation by dental scientists who recorded destruction of the supporting tissue around caries free dentition which led to suggestion that nutritional factor was to blame. Chapper et al⁽¹⁷⁾ found that the prevalence of gingivitis and gingival bleeding was increased with increased BMI the same finding was illustrated by Sarlati et al⁽¹⁸⁾ who found a higher dental plaque and gingival index among overweight children and these indices increased with increasing body weight and waist circumference.

There is no Iraqi study concerning this subject; therefore this study was conducted in order to assess the oral health condition among the overweight children aged 6-11 years and compare to normal weight children of the same age and gender

MATERIALS AND METHODS

All 4650 students aged 6-11 years from 12 primary schools that were randomly selected from Baghdad, were chosen for BMI measurements and only 5.14% were found to be overweight according to Chronic Disease and prevention Center (CDC) growth charts⁽¹⁹⁾.

A control group, with normal weight⁽¹⁹⁾ was chosen from same class matching in age, gender with study group. Plan mouth-dental mirror no.4. and Sickle-shaped dental explorer no.00 were used in the present study. Anthropometric Measurements included measurement of weight and height according to Trowbidge⁽²⁰⁾ using Bathroom scale and height measuring tape. Body Mass Index (BMI) is a number calculated from child's weight and height, according to this formula

$$\text{Body weight (Kg)} / (\text{Height (m)})^2 = \text{BMI Kg/m}^2 \quad (21)$$

According to specific chart (CDC growth charts) that was used to indicate the BMI according to age and gender and identifies the overweight as above 95 percentile while the normal weight as 5-85 percentile⁽¹⁵⁾. Caries experience was recorded according to decayed, missing, filled index (DMFS, dmfs for permanent and primary teeth respectively). The diagnosis of dental caries was according to the criteria of Manjie et al⁽¹⁾ while missing and filled surfaces according to the criteria of WHO⁽²²⁾

Dental plaque thickness adjacent to gingival margin was assessed by using plaque index (PI) of Silness and Loe⁽²⁾. Gingival health condition was assessed using gingival index described by Loe and

Silness⁽³⁾ Ramfjord index teeth⁽⁴⁾ were examined to represent the whole dentition

RESULTS

The distribution of normal weight and overweight children is shown in Table 1 that illustrates the percentage of overweight males was higher than females (56.49% and 43.52% respectively).

The result of the present study showed that 10.04% of the total overweight children were caries free which was higher than that found among the normal weight children (1.26%). The same results were found in each gender (Figure 1). Dental caries experiences among overweight and normal weight children in primary dentition are shown in Table 2. The result of the present study showed that the mean dmfs for the total overweight children was (9.49±7.54) lower than that of total normal weight children (12.55±8.27) this difference was highly significant. The same result concerning each gender.

The result of the present study showed that for the total sample the mean of ds, fs, ms, among overweight children were lower than that of the normal weight as the differences were highly significant concerning ds, fs (t = 3.78 and 3.39 respectively, df = 476, p<0.01).

Caries experience for the permanent dentition among the over-weight and normal weight children is shown in Table 3. The result of the present study showed that for the total sample the mean DMFs for the overweight children (1.27±2.05) was lower than that of normal weight (1.72±6.01) and the difference was significant. The same result was found concerning each gender but the differences were not significant (p>0.05). Table 3 illustrates the component of DMFs among the over-weight and normal weight children by age and gender, this table show that for the total sample the mean Ds, Ms, Fs were higher among normal weight children, however these differences was only significant concerning Ms component (t= 1.99, df= 476, p<0.05).

Table 4 shows that for the total sample the mean plaque index was higher among overweight (1.49±0.44) than normal weight children (1.46±0.49). However the difference was not significant. The same result was found concerning females, while opposite finding among males. In the present study the prevalence of gingivitis was found to be (98.74%) among the overweight children and (98.32%) among the normal weight children.

Table 4 illustrates the mean gingival index among the overweight and normal weight children. This table illustrates that the overweight

children had (0.92 ± 0.39) higher mean gingival index than that of normal weight children (0.91± 0.51) and the same result were found among the males while the opposite result concerning the females. Higher percentage of moderate gingivitis was found among the overweight males while the mild type was found among the overweight females than that among the normal weighted children (Table 5).

DISCUSSION

This study was designed to evaluate the increase in body weight in relation to oral health among the primary school children in Baghdad city in Iraq. The present study used a control group (normal weight) which is similar as possible with regard to age, gender, social structure and geographic position except in weight condition.

The early dental research worker of the effect of good nutrition while the teeth were forming to prevent dental caries (23,24) were right to some extent this was also confirmed by previous Iraqi studies by Al-Obaidi (25), Diab (26), Droosh (27) and Jabber (28).

In the present study the prevalence of dental caries as well as caries experience in primary and permanent teeth were found to be higher among normal weight than overweight group. This finding in accordance with Willershausen et al (9), Kantovitz et al (10), Macek et al (13), Pinto et al (11). The decreased prevalence and severity of dental caries among overweight children could be partially explained by the overweight children were reported to consume more fat than their counterpart (29-31). In contrast to many other health

problems associated with a high fat diet an inverse relation ship between percentage of fat in the diet and the development of caries had been identified. High level of fat in the diet binds to various sugars in the diet thus reducing their solubility, the result is a lower drop in pH and weaker acid attacks, other mechanisms:-

- Coating the tooth surface with oily substances this means that food particles would not be readily retained.
- A fatty protective layer over plaque would prevent fermentable sugar substrate from being reduced to acid.
- High concentration fatty acids may interfere with the growth of cariogenic bacteria.
- Increased dietary fat will decrease the amount of dietary fermentable carbohydrate (16)

The data of the present study showed no significant differences in mean gingival index between the overweight and normal weight children this could be attributed to the non significant differences in mean plaque index between them as a strong positive correlation found in the present study between plaque and gingival indices as well as in other studies (26,27,31). However, possible nutritional influences on the development and progression of disease may occur at several points (32).

Table 1: Distribution of the overweight and normal weight children according to gender

	overweight			normal weight		
	Gender	No.	%	Gender	No.	%
Total	Male	135	56.49	Male	134	56.07
	Female	104	43.51	Female	105	43.93
	Total	239	100.00	Total	239	100.00

Table 2: Caries experience for the primary teeth among overweight and normal weight children by gender

gender		overweight			Normal weight			t-value	df
		mean	SD	SE	Mean	SD	SE		
Male	ds	8.21	6.14	0.53	10.45	6.64	0.57	2.86**	267
	ms	1.16	3.40	0.29	1.87	3.19	0.28	1.77	
	fs	0.07	0.45	0.04	0.28	1.09	0.09	2.07*	
Female	ds	8.52	6.64	0.65	10.97	7.72	0.75	2.46*	207
	ms	1.00	3.51	0.34	1.31	3.17	0.31	0.67	
	fs	0.02	0.19	0.02	0.26	0.72	0.07	3.25**	
Total	ds	8.35	6.35	0.41	10.68	7.12	0.46	3.78**	476
	ms	1.09	3.44	0.22	1.63	3.19	0.21	1.76	
	fs	0.05	0.36	0.02	0.27	0.94	0.06	3.39**	
Male	dmfs	9.45	7.32	0.63	12.60	8.09	0.70	3.35**	267
Female	dmfs	9.54	7.84	0.77	12.49	8.53	0.83	2.59*	207
Total	dmfs	9.49	7.54	0.49	12.55	8.27	0.54	4.23**	476

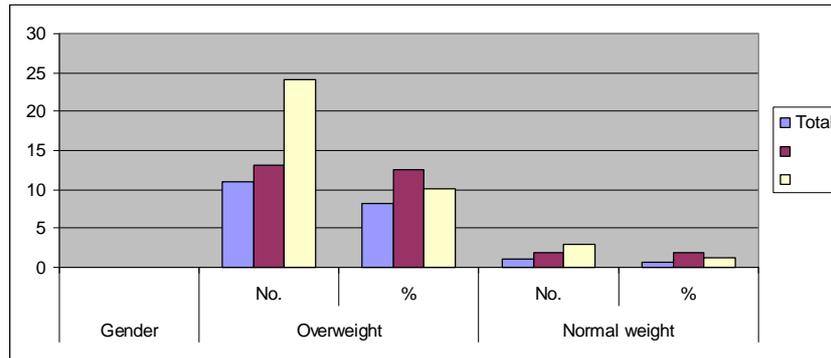


Figure 1: Distribution of caries free children among the overweight and normal weight children by gender

Table 3: Caries experience for the permanent among overweight and normal weight children by gender

Gender		Overweight			Normal weight			t-value	Df
		Mean	±SD	±SE	Mean	±SD	±SE		
Male	Ds	1.09	1.86	0.16	1.19	1.85	0.16	0.19	267
	Ms	0.00	0.00	0.00	0.37	2.26	0.19	1.91	
	Fs	0.08	0.41	0.03	0.00	0.00	0.00	2.48*	
Female	Ds	1.31	2.16	0.21	1.63	2.49	0.24	1.02	207
	Ms	0.05	0.49	0.04	0.09	0.68	0.06	0.57	
	Fs	0.04	0.35	0.03	0.17	8.21	0.80	1.12	
Total	Ds	1.18	1.99	0.13	1.39	2.16	0.14	1.09	476
	Ms	0.02	0.32	0.02	0.25	1.76	0.11	1.99*	
	Fs	0.07	0.39	0.03	0.08	5.45	0.35	0.98	
Male	DMFs	1.17	1.92	0.16	1.56	2.95	0.25	1.31	267
Female	DMFs	1.40	2.18	0.21	1.90	8.42	0.82	1.50	207
Total	DMFs	1.27	2.05	0.13	1.72	6.01	0.39	1.91*	476

Table 4: The mean gingival and plaque indices among overweight and normal weight children by gender

	Gender	Overweight			Normal weight			t-value	df
		Mean	±SD	±SE	Mean	±SD	±SE		
Gingival index	Male	0.87	0.39	0.33	0.83	0.47	0.40	0.79	267
	Female	0.99	0.45	0.44	1.02	0.50	0.40	0.54	207
	Total	0.92	0.39	0.03	0.91	0.51	0.03	1.01	476
Plaque index	Male	1.54	0.39	0.33	1.55	0.50	0.43	0.93	267
	Female	1.42	0.49	0.48	1.35	0.44	0.43	0.95	207
	Total	1.49	0.44	0.03	1.46	0.49	0.03	0.57	476

Table 5: The severity of gingivitis among the overweight and normal weight children by gender

Gender	GI	Overweight		Normal weight	
		No.	Percentage	No.	Percentage
Male	0.1-1	77	57.04	84	62.69
	1.1-2	43	31.85	38	28.36
	2.1-3	0	0.00	0	0.00
Female	0.1-1	55	52.88	48	45.71
	1.1-2	47	45.19	53	50.48
	2.1-3	0	0.00	1	0.95
Total	0.1-1	132	55.23	132	55.23
	1.1-2	90	37.66	91	38.08
	2.1-3	0	0.00	1	0.42

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