

Growth Monitoring and Overweight/Obesity Rates of Primary School Students in Tarsus

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Abstract

Background: Obesity is a major health care problem in Turkey as it is in many countries. Obese children are most likely to become obese adults with increased risk of cardiovascular diseases, diabetes, hypertension, increased blood levels of lipids, and increased risk of some cancer types. The aim of this study was to assess the growth rates of all primary school students in Tarsus American College (TAC) in terms of obesity/overweight.

Methods: All primary school students (n=328) were enrolled in the study. Their weight and height were measured two times each year and were compared with those of their peers using percentile scale and body mass index charts.

Results: The age range was 7-14 years. Body mass index (BMI) values revealed that 22.9% of all students had BMI between 85-95 percentile indicating the risk of overweight and 16.2% of them had >95 percentile and were considered as overweight, 10.7% of students had BMI>97 percentile indicating morbid obesity, 79% had BMI >50 percentile and 21% had BMI<50 percentile. The total risk was 39%.

Conclusion: Improving awareness in parents, teachers, staff and students for obesity is an important first step in management of weight problems in children.

Key words: obesity, overweight, BMI, school, children.

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Introduction

Obesity is a major health care problem in Turkey as it is in many countries. Obese children are most likely to become obese adults with increased risk of cardiovascular diseases, diabetes, hypertension, increased blood levels of lipids, and increased risk of some cancer types.

BMI is widely used for growth monitoring in children older than two years of age. It gives the opportunity to compare weight with height (1). For adults, normal range for BMI is 18.5-25. In children and teens, the amount of body fat changes with age and gender. Different from adults, in children, BMI values are compared with those of children in the same age as percentiles. The values are different for boys and girls (2). BMI values are lower for younger children. BMI value below 5 percentile is considered as underweight while 85 to 95 percentile as risk of overweight and above 95 percentile as overweight (Table 1). The lowest values are measured for children in 2 to 4 years old.

Formula for BMI = weight (kg) / [height (m)]²

The aim of this study was to assess the growth rates of all primary school students in Tarsus American College (TAC) in terms of obesity/overweight.

However, height and weight percentiles are not always sufficient to detect overweight or underweight in children as they show the percentage of the height and weight of children in comparison with their peers at the same age ignoring the ratio of the weight and height.

For this reason, in this study, weight and height percentile and BMI measurements are assessed separately.

Table 1: Classification of BMI values

Weight status category	Percentile range
Underweight	Less than the 5 th percentile
Healthy weight	5 th percentile to less than the 85 th percentile
At risk of overweight	85 th to less than the 95 th percentile
Overweight	Equal to or greater than the 95 th percentile

CDC (centers for disease control and prevention, Atlanta, USA)

Methods

All primary school students (n=328) were enrolled in the study. Weight and height measurements of all students in Tarsus American College Primary School (kindergarten to 12th grade) have been recorded and processed electronically in terms of both weight/height percentiles and body mass index (BMI) growth charts since August 2003. They have been monitored twice a year; in October and April and were compared with those of their peers using percentile scale and body mass index charts. Growth monitoring and physical examination results are sent to parents annually and class statistics are shared with teachers and administrators.

The weight was measured by the school nurse using a precise weighing scale (NAN human weighing scale 1-150 kg) and the height was measured using a height-scale which is properly attached to the inner wall of the infirmary. The scale

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is constructed by the school technicians and tested by the school doctor.

Data was installed in the infirmary computers using a self-prepared program which calculates the age of students in number of days and expresses the percentiles of their height, weight and BMI

comparing with those of peers in the same age group.

Results

Weight and Height percentiles

Only 2 classes (Justinien and Tibelius) out of 18 had an average weight percentile below 50 percentile.

Table 2: Measurements for 18 classes of TAC Primary School.

Class names	Number of students	Average age in class	Average weight (kg) of students in class	Weight for 50 percentile at average age	Weight difference with 50 percentile (kg)	Average weight percentile in class	Average height (cm) of the students in class	50 percentile height (cm) for the average age of the class	Average percentile for height in the class	Height difference with 50 percentile (cm) for the average age of class
Kindergarden	5	5.7	23.2	20.2	3.0	75.9	113.6	114.4	50.1	-0.8
Antonius (1)	18	6.3	25.4	22.1	3.4	69.7	118.5	119.0	52.6	-0.5
Cleopatra (1)	15	6.3	22.1	21.9	0.2	55.5	116.7	118.8	42.4	-2.1
Perseus (2)	20	7.5	27.1	25.4	1.7	65.5	124.4	125.4	45.5	-1.0
Daniel (2)	23	7.7	27.0	24.4	2.6	64.6	122.9	123.7	47.4	-0.7
Gözlükule (3)	13	8.6	33.7	29.2	4.5	69.1	132.1	130.6	56.8	1.5
Justinien (3)	11	8.6	27.6	29.3	-1.6	41.6	127.3	130.7	33.0	-3.4
Lokman Hekim (4)	19	9.5	34.4	33.2	1.2	53.7	135.5	136.1	49.3	-0.7
Şahmeran (4)	18	9.5	40.7	33.3	7.3	74.9	137.7	136.6	55.3	1.1
Adile Çavuş (5)	26	10.6	42.1	39.2	3.0	55.8	143.8	144.1	51.2	-0.3
İskender (5)	26	10.5	39.2	39.0	0.2	52.1	140.8	144.0	38.1	-3.1
Klikya (6)	18	11.5	44.7	42.9	1.9	57.6	149.1	149.6	50.3	-0.5
Misaki Milli (6)	19	11.3	43.6	42.3	1.2	58.2	150.6	149.2	67.4	1.3
Sezar (7)	20	12.5	53.8	47.9	5.9	68.3	155.8	155.4	55.1	0.4
Pompeus (7)	23	12.5	55.0	48.3	6.7	63.4	154.5	156.0	43.9	-1.5
Tibelius (8)	19	13.5	50.8	51.4	-0.6	45.6	155.9	159.2	34.8	-3.3
Korikos (8)	18	13.6	55.1	52.2	2.9	57.4	160.7	159.9	56.9	0.7
Efesus (8)	18	13.1	56.1	51.0	5.2	64.3	160.5	158.6	60.6	1.9

First the mean age for the students in each class was calculated. Then, the height and weight percentile for that mean age was compared with 50 percentile of the same age.

Height records of 8 classes were below 50 percentile and 10 classes were above 50 percentile (Table 2).

Body Mass Index percentiles

Only 4 students (1.2%) had BMI values below 5 percentile (underweight) (Table 3), 196 students (59.6%) had normal BMI values (between 5 and 85 percentile), 75 students (22.9%) were at risk of overweight with BMI between 85 and 95 percentiles and 53 students (16.2%) were in overweight group. The total risk was 39% (n=128). Thirty-five students (10.7%) had BMI values over 97 percentile (severe obesity). Seventy (21%) students had BMI values less than 50 percentile while 258 students (79%) had over 50 percentile.

Discussion

Our findings for the percentage of students for overweight (16.2%) is similar to that of U.S. children and adolescents (17.4% to 18.8%)(3). Growth rates

of all children should be followed up starting from birth and through school years. Eating and physical activity habits of children and families should be considered in obesity prevention programs. These programs may help children to have safer and more self-confident puberty periods.

Table 3: BMI values for all the students of TAC Primary School (n=328)

Total	<5 percentile (underweight)	5 – 85 percentile (normal)	85 - 95 percentile (risk of overweight)	> 95 percentile (overweight)
328	4	196	75	53
100%	1.2%	59.8%	22.9%	16.2%

If not managed properly, childhood obesity leads to adulthood obesity that can lead to severe complications. Families, teachers, administrators

and school health care providers should work together and put further emphasis on implementing healthy eating habits and lifelong physical activity programs to prevent and cure childhood obesity.

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