Occurrence of overweight, obesity and their associated risk factors among primary school pupils in Samarra/Iraq: a cross –sectional study

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Abstract

Background

The prevalence of overweight and obesity among schoolchildren in the Eastern Mediterranean region is increasing. The aim of this study is to find the prevalence and the associated risk factors of increasing weight among primary school pupils.

Methods

This is a cross-sectional descriptive study carried out during the school year 2019 in Samarra city/Iraq. A total of 450 primary schoolchildren of both sexes (222 male and 228 female) were involved in this study aged 7 to 13 years. Children were categorized into four BMI categories: Thin < 5th percentile, normal ≥ 5-84th percentile, overweight 85-97th percentile and obese ≥ 97th. All students weighed with light clothes and were barefooted. Significance of difference of different qualitative data were tested using Chi-square test with application of Yate's correction.

Results

Occurrence of obesity in this study was 12%, and overweight was 18.4%. It was found that most food taken to school were sugar and carbohydrates (Chips and Juice were 25%, Biscuit and chocolate were 28.1%). Class grade (second and third) (p value=0.0001) of schoolchildren and mother education risk factors (p value=0.025) shows significant difference with BMI percentile. In addition, our results show significant difference with BMI percentile and risk factors (type of food taken to school (p value: 0.048), taking money to buy from school canteen (0.005), soft drinking (0.038), and eating snacks (0.001).

Conclusion

In this survey, an increase in occurrence of weight among primary schoolchildren was found. Several factors contribute in this epidemiological result including absence of health-educated programs delivered to the pupils by schools.

Key answer: Obesity, BMI, risk factors, primary school, Iraq

Introduction

In developing and low-income countries, the attitude towards healthy diet is still not a persuasive issue by public. In some countries, still increasing processed and red meat intake to two meals per day, in addition to high sugar drinks. Where in most countries among these regions diet is lacking whole grains, nuts, green vegetables, and fruits [(1)]. Globally it is estimated that more than 300 million people aged 5 years -19 years have excess weight, and about 40 million children under the age of 5 years are overweight or obese [(2)]. The prevalence of overweight and obesity among school children in the Eastern Mediterranean region is documented ranging from 7% to 45% [(3,4)], and according to the WHO report, Iraq ranks 23rd with the highest prevalence of adult obesity worldwide [(3)].

Obesity and overweight are diseases predisposed by several factors including environmental, genetic, biological, behavioral, inactive daily physical activity and mother status during pregnancy affecting fetus and child, consuming high calories food intake, and sedentary lifestyle [(4,5,6)].

It's documented that childhood obesity can cause several health problems and well known chronic diseases such as type 2 diabetes, heart diseases, asthma, obstructive sleep apnea, psychological problems, and low self-esteem [(7,8,9)]. The aim of this study is to figure out the occurance of overweight and obesity among primary school pupils and to define the associated risk factors.

Methods

Samarra where the study took place, is a city in Iraq, it lies on the east bank of the Tigris in the Salahaldyain province [(10)]. This is a cross-sectional descriptive study carried out during the school year 2018-2019, and three governmental primary schools were recruited, one in the center of city and the other two were from the periphery. Due to self-fund of this study and limited resources, schools were

conveniently recruited from a list provided by the governorate education department. A total of 450 primary schoolchildren of both sexes (222 male and 228 female) were involved in this study aged 7 to 13 years. Inside class, pupil was called alphabetically by his/her name to have their weight and height measured, and to provide with questionnaire form. Exclusion criteria include age under 6 year or above 13 year, in addition to mental abnormality. All students weighed by Conair WW digital glass scale with light clothes and were barefooted. Concerning height measurement for pupils, MM002 Height-length measuring board wooden scale was used in this study. Pupils were asked to stand upright with their head up and the heel, buttock, and occiput against the wall and to take off their shoes. Height was recorded to the nearest 0.5 cm.

Sample size calculation was carried out and according to the prevalence of obesity of the country [11,12,13], and level of significant at 5%.

A list of questions were delivered to pupils and their parents including parent's education, family income (in Iraqi dinars), type of feeding during the first six months of life, weaning time, food favorite of pupils, dietary habits and breakfast intake. In addition, family history of obesity, food selection at home and food buying at school, hours spent on TV watch, fast food intake, and other factors that might contribute as possible risk factors to obesity were asked. Permission was taken from school principal before starting the survey. The aim of the survey and the questions present in the questionnaire forms all were discussed with school administration, teachers, and pupils. In addition, a written informed consent were handover to pupils at school to be sign by parents/guardians. They can sign or withdraw from the study completely.

Body Mass Index (BMI) defined as person's weight in kilograms divided by the square of the person's height in metres (kg/m2) and it is calculated using the formula weight (kg)/height (m2) [14]. Children were categorized into four BMI categories:

Thin < 5th percentile, normal ≥ 5-84th percentile, overweight 85-97th percentile, and obese ≥ 97th. These measurements were used to determine the body mass index (BMI) percentile as per the guidelines of Centers for Disease Control, 2000 [15,16].

Statistical analysis

Analysis of data was carried out using the available statistical package of SPSS-27 (Statistical Packages for Social Sciences- version 27). Data were presented in simple measures of frequency, percentage, and mean [17].

Ethical approval sought from Anbar University.

Results:

Socio-demographic characteristics of pupils were described, 54% were females and 46% males. Percentages of pupils in classes was 23.3%, in first class, 18.4% in second and fourth classes, third class 15.6%, fifth class 13.6%, and the least percentage was among sixth grade 10.7% . There was 7.8% of pupils under study have family history of obesity, and more than half of them were breast fed (53.6 %), and the rest were artificial and mixed milk feeding. (Table 1).

Schoolchildren attitude towards food preference showed high percentage of pupils (85.3%) eat breakfast before going to school, and almost three quarter of them (72%) take food with them to school and that the highest percentage of food taken was cheese sandwich, chips and juice, and Biscuit and Nestle. Results showed that 33.3% of schoolchildren under study drink more than three times per week soft drinks. In addition, it was found that 39.8% of children spent 1-2 hours watching TV or playing videogames, and that 18.7% of them spent more than three hours. While in playing any type of sport (football, cycling) it was found that 9.1% of pupils do not play any type of exercise, and that almost one quarter (23.3%) of pupils who plays five times and more sport per week for 20 minutes (Table 2).

Class grade (2nd and 3rd) of pupils (p value=0.0001) of schoolchildren and mother education risk factors (p value=0.025) shows significant difference with BMI percentile. In addition, type of food taken to school (p value: 0.048), taking money to buy from school canteen (0.005), soft drinking (0.038), and eating snacks (0.00) all shows significant difference with BMI percentile. Our results show significant difference with BMI percentile and risk factors (type of food taken to school (p value: 0.048), taking money to buy from school canteen (0.005), soft drinking (0.038), and eating snacks (0.001) (Table 3). While other risk factors (eating breakfast before going to school, taking food to school, and eating fruits and vegetables) showed no significant difference with BMI percentile.

Pie chart figure demonstrate the main four BMI percentile and its percentage in this survey and as follows; Malnourished percentile was 35(7.8%), Normal percentile 278 (61.8%), overweight percentile 83(18.4%), and obese 54(12%).

Discussion

This study demonstrate the risk factors and the prevalence of increase weight among primary schoolchildren in Samarah City, Iraq. It is the first study done in this city on schoolchildren since Salahaldyain province was freed from ISIS group. Although people in province went through difficult situations, moving to other places while others lived inside camps for more than a year, still the prevalence of obesity in this study was 12%, and overweight was 18.4%. A similar study on primary schoolchildren pupils was done by Al-Delaimy et al [11] at Ramadi, city, Al-anbar province west to Samara city with similarity of family culture and food attitude were the result of prevalence of obesity and overweight were 13.3% and 15.4% respectively. A study in Iraq by Alrediany and Al Lami was conducted on 10 primary schools in 2016 located in different places of Baghdad (the capital city of Iraq) showed results near to the above studies, where the prevalence of high BMI was 30.3%, including 16.3% overweight and 14% obesity [18]. In all above

three studies including our study, the overweight prevalence is more than the obesity prevalence among schoolchildren. If there was, a follow up to the above schoolchildren with overweight prevalence may be all of them will be shift to obese pupils if there was no control measures to them.

Although in this study parents trying to support their children through providing them food to school and giving them money to buy from school canteen, but the results show the highest food taken to school from home and food bought from canteen were full of sugar and carbohydrate (sweets, chips, nestle, juice, biscuit). This attitude could have an impact on children concerning the weight increase. Budd and hayman in their paper comments on this matter that parents have an important role on children's exercise and nutritional attitude habits, which eventually effect on children weight [19]. Low educated parents concerning their knowledge about food contents and high food calories in sugar and carbohydrate could have an effect on children in becoming obese even during adulthood. Lambrinou et al in his paper describe different strategies and interventions to change family and parents attitude towards healthy food and to prevent obesity in schoolchildren. One of these approaches is that parents involved in educational and newsletter including school meeting and healthy messages [20]. In addition, it is prove that primary school can be an excellent supportive environment for prevention of pupils from overweight and obesity through health education and encouraging sport at both school and home [21]. It is documented that type of drinks have a direct effect on increase weight and obesity on children and adults. Sahoo et al [22] in his paper pointed out this matter that drinks with sugar is a linked factor that involved in childhood obesity. In our study, even one to two canned soft drinks weekly were with high prevalence of overweight and obese pupils. Anderson and Butcher explained in their research that pupil's environment including school environment might have its impact on children weight though

consumption of high calories and energy foods and drinks including snacks such as biscuits and soft drinks intake [23]. In addition to the sport and active movement factor by pupils, other studied factors in this research such as sitting and spending time in front of TV and play games showed no significant influence on obesity. This is not the same scene in a study by Story et al, which identify that increase hours spend in TV watching is in relation with the consumption of high calories sweet, snacked foods and soft drinks [24].

Conclusion

In this study, in addition to low educated mother, family attitude and practice in food intake, has proved to have a role and considered as risk factors for children by choosing the food they take to school or ate at home and canteen. With absence of health educated programs delivered by the school to the pupils and to their families for prevention of obesity, all contribute the current prevalence of increase weight in schoolchildren found in this study. A compulsory health education program should build for both the pupils and their families in order to prevent obesity among pupils.

Acknowledgements

Authors would like to acknowledge University of Anbar and College of Medicine for encouraging such study and in approving ethical issue. In addition, authors want to thanks the General Directorate of Education at Samara City, Salahaldyain province, Iraq for their cooperation during this study.

Disclaimer

None

Conflicts of interest

The authors declare that they have neither competing interests nor financial disclosure.

Funding disclosure

This study was self-funded.

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Authors' contributions

All authors read and approved the final manuscript.

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Tables

Table1: Socio-demographic characteristics of pupils, family history and feeding practice

		No	%
Class	First	105	23.3
	Second	83	18.4
	Third	70	15.6
	Fourth	83	18.4
	Fifth	61	13.6
	Sixth	48	10.7
Gender	Male	207	46.0
	Female	243	54.0
Father education	Illiterate	44	9.8
	Primary	163	36.2
	Intermediate	48	10.7
	Secondary	97	21.6
	College	98	21.8
Mother education	Illiterate	78	17.3
	Primary	254	56.4
	Intermediate	11	2.4
	Secondary	65	14.4
	College	42	9.3
Average monthly income of family (Iraqi dinar)	<250 TID	69	15.3
	250---	130	28.9
	500---	123	27.3
	750---	66	14.7
	=>1000 TID	62	13.8
Family history of obesity	Yes	35	7.8
	No	415	92.2
Type of feeding in the first 6 months of life	Breast feeding	241	53.6
	Artificial milk feeding	81	18.0
	Mixed	128	28.4
Month of weaning (For breast fed only=241)	<6months	3	1.2
	6---11	83	34.4
	12---17	52	21.6

	18---23	37	15.4
	=>24months	66	27.4

Table 2: Pupil's attitude towards food preference, breakfast, school canteen, playing sport per week, time watching tv or playing gamed, and money intake

		No	%
Eating breakfast before going to school	Yes	384	85.3
	No	66	14.7
Taking food with him/her to school	Yes	324	72.0
	No	126	28.0
Type of food taken to school	Egg sandwich	64	14.3
	Cheese sandwich	108	24.1
	Chips & Juice	112	25.0
	Biscuit & Nestle	126	28.1
	Others	38	8.5
Playing sport (for at least 20 minutes) in the week (walking, football, cycling)	One-two times	176	39.1
	Three times & more	128	28.4
	Five times & more	105	23.3
	Don't play	41	9.1
Time of watching TV or playing videogames (during school days)	Less than one hour	155	34.4
	1-2 hours	179	39.8
	More than three hours	84	18.7
	Don't watch it	32	7.1
Taking money to buy from canteen/shops	Yes	379	84.2
	No	71	15.8
Eating snack food from restaurants in week	One time	106	23.6
	Two-three times	100	22.2
	Every day	15	3.3
	Don't buy it	229	50.9
Type of food bought from canteen/shops	Sandwich/meat	48	
	Biscut, chips/sweets	385	
	Juice Water	265 5	
Drinking soft drinks in the week	One time	152	33.8
	Two times	123	27.3
	More than three times	150	33.3
	Don't drink	25	5.6

Table 3: Association of risk factors and BMI percentile groups

		Nutritional status (WHO BMI Percentile for age & sex)								P value
		Malnourished (<5 Percentile)		Normal (5- <85 Percentile)		Overweight (85- <95 Percentile)		Obese (=>95 Percentile)		
		No	%	No	%	No	%	No	%	
Class	First	19	54.3	71	25.5	5	6.0	10	18.5	0.00*
	Second	3	8.6	33	11.9	25	30.1	22	40.7	
	Third	2	5.7	46	16.5	14	16.9	8	14.8	
	Fourth	4	11.4	57	20.5	17	20.5	5	9.3	
	Fifth	1	2.9	43	15.5	11	13.3	6	11.1	
	Sixth	6	17.1	28	10.1	11	13.3	3	5.6	
Gender	Male	23	65.7	119	42.8	37	44.6	28	51.9	0.05
	Female	12	34.3	159	57.2	46	55.4	26	48.1	
Father education	Illiterate	5	14.3	27	9.7	8	9.6	4	7.4	0.87
	Primary	14	40.0	93	33.5	32	38.6	24	44.4	
	Intermediate	5	14.3	31	11.2	8	9.6	4	7.4	
	Secondary	6	17.1	66	23.7	15	18.1	10	18.5	
	College	5	14.3	61	21.9	20	24.1	12	22.2	
Mother education	Illiterate	13	37.1	50	18.0	11	13.3	4	7.4	0.02*
	Primary	14	40.0	160	57.6	48	57.8	32	59.3	
	Intermediate	-	-	9	3.2	2	2.4	-	-	
	Secondary	5	14.3	34	12.2	12	14.5	14	25.9	
	College	3	8.6	25	9.0	10	12.0	4	7.4	
Average monthly income of family (IDT)	<250 TID	5	14.3	41	14.7	14	16.9	9	16.7	0.59
	250---	10	28.6	86	30.9	21	25.3	13	24.1	
	500---	13	37.1	79	28.4	18	21.7	13	24.1	
	750---	3	8.6	41	14.7	13	15.7	9	16.7	
	=>1000 TID	4	11.4	31	11.2	17	20.5	10	18.5	
Type of feeding in the first 6 months of life	Breast feeding	19	54.3	156	56.1	46	55.4	20	37.0	0.11
	Artificial feeding	8	22.9	51	18.3	12	14.5	10	18.5	
	Mixed	8	22.9	71	25.5	25	30.1	24	44.4	
Month of weaning (For breast fed only)	<6months	-	-	3	1.9	-	-	-	-	0.05
	6---	7	36.8	56	35.9	13	28.3	7	35.0	
	12---	10	52.6	27	17.3	11	23.9	4	20.0	
	18---	1	5.3	29	18.6	5	10.9	2	10.0	
	=>24months	1	5.3	41	26.3	17	37.0	7	35.0	
Family history of obesity	Yes	2	5.7	19	6.8	10	12.0	4	7.4	0.445
	No	33	94.3	259	93.2	73	88.0	50	92.6	
Type of food taken to school	Egg sandwich	4	11.4	35	12.7	18	21.7	7	13.0	0.04*
	Cheese sandwich	12	34.3	58	21.0	18	21.7	20	37.0	

	Cheeps & Juice	5	14.3	75	27.2	23	27.7	9	16.7	
	Biscuit & Nestle	11	31.4	78	28.3	20	24.1	17	31.5	
	Others	3	8.6	30	10.9	4	4.8	1	1.9	
Taking money to buy from canteen/shops	Yes	31	88.6	245	88.1	64	77.1	39	72.2	0.00*
	No	4	11.4	33	11.9	19	22.9	15	27.8	
Drinking soft drinks in the week	One time	6	17.1	100	36.0	30	36.1	16	29.6	0.03*
	Two times	10	28.6	71	25.5	19	22.9	23	42.6	
	More than three times	17	48.6	95	34.2	28	33.7	10	18.5	
	Don't drink	2	5.7	12	4.3	6	7.2	5	9.3	
Eating snack food from restaurants in week	One time	1	2.9	60	21.6	24	28.9	21	38.9	0.00*
	Two-three times	15	42.9	55	19.8	16	19.3	14	25.9	
	Every day	-	-	9	3.2	5	6.0	1	1.9	
	Don't buy it	19	54.3	154	55.4	38	45.8	18	33.3	
*Significant difference between percentages using Pearson Chi-square test (χ^2-test) at 0.05 level.										

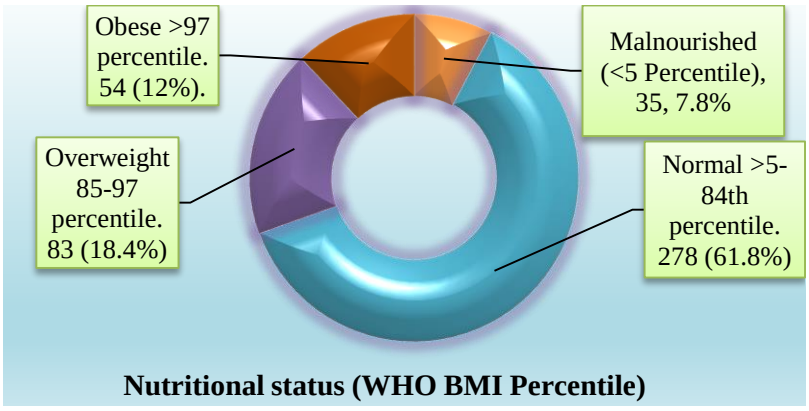

Figure: Nutritional status (WHO BMI Percentile) Prevalence of obesity 12%, overweight 18.4%