

# Prevalence of overweight and obesity among primary school students in Bandar Abbas, Iran, 2013-2014

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## Original Article

### Abstract

**Introduction:** Childhood overweight and obesity is linked to obesity in adulthood and regarding the negative effects of obesity on physical and mental health, weight management in childhood is of a special importance. This study aims at analyzing the prevalence of overweight and obesity, based on the World Health Organization's (WHO) new child growth standards, among primary school students in the Bandar Abbas, Iran.

**Methods:** This cross-sectional study was conducted among 1500 (7-12 year old children) studying in primary schools of Bandar Abbas city. For collecting nutritional information of children and their families a questionnaire was used and their height, weight and waist circumference were measured by the educated trainers and finally children's BMI was assessed.

**Results:** Out of a total of 1052 subjects, whose information were complete, 624 students (59.3%) were boys and 427 students (40.6%) were girls; 14.37% were malnourished (below 5 percentile), 58.24% were normal (between 5 and 85 percentiles) and 8.64% were overweight (between 85 and 95 percentiles) and 18.75% were obese (over 95 percentile).

**Conclusion:** Today children's overweight and obesity have been doubled in contrast to a decade ago in Bandar Abbas city. However, implementation of more education programs regarding safe nutrition in children is recommended.

**Key words:** Overweight, Obesity, WHO

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### Introduction:

Today, obesity is considered as socio-medical problem in various societies. As obesity rate has been doubled in most age ranges within past thirty years, the rate of related heart diseases has been tripled and also the rate of diabetes and kidney diseases has been increased considerably (1).

Children's obesity is associated with several socio - psychological problems including seclusion, negative self-perception, depression, etc (2). There is a direct relationship between the length of childhood overweight and the possibility of overweight occurrence in the adulthood (3).

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Obese children usually suffer from one or two coronary heart diseases (CHD) risk factors such as hyperlipidemia, hypertension, hyperinsulinemia.<sup>1</sup> Another hazardous problem of obesity is the increased possibility of occurrence of type II diabetes in children and adults which brings about other chronic diseases and detrimental economical risks for both people and the society (4,5).

Children whose fat mass returns naturally before age of 5.5 in contrast to those children whose fat mass return after age of 7 will gain more weight in their adulthood (6). Both time of return of fat mass and the excessive amount of fat in adulthood are two key factors in children obesity, which the latter is the most important obesity index in adults and its related problems. This study aims at studying overweight and obesity prevalence among primary school children in Bandar Abbas City.

## Methods:

In this cross-sectional study, a total of 1500 seven to twelve year old children were selected using cluster sampling from primary schools in Bandar Abbas city. Former data on national overweight population, 16%, was used for calculating number of samples. For this purpose about 1250 people were calculated, however, for making sure and the possibility of excluding some participants, 1500 questionnaires were distributed.

A total of 10 primary schools, including public, private and exceptional children schools, were selected casually in Bandar Abbas city (five girls' school and five boys' school). For making balance between boys and girls, an equal number of boys' and

### 1. NHANES: National Health and Nutrition Examination Survey:

Girls' schools were selected. In the selected schools a class was selected randomly and all students of the class contributed in the project after taking their parents' consent. A questionnaire including personal information of students and parents was used to collect information. A written consent form attached to the first page of the questionnaire was given to parents and they were asked to fill the questionnaire and sign the consent form if they are agreed with participation of their child in this research project. 1200 forms out of

1500 initial forms were filled by parents. In the next stage, all children who, according to the questionnaire information, had severe disease or used to use drugs that have a negative effect on the child's growth were excluded from the study and finally 1052 children were analyzed.

Certain information such as age, gender, birth ranking, certain diseases such as hypertension, hyperinsulinemia, CHD, respiratory disease, signs of puberty (such as enlargement of breasts, pubic hair and axillary (armpit) hair), kid's physical activity based on the house and yard area, transportation means for going to and from school, type and time of exercise during school time and summer, hours of working with computer and hours of watching TV were asked in this questionnaire. Also the kid's nutritional status was asked through certain questions about the amount of main course (breakfast, dinner, and lunch), the school time snack prepared by parents for their children, amount of morning and evening snacks, amount of drinking milk, vegetables, fruits and also amount and number of fast food meals, French fries and junk food per week.

For demonstrating or rejecting the role of inheritance on prevalence of children obesity, certain information including height, weight and metabolic diseases (hypertension, diabetes, and hyperlipidemia) were asked from parents and finally family's economic status, income level and accessibility to healthy food were asked.

After filling the questionnaire by parents, finally 1200 forms were returned to schools and further information were asked from health instructors.

Height, weight and waist circumference (WC) needed to be measured for calculating BMI and also for making sure and final analyzing the obesity's side effects. Weights of subjects were measured by a Seca scale with an accuracy of 100gr. with light clothing and their heights were measured with a flexible tape measure with an accuracy of 1cm with no shoes on. The measuring process was controlled directly by the author and percentiles were measured based on BMI calculation using SPSS software (version 16) and the information were compared with the Center for Disease Control (CDC) table (WHO has separate BMI diagrams for both sexes. According to these diagrams a 6 year old child with a BMI of 24 may be abnormal

(overweight); whereas this BMI is considered normal for an 11 years old child); thus BMI for each age range and gender needs to be compared with the diagram. Waist circumference was measured as a good predictor of obesity related diseases.

1052 six to fourteen year old children (from girls' and boy's primary schools) were analyzed and no significant difference was found between boys and girls in terms of weight gain.

## Results:

Table 1 summarizes the average amounts of weight, height, WC and age of children based on gender. Age ranges of 6 and 13 to 15 years old were removed from the BMI analysis table, because their quantities were not sufficient and finally the age range of 7 to 12 years old (both boys and girls) were analyzed based on BMI percentage. According to WHO's theory, children whose weights are between average 85-95 percentile have overweight and children whose weights are more than 95 percentile are considered obese.

Tables 2 compare un-nourished, normal, overweight and obese children male and female. In the age range of 7 years old, 22.15% had a BMI below 5 percentile, 61.9% had a BMI between 5 and 85 percentile and 8.55% between 85-95 percentiles and then 7.31 had a BMI over 95 percentile.

In general, in the age range of 8 years old, (11.5%) had a BMI below 5 percentile, (55.3%) had a BMI between 5 and 85 percentile, (6.6%) had a BMI between 85 and 95 percentile and (27.05%) had a BMI over 95 percentile.

In the age range of 9 years old, (16.75%) had a BMI below fifth percentile, (58.9%) had a BMI between 5 and 85 percentile, (9.45%) were overweight and (14.9%) were obese.

In the age range of 10 years old (13.9%) had a BMI below 5 percentile, (59.5%) had a BMI

between 5 and 85 percentile, (10.35%) had a BMI between 85 and 95 percentile and (15.98%) had a BMI over 95 percentile.

In the age range of 11 years old, (12.25%) had a BMI below 5 percentile, (55.85%) had a BMI between 5 and 85 percentile, (11.7%) had overweight and 5 children (20.15%) were obese.

In the age range of 12 years old, (18.9%) had a BMI below 5 percentile, (50.5%) had a BMI between 5 and 85 percentile, (9.45%) had a BMI between 85 and 95 percentile and (21.1%) had a BMI over 95 percentile.

Table 3-4 summarizes all of above mentioned information with separate in male and female.

62 boys (about 10%) and 42 girls (9.9%) had lung disease (36.5%), heart disease (9.6%), rheumatism disorder (2.9%), blood disorder (45.2%) and neuromuscular diseases (5.8%). Further statistical analysis is needed to figure out what percent of obese people have such diseases.

**Table 1. Average amounts of age, weight, height and WC, based on gender**

	Boys	Girls	Total
	Mean±SD	Mean±SD	Mean±SD
Age	9.68±1.1	9.36±1.8	9.55±1.9
Weight	11.14±32.43	31.35±11.15	31.98±11.15
Height	133.59±14.31	132.85±11.15	133.29±14.75
WC	71.61±14.42	61.85±15.36	61.50±13.82

**Table 2. Frequency (%) of students (7-12 years old) based on BMI percentiles in Bandar Abbas**

Percentile	Male	Female	Overall
	N (%)	N (%)	(%)
<5	75(13.3)	63(15.8)	14.37
5-85	322(57.3)	237(59.5)	58.24
85-95	48(8.5)	35(8.8)	8.64
95-99	52(9.3)	33(8.3)	8.85
>99	65(11.6)	30(7.5)	9.90
Total	562(100)	398(100)	100

**Table 3. Frequency (%) of BMI percentiles in male students (7-12 years old) in Bandar Abbas**

	7 years	8years	9years	10years	11years	12years
<5	7(31.8)	20(11.6)	13(20.6)	19(12.4)	3(4.9)	13(14)
5-85	12(54.5)	112(65.9)	34(54)	82(53.6)	39(63.9)	43(46.2)
85-95	2(9.1)	9(5.3)	7(11.1)	14(9.2)	5(8.2)	11(11.8)
95-99	0(0)	12(7.1)	2(3.2)	17(11.1)	6(9.8)	15(16.1)
99<	1(4.5)	17(10)	7(11.1)	21(13.7)	8(13.1)	11(11.8)
Total	22(100)	170(100)	63(100)	153(100)	61(100)	93(100)

**Table 4. Frequency (%) of BMI percentiles in female students (7-12 years old) in Bandar Abbas**

	7 years	8 years	9 years	10 years	11 years	12 years
<5	11(12.5)	4(10.5)	15(12.9)	4(15.4)	9(19.6)	20(23.8)
5-85	61(69.3)	17(44.7)	74(63.8)	17(65.4)	22(47.8)	46(54.8)
85-95	7(8)	3(7.9)	9(7.8)	3(11.5)	7(15.2)	6(7.1)
95-99	3(3.4)	6(15.8)	6(5.2)	1(3.8)	7(15.2)	10(11.9)
99<	6(6.8)	8(21.1)	12(10.3)	1(3.8)	1(2.2)	2(2.4)
<b>Total</b>	<b>88(100)</b>	<b>38(100)</b>	<b>116(100)</b>	<b>26(100)</b>	<b>46(100)</b>	<b>84(100)</b>

### Conclusion:

In this study the prevalence of overweight and obesity were 8.65% and 18.35%, respectively. The most recent report of National Health and Nutrition Examination Survey (NHANES) reported prevalence of obesity (BMI above 95 percentile) in 2-19 years old children 16.9% and prevalence of high BMI (BMI between 85 and 95 percentile) 31.7% (4). With regard to our results in Bandar Abbas City, the prevalence of overweight has not increased as large as global and national standards but it's double as two decade ago, however its important point is the high percent of normal weights (between 5-85 percentiles) among children in Bandar Abbas City (58.4%) and the considerable constant of malnutrition from 13.56% to 14.55% during past 10 years.

Lack of significant difference between girls and boys questions the belief that in this city less attention is paid to girls' nutrition in contrast to boys and indicates that people's information about nutrition of their children, apart from their gender, has been enhanced.

The enhanced information of the society on the priorities of healthy nourishment and proper exercises demonstrates its positive effect on the increased number of children with normal BMI in this city.

Prevalence of obesity among Bandar Abbasi children during past decades has been less than 5 percent; however, in this report it has increased to 18.35 which indicate a two time increase (6,7). the overweight and obesity in children need more attention from authorities and families on the children's physical activity and avoiding high-calorie foods. In this study, the area of most houses reported small which necessitate more movement of children in sport halls of schools and gyms.

The importance of educating healthy nourishment and an adjusted calorie is felt more than ever (8-10).

The United States Prevention Services regulations suggest a screening for obesity for 6-8 years old children and referring them to a treatment program if necessary (11,12). An article in 2010 suggested less prevalence of obesity among children who eat regularly evening meal with their family, have a sufficient sleep time and spend fewer hours for watching TV (13). Schools are a natural environment to prevent obesity, in which medical and nutritional programs and proper places for exercising and healthy food can be provided (11).

Although most schools have not proper programs, several preventive plans on obesity have been successful.

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