

## 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

**Objective:** To find the prevalence of overweight and obesity and the risk factors for increasing weight among young students.

**Method:** The cross-sectional, descriptive study was conducted during the 2018-19 academic year in Samarra, Iraq, after approval from the ethics review committee of Anbar University, Al Anbar, Iraq, and comprised primary schoolchildren aged 7-13 years regardless of gender. After collecting sociodemographic data, based on body mass index values, the children were categorised into malnourished <5th percentile, normal 5-84th percentile, overweight 85-97th percentile, and obese  $\geq$ 97th percentile. Data was analysed using SPSS 27.

**Results:** Of the 450 subjects, 243(54%) were girls and 207(46%) were boys. Obesity was found in 54(12%), subjects, while 83(18.4%) were overweight. Class grades of the schoolchildren, mothers' education, type of food taken to school, money to buy from the school canteen, consumption of soft drinks, and eating snacks were significantly related to body mass index percentile ( $p < 0.05$ ).

**Conclusion:** Overweight and obesity were prevalent in school children, and a number of factors contributed to the problem, highlighting the need for health education interventions.

**Key Words:** Overweight, Snacks, Obesity, Risk Factors, Health, Carbonated, Beverages (JPMA 74: S127 (Supple-8); 2024) DOI:<https://doi.org/10.47391/JPMA-BAGH-16-28>

### Introduction

In low- and middle-income countries (LMICs), the attitude towards healthy diet is not what it should be, and the focus has remained on increasing intake of processed food and red meat and sugar, while whole grains, nuts, green vegetables and fruits are generally missing<sup>1</sup>. Globally it is estimated that more than 300 million people aged 5-19 years have excess weight, and about 40 million children aged <5 years are overweight or obese<sup>2</sup>. The prevalence of overweight and obesity among schoolchildren in the Eastern Mediterranean region ranged 7-45%<sup>3,4</sup>, and, according to a World Health Organisation (WHO) report, Iraq ranks 23rd, with the highest prevalence of adult obesity worldwide<sup>3</sup>.

Obesity and overweight are diseases predisposed by environmental, genetic, biological and behavioural factors<sup>4-6</sup>.

Childhood obesity can cause several health problems and well-known chronic diseases, such as type 2 diabetes, heart diseases, asthma, obstructive sleep apnoea, psychological problems, and low self-esteem<sup>7-9</sup>.

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The current study was planned to find the prevalence of overweight and obesity, and the risk factors for increasing weight among young students.

### Subjects and Methods

The cross-sectional, descriptive study was conducted during the 2018-19 academic year in Samarra, Iraq, after approval from the ethics review committee of Anbar University, Al Anbar, Iraq. Samarra city lies on the east bank of the Tigris in the Salahaldyain province<sup>10</sup>. For the current study, three governmental primary schools were selected, one in the centre of the city, and the other two from the peripheral areas. The schools were selected using a convenience sampling technique from a list provided by the governorate education department. The sample size was calculated in line with a reported prevalence of obesity<sup>11-14</sup> using the equation<sup>15</sup>  $n = Z^2 \frac{1-\alpha/2}{P(1-P)/d^2}$  with a level of significance of 5%. The sample comprised primary schoolchildren aged 7-13 years regardless of gender. After obtaining permission from the school principal, pupils were called alphabetically by their names during in-session classes, and they were given the study questionnaire along with a written informed consent form that had to be filled up by their parents at home. Children outside the age range and those with any psychological abnormality were excluded.

The study questionnaire explored parent's education, family income (in Iraqi dinars), type of feeding during the

first six months of life, weaning time, favourite food of the subject, dietary habits and breakfast intake. In addition, family history of obesity, food selection at home and food buying at school, hours spent watching television, fast food intake, and other factors that might be possible obesity risk factors were asked.

All students were weighed using a digital glass scale with light clothes and barefooted. Height was taken using a wooden scale. The subjects were asked to take off their shoes and to stand upright with their head up, and the heel, buttock and occiput against the wall. Height was recorded to the nearest 0.5cm.

Based on height and weight, body mass index (BMI) values were worked out<sup>16</sup>. Based on BMI values, the subjects were categorised into malnourished <5th percentile, normal 5-84th percentile, overweight 85-97th percentile, and obese ≥97th percentile, as per the guidelines of the Centres for Disease Control and Prevention (CDC)<sup>17,18</sup>.

Data was analysed using SPSS 27. Data was presented as frequencies and percentages as well as mean and standard deviations, as appropriate<sup>19</sup>. P<0.05 was considered significant.

**Results**

Of the 450 subjects, 243(54%) were girls and 207(46%) were boys. There were 105(23.3%) subjects in grade I, 35(7.8%) had a family history of obesity, and 241(53.6 %) had been exclusively breastfed for the first 6 months of life (Table 1). Obesity was found in 54(12%) subjects, while 83(18.4%) were overweight (Figure).

Among the schoolchildren, 384(85.3%) were having

**Table-1:** Sociodemographic characteristics of the participants and feeding practices.

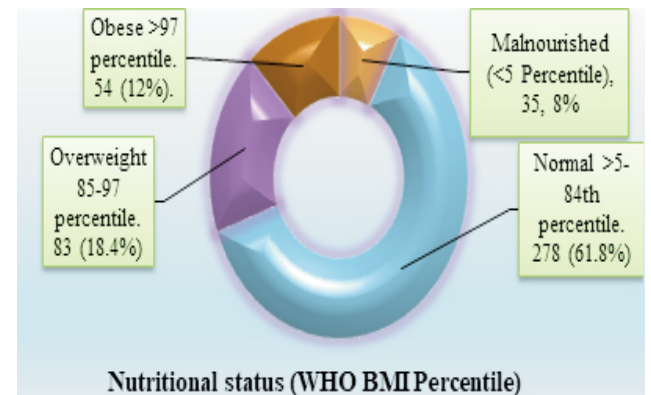
Characteristics	Frequency	Percentages
<b>Class</b>		
First	105	23.3
Second	83	18.4
Third	70	15.6
Fourth	83	18.4
Fifth	61	13.6
Sixth	48	10.7
<b>Gender</b>		
Male	207	46.0
Female	243	54.0
<b>Father education</b>		
Illiterate	44	9.8
Primary	163	36.2
Intermediate	48	10.7
Secondary	97	21.6

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College	98	21.8
<b>Mother's education</b>		
Illiterate	78	17.3
Primary	254	56.4
Intermediate	11	2.4
Secondary	65	14.4
College	42	9.3
<b>Average monthly income of family (Iraqi dinar)</b>		
<250 ID	69	15.3
250---	130	28.9
500---	123	27.3
750---	66	14.7
=>1000 ID	62	13.8
<b>Family history of obesity</b>		
Yes	35	7.8
No	415	92.2
<b>Type of feeding in the first 6 months of life</b>		
Breast feeding	241	53.6
Artificial milk feeding	81	18.0
Mixed	128	28.4
<b>Month of weaning (For breast fed only=241)</b>		
<6months	3	1.2
6---11	83	34.4
12---17	52	21.6
18---23	37	15.4
=>24months	66	27.4

ID- Iraqi Dinar



**Figure:** Nutritional status, as per the World Health Organisation (WHO) body mass index (BMI) percentile categorisation.

**Table-2:** Students' attitude towards food preferences, breakfast, school canteen, playing sports per week, time watching television or playing game, and money intake.

Characteristics	Frequency	Percentages
<b>Eating breakfast before going to school</b>		
Yes	384	85.3
No	66	14.7
<b>Taking food with him/her to school</b>		
Yes	324	72.0
No	126	28.0

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<b>Type of food taken to school</b>		
Egg sandwich	64	14.3
Cheese sandwich	108	24.1
Chips & Juice	112	25.0
Biscuit & Nestle Juice	126	28.1
Others	38	8.5
<b>Playing sport (for at least 20 minutes) in the week (walking, football, cycling)</b>		
One-two times	176	39.1
Three times & more	128	28.4
Five times & more	105	23.3
Don't play	41	9.1
<b>Time of watching TV or playing videogames (during school days)</b>		
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
<b>Taking money to buy from canteen/shops</b>		
Yes	379	84.2
No	71	15.8
<b>Eating snack food from restaurants in week</b>		
One time	106	23.6
Two-three times	100	22.2
Every day	15	3.3
Don't buy it	229	50.9
<b>Type of food bought from canteen/shops</b>		
Sandwich/meat	48	
Biscuit, chips/sweets	385	
Juice	265	
Water	5	
<b>Drinking soft drinks in the week</b>		
One time	152	33.8
Two times	123	27.3
More than three times	150	33.3
Don't drink	25	5.6

breakfast before going to school, 324(72%) took food with them to school, 150(33.3%) consumed soft drinks >3 times per week, 179(39.8%) spent 1-2 hours watching TV or playing videogames, 41(9.1%) did not play any type of outdoor sport, and 105(23.3%) had some sporting activity 5 times and more per week for 20 minutes (Table 2).

Class grade of the schoolchildren, mothers' education, type of food taken to school, taking money to buy from the school canteen, consumption of soft drinks, and eating snacks were significantly related to body mass index percentile (p<0.05) (Table 3).

### Discussion

To the best of our knowledge, the current study is the first to be conducted in Samarra city in the Salahaldyain province of Iraq since it was freed from the clutches of terrorists. Although people in the province went through difficult situations, moving to other places, or living inside camps for more than a year, the prevalence of obesity in the current study was 12%, while 18.4% were overweight. A similar study on primary schoolchildren was done<sup>11</sup> in Ramadi, a city west of Samarra having similarity in family culture and food attitude which , reported 13.3% obese and 15.4% overweight. A study conducted in 10 primary schools across Baghdad in 2016 reported 16.3% overweight and 14% obesity<sup>20</sup>. None of the studies<sup>11,20</sup>, including the current study, had a follow-up phase, or, else, the overweight would have crossed over to the obesity category owing to the lack of health interventions.

**Table-3:** Association of risk factors with body mass index (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	

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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 (ID)	<250 ID	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 ID	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 ( $\chi^2$ -test) at 0.05 level.

ID-Iraqi Dinar

Most of the students in the current study consume food items full of sugar and carbohydrate. This attitude could have an impact on children concerning weight increase. Budd and Hayman said parents have an important role in children's exercise and nutritional habits, which eventually affect children's weight<sup>21</sup>. Lambrinou et al. described different strategies and interventions to change family and parents' attitudes towards healthy

food and to prevent obesity in schoolchildren. One of these approaches is that parents are involved in awareness programmes both in society and in their children's schools<sup>22</sup>. Primary schools can be an excellent supportive environment for the prevention of children from overweight and obesity through health education, and encouraging sport activity<sup>23</sup>.

The consumption of soft drinks has a direct and negative effect on weight and obesity in children and adults.<sup>24</sup> A study explained that a pupil's environment, including the school environment, might have an impact on children's weight through consumption of high calories and energy foods and drinks, including snacks such as biscuits and soft drinks intake<sup>25</sup>.

Though the current study did not find a significant association between weight and spending time in front of the TV, the link was established by Story et al<sup>26</sup>.

## Conclusion

Overweight and obesity was prevalent in schoolchildren, and a number of factors contributed to the problem, highlighting the need for health education interventions in schools.

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