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Prevalence and Risk Factors Associated with Overweight and Obesity among under than 5 Years Children

Hussein A. Naji[1] *MBChB*, **Maysaloon M. Abdulla**[2] *MBChB FICMS*

[1]Dept.Ministry of health, [2]Dept. of Family & Community Medicine, Al-Nahrain University.

Abstract

Background Childhood obesity is a serious public health problem with increasing prevalence worldwide.

Objectives To estimate the prevalence of obesity and overweight among under 5 years children and to clarify some factors associated with them like socioeconomic status, sedentary behavior, eating habits etc.

Methods A total of 606 children from those visiting health care center for vaccination or routine care aged 2 months up to < 5 years. The parent (or caretaker) of each child was interviewed using a special questionnaire form provides information about sociodemographic characteristics, inclusion and exclusion criteria, delivery and pregnancy, feeding and nutrition, physical activity, and measurement of weight and height.

Results The prevalence of overweight was 16.8%; of those at risk of obesity were 18.15 %. No significant association found between obesity, age, gender of the children, occupation of the parents, type and size of the family, obstetrical characteristics, eating habits. A significant association between obesity and residency of the children, educational level of parents, added food given to the child and age started to give this food, and physical activity.

Conclusion The study shows that the prevalence of overweight and those at risk of obesity are increased in Iraq in the last decade.

Keywords Overweight, obesity, under 5 years' children, BMI.

Introduction

Obesity is defined as excessive body fat that results when intake and consumption of energy are not balanced [(1-3)] and from the functional point of view can be defined as maladaptive increase in the mass of somatic fat store. An ideal definition of obesity in children will reflect both the possibility of the child to become an obese adult, as well as present and future risk of adiposity related complication [(4,5)]. Again it also defined as an excess of fat over that needed to maintain health [(6)].

Obesity is rapidly increasing in children and adolescents. Researchers reported that childhood obesity (at risk for overweight or overweight) doubled over the last three decades in the United States [(7)].

According to WHO available sources, the prevalence of children less than 5 years overweight and obesity in Iraq was 15% in the year 2006, while prevalence of underweight was 7.1% [(8-9)]; while local available sources from the Ministry of Health in our country, the prevalence of children under 5 years overweight and obesity in Iraq was 13.9% in the year 2010 (11.5 % in male, 9.5 % in female), while prevalence of underweight was 6.4% [(10)].

The intension of the study is to estimate the prevalence of obesity and overweight and those at risk among under 5 years children and to clarify some factors associated with overweight and obesity among them.

Methods

A cross sectional study was carried out during the period from 3rd January to 31st March, 2012 (a month for each center) in Baghdad Al-Karkh (Al-Rashid, Al-Shabab and Al-Washash primary health care centers).

A total of 606 children aged 2 months up to < 5 years from those visiting health care center for vaccination or routine care were included in this study. The parent (or care taker) of each child (mother, father or other member of the family) was interviewed by the researcher using a special questionnaire form constructed for this study. The questionnaire form consists of five sections provides information about socio-demographic characteristics of the children, obstetrical characteristics, feeding and nutrition of the child, physical activity, and measurement of weight and height to calculate WHZ (weight for height z score). Weight was measured with a well-calibrated digital scale. All boys and girls were barefooted with minimal cloths. Weight was measured in kilograms with an accepted error of 0.1 kg. Height was measured in centimeters with tape measures in standing position for children 2 years and more and in supine for those less than 2 years.

Weight for height and WHZ score indicators were used to estimate whether the child is obese or over weighted or not using the NCHS/WHO method. Children categorized according to their weight for height and WHZ scores into:

1. Underweight and wasted with z score below -2
2. Normal with z score -2 to +1
3. At risk of obesity with z score +1 to +2
4. Overweight and obese with z score above +2 (WHO, March 2011).

Weight for height and WHZ scores was calculated using *WHOAnthro* computer program available at WHO website.

The children included in the study sample were those aged two months to five years of both genders including those attending the health centers for vaccination, apparently healthy and those with acute mild illnesses which not affect the outcome of the study (like flu).

Children aged less than two months and five years and more, those with chronic illnesses (like respiratory disease, diabetes mellitus.. etc), those with a known syndrome causing obesity like Prader–Willi syndrome were excluded from the study.

Data of the study was analyzed using available statistical computer program of SPSS-16 (statistical packages for social sciences).

Results

The prevalence of overweight in the sample was 16.8% and of those at risk of obesity was 18.15 %. Highest proportion of overweight children was found in those aged 36-47 months, while highest proportion of children at risk was noticed in those aged 12-23 and 24-35 months. No significant association was found between WHZ and age. The proportion of overweight and obesity was found to be higher among male children. No Significant association was found between WHZ and gender. Highest proportion of overweight and at risk of obesity was found among children living in rural area. Significant association was found between WHZ and residency as show in table 1.

Highest frequency of obesity was noticed among children whose fathers and mothers had lower level of education. A significant association was found between WHZ and educational level of educational level of both parents as show in table 2.

Highest frequency of obesity was noticed among children whose fathers and mothers were workers. No significant associations were found between WHZ and occupation of both parents as show in table 3.

The proportion of overweight and obesity was found to be higher among children with extended family of two children and when the children rank fourth in the family. No Significant association was found between WHZ and Type of family, family size and rank of the child as show in table 4.

Highest proportion of overweight was noticed among children who had history of breast feeding during infancy, children with no added food, when added food started 6 months age and older. No Significant association was found between WHZ and type of feeding during infancy, breast feeding period. Significant association was found between WHZ and added food for child and age of starting added food as show in table 5.

Table 1. Distribution of the studied sample by age, gender and residency and WHZ

Parameter		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Age (months)	3-11	160	61.3	49	18.8	52	19.9	261	100
	12-23	109	66.1	31	18.8	25	15.2	165	100
	24-35	44	59.5	17	23.0	13	17.6	74	100
	36-47	27	61.4	8	18.2	9	20.5	44	100
	48-60	16	66.7	5	20.8	3	12.5	24	100
	χ^2 = 3.049, d.f = 8, *P* = 0.931								
Gender	Female	173	64.3	51	19.0	45	16.7	269	100
	Male	183	61.2	59	19.7	57	19.1	299	100
	χ^2 = 0.692, d.f = 2, *P* = 0.708								
Residency	Rural	61	55.0	22	19.8	28	25.2	111	100
	Urban	295	64.6	88	19.3	74	16.2	457	100
	χ^2 = 5.385, d.f = 2, *P* = 0.048								
Total		356	62.7	110	19.4	102	18.0	568	100

Table 2. Distribution of the studied sample by Educational levels of the parents and WHZ

Educational Level		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Educational level of father	Illiterate	51	63.0	14	17.3	16	19.8	81	100
	Read & write	43	51.8	22	26.5	18	21.7	83	100
	Primary school	50	56.2	18	20.2	21	23.6	89	100
	Secondary school	113	70.6	21	13.1	26	16.2	160	100
	College & above	99	63.9	35	22.6	21	13.5	155	100
	χ^2 = 14.560, d.f = 8, *P* = 0.0480								
Educational level of mother	Illiterate	41	53.9	14	18.4	21	27.6	76	100
	Read & write	52	58.4	19	21.3	18	20.2	89	100
	Primary school	62	66.0	16	17.0	16	17.0	94	100
	Secondary school	126	65.3	37	19.2	30	15.5	193	100
	College & above	75	64.7	24	20.7	17	14.7	116	100
	χ^2 = 7.807, d.f = 8, *P* = 0.0450								
Total		356	62.7	110	19.4	102	18.0	568	100

Table 3 : Distribution of the studied sample by occupations of the parents and WHZ

Occupation		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Occupation of father	Worker	198	58.2	74	21.8	68	20.0	340	100
	Employed	15	69.3	36	16.0	33	14.7	225	100
	Others	62	66.7	0	0.0	1	33.3	3	100
	χ^2 = 8. 118, d.f = 4 *P* = 0.087								
Occupation of mother	Unemployed	224	63.3	65	18.4	65	18.4	354	100
	Employed	124	61.1	42	20.7	37	18.2	203	100
	Other	8	72.7	3	27.3	0	0.0	11	100
	χ^2 = 3.019, d.f = 4, *P* = 0.555								
Total		356	62.7	110	19.4	102	18.0	568	100

Table 4. Distribution of the studied sample by Type of family, family size and rank of the child and WHZ

Family Parameter		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Type of family	Nuclear	269	61.7	93	21.3	74	17.0	436	100
	Extended	87	65.9	17	12.9	28	21.2	132	100
	χ^2 =5.038, d.f = 2, *P* = 0.081								
Family size	≤4	283	62.3	89	19.6	82	18.1	454	100
	>4	73	64.0	21	18.4	20	17.5	114	100
	χ^2 = 0.121, d.f = 2, *P* = 0.941								
Rank of the Child in the Family	1	130	62.8	37	17.9	40	19.3	207	100
	2	129	59.4	51	23.5	37	17.1	217	100
	3	57	67.9	12	14.3	15	17.9	84	100
	4	28	70.0	5	12.5	7	17.5	40	100
	5	7	63.6	4	36.4	0	0.0	11	100
	≥6	5	55.6	1	11.1	3	33.3	9	100
	χ^2 = 10.824, d.f = 10, *P* = 0.371								
	Total	356	62.7	110	19.4	102	18.0	568	100

Highest frequencies of overweight and obesity were found among children who had consumed <3 meals/day, child not eats with family, sometimes eating at night and not eating outside house. No Significant association was noticed between WHZ and number of meals consumed per day or habit of eating outside home, eating with the family and eating at night as show in table 6.

The proportion of overweight and obesity was found to be higher among children who sleep 13 hours and more per day and those who watch television four hours and more and who play 4 hours and more per day. A significant association was found between WHZ and the watching of television, child play hours and the sleeping hours per day as show in table 7.

Table 5. Distribution of the studied sample by Feeding during first six months, breast feeding period and added food and WHZ

Family Parameter		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Type of family	Nuclear	269	61.7	93	21.3	74	17.0	436	100
	Extended	87	65.9	17	12.9	28	21.2	132	100
	χ^2 =5.038, d.f = 2, *P* = 0.081								
Family size	≤4	283	62.3	89	19.6	82	18.1	454	100
	>4	73	64.0	21	18.4	20	17.5	114	100
	χ^2 = 0.121, d.f = 2, *P* = 0.941								
Rank of the Child in the Family	1	130	62.8	37	17.9	40	19.3	207	100
	2	129	59.4	51	23.5	37	17.1	217	100
	3	57	67.9	12	14.3	15	17.9	84	100
	4	28	70.0	5	12.5	7	17.5	40	100
	5	7	63.6	4	36.4	0	0.0	11	100
	≥6	5	55.6	1	11.1	3	33.3	9	100
	χ^2 = 10.824, d.f = 10, *P* = 0.371								
	Total	356	62.7	110	19.4	102	18.0	568	100

Table 6. Distribution of the studied sample by Total number of meals/day and eating habits and WHZ

Eating habits		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Meals / Day	<3	180	61.4	54	18.4	59	20.1	293	100
	≥3	176	64.0	56	20.4	43	15.6	275	100
	χ^2 = 2.023, d.f = 2, *P* = 0.364								
Child eat with family	Yes	132	61.4	46	21.4	37	17.2	215	100
	No	224	63.5	64	18.1	65	18.4	353	100
	χ^2 = 0.934, d.f = 2, *P* = 0.627								
Eating at night (extra meals)	Always	4	80.0	1	20.0	0	0.0	5	100
	Sometimes	22	52.4	12	28.6	8	19.0	42	100
	No	330	63.3	97	18.6	94	18.0	521	100
	χ^2 = 3.903, d.f = 4, *P* = 0.419								
Eating outside house	Sometimes	13	76.5	3	17.6	1	5.9	17	100
	No	343	62.3	107	19.4	101	18.3	551	100
	χ^2 = 1.982, d.f = 2, *P* = 0.371								
Total		356	62.7	110	19.4	102	18.0	568	100

Table 7: Distribution of the studied sample by Sleeping hours per day, Watching TV, Child play hours and WHZ

Sleeping habits		Normal		At risk		Overweight		Total	
		No.	%	No.	%	No.	%	No.	%
Sleeping Hours/Day	<8	85	63.4	24	17.9	25	18.7	134	100
	9-12	254	64.0	77	19.4	66	16.6	397	100
	>13	17	45.9	9	24.3	11	29.7	37	100
	χ^2 = 5.673, d.f = 4, *P* = 0.025								
Watching TV (hr)	None	255	61.7	79	19.1	79	19.1	413	100
	<4	52	70.3	14	18.9	8	10.8	74	100
	≥4	49	60.5	17	21.0	15	18.5	81	100
	χ^2 = 3.364, d.f = 4, *P* = 0.049								
Child play (hrs)	<4	287	62.9	89	19.5	80	17.5	456	100
	≥4	69	61.6	21	18.8	22	19.6	112	100
	χ^2 = 0.273, d.f = 2, *P* = 0.028								
Total		356	62.7	110	19.4	102	18.0	568	100

Discussion

Childhood obesity is a serious public health problem; the prevalence of childhood obesity is increasing rapidly worldwide [8]. There were few available national studies about the prevalence of overweight and obesity of children in Iraq.

In this study, the prevalence of overweight was higher than rates from assessment of nutritional status of children done by Iraqi Ministry of Health which found that 10.5% of less than five years children was over weighted [10]. The prevalence of obesity as reported from the Islamic Republic of Iran was (2-3%), Lebanon (3.2% among 3-19 year-old girls) [9]. On the other hand higher prevalence was estimated in Bahrain (38.5%), Kuwait (31.8%) and in Taipei, Taiwan (30%) [9].

The high prevalence of overweight and obesity in this study was mostly due to improvement in economical condition of people and incorrect feeding habits and physical inactivity.

The prevalence of overweight and obesity in the studied children were higher among those less than 36 months of age similar to assessment of nutritional status of children by Iraqi ministry of health [10] and a study done in Greece [11]. Other

studies in USA in 1997 and Canada in 2004 reported higher rates than this study [12,13].

The reason for such high rates of obesity among this age group may be due to low physical activity, early age of starting added food and the unhealthy type of added food.

The prevalence of overweight and obesity in the studied children were higher in males compared to females similar finding were found by Iraqi ministry of health in 2010 and study done in Greece in 2007 [10,11] and the opposite was found in Canada in 2004 [13].

This may be explained by the fact of eating habits, which differ between males and females.

Children living in rural areas had higher rates of overweight obesity compared to urban areas which was in agreement with a study done in Cyprus in 2005 [14]. While a study done in Greece in 2007 for preschool children found that the prevalence was higher in children living in urban area [11]. This may be due to unhealthy dietary habits among children of rural area.

Higher percentage of overweight was noticed among children whose parents had a lower level of education, mother was unemployed and father was worker. Higher rates of overweight were estimated among children with extended type of family, family size of four or less members and the rank of the child was four or less. The associations between weight for height z score (WHZ) and socioeconomic indicators used in this study were not significant (except for educational levels of both parents), which indicate that the effect of socioeconomic factors on the prevalence of obesity and overweight was not so strong. This finding is similar to study done in Greece in 2007 [11]. A study done in united states, new Mexico in 1991 did not find any associations between obesity in preschool children and parameters such as maternal education level and household size [15] while a significant relation was reported in other study in Germany in 1999 [16].

The obesity is higher due to poor knowledge about healthy habits of feeding, high number of children living in the same place and short time available to care for children.

The current study found that children who were breastfed during first six months of their life had higher prevalence of overweight, also those who breast fed less than 6 months, those children with no added food and those started added food at age of 6 month and older.

No Significant association was found between WHZ and type of feeding during infancy, breast-feeding period. Significant association was found between WHZ and added food for child and age of starting added food.

Higher percentage of overweight was noticed among children who had less than 3 meals per day, not eat with their family, eat at night extra meals sometimes, not eat outside house and not eating sweets, fruits, vegetables and drinking water. No Significant association was found between WHZ and number of meals per day, eat with their family, eat at night extra meals, eat outside house and not eating sweets, fruits, vegetables and drinking water.

The prevalence of overweight and obesity in the studied children were higher in children whose sleeping hours more than 13 hours per day, watching TV and playing video games 4 and more hours per day and children who play for 4 hours and more per day. A Significant association was found between WHZ and sleeping hours per day, watching TV hours and child play hours. This is due to the fact that physical inactivity leads to overweight and obesity.

Nationwide analytical studies are needed to assess the problem of obesity among under 5 years children and to evaluate the risk factors behind it and Health education for parents and others who can influence children life style habits.

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Correspondence to Dr. Hussein A. Naji
E-mail: husseinalinaji_kom@yahoo.com
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