

Prevalence of childhood obesity in schools of Northern Greece.

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ABSTRACT: Prevalence of obesity in 592 Greek pupils (7-15 years old) was investigated. Body Mass Index (BMI) was calculated and percentages of overweight and obese children in age groups were assessed. High percentage of Greek children is overweight and obese. Comparison of BMI between schools of Thessaloniki center and the suburbs and between boys and girls showed no statistically significant difference.

Key Words: Childhood obesity, Epidemiology, BMI, Greece.

INTRODUCTION

Obesity has become one of the major health problems worldwide. Childhood and adolescent obesity has become epidemic in western societies and seems to be a risk factor for adult obesity, with its consequent morbidity and mortality^{1,2,3}. More than two thirds of children 10 years and older who are obese will become obese adults⁴.

Body Mass Index (BMI), defined as weight in kilograms divided by the square of height in meters (Kg/m²), is the easiest and most popular way of screening children and adolescents for obesity. It's an indirect way of estimating body fat content, as it is well correlated to direct measures of body fat, such as dual-energy x-ray absorptiometry⁵. BMI in childhood changes substantially with age⁶.

The increased frequency and severity of childhood obesity has been related to various medical complications, such as impaired glucose tolerance and greater risk for hypertension, hyperlipidemia, arteriosclerosis and chronic liver disease⁸. Therefore, focusing on childhood and adolescent obesity may offer best results in the prevention of adult obesity.

In 2001, according to the International Association for the Study of Obesity - International Obesity

Task Force, countries with the highest prevalence of childhood obesity among children aged 10-16 years worldwide were approximately USA 25%, Canada 19%, Spain and England 18%, Italy and Greece 17%⁷. The aim of the present study was to investigate the prevalence of obesity in Greek pupils in the area of Thessaloniki, in Northern Greece.

MATERIALS AND METHODS

In the present study, 592 children and adolescents (303 boys and 289 girls) aged 6-15 years (mean \pm SD, 11.3 \pm 1.7 years) participated. All of them were pupils, in 11 public schools (eight primary and three high schools) of the city center of Thessaloniki (3 schools) and of the urban suburbs of the city (8 schools), the second in population city in Greece, situated in the Northern part of the country. The aim of the study was clearly explained to the children and parents, orally and by a written form. They were informed on factors contributing in obesity, such as socioeconomic conditions, school environment and food provided in it, place of living, family habits (eating, exercising, etc.) and skills and diet of the child itself. A consent form was signed by the parents of the children.

All the measurements took place in the school set-

Table 1. BMI values (mean \pm SD) and percentages of overweight and obese in Greek primary and high school children.

Age groups (years)	n	BMI (Kg/m ²)	Minimum (Kg/m ²)	Maximum (Kg/m ²)	Overweight [n (%)]	Obese [n (%)]
Primary School						
6-7	21	16.3 \pm 2.4	13.55	23.08	5 (23.81)	1 (4.76)
7-8	20	18.0 \pm 3.7	13.20	28.42	3 (15.00)	3 (15.00)
8-9	13	19.3 \pm 2.9	16.00	23.94	3 (23.07)	2 (15.38)
9-10	50	18.4 \pm 3.3	13.58	26.67	12 (24.00)	3 (6.00)
10-11	107	19.8 \pm 3.5	15.23	33.77	28 (26.17)	8 (7.48)
11-12	74	19.9 \pm 3.9	14.29	36.19	20 (27.03)	3 (4.05)
High School						
12-13	103	20.7 \pm 4.4	13.85	39.06	17 (16.50)	11 (10.68)
13-14	164	22.0 \pm 3.5	15.40	33.86	38 (23.17)	11 (6.71)
14-15	40	22.1 \pm 3.8	16.90	33.46	6 (15.00)	3 (7.50)
Total	592				132 (22.30)	45 (7.82)

ting. Height was measured with a Raven Minimeter (Raven Equipment Limited, Essex, United Kingdom), with no shoes on, to the nearest 0.1cm. Weight was measured with a Seca weighing machine (Seca, Hannover, MD), without shoes, to the nearest 500 grams. BMI was calculated and children were classified based on the age and sex cut off points for BMI as "overweight", with BMI values over the 85th percentile, and "obese", when they had BMI values over the 95th percentile, according to the International Obesity Task Force recommendation⁷.

Statistical analysis of data was performed with package SPSS for Windows (v.13.0). Student's t-test for non-parametric values and oneway ANOVA were performed for comparison of means. Statistical significance was considered for $p < 0.05$.

RESULTS AND DISCUSSION

The results of the study are summarized in Table 1. In each age range, at least one fourth of the children in primary school and one fifth of those in high school, were overweight. Percentage of obesity ranged from 4.05 to 15.38% (mean 8.8%) in primary school and between 7.50 and 10.68% (mean 8.3%) in high

school, overall mean 8.53%, which is high, but comparable to those of other European countries: in Spain the prevalence of obesity is 9.2%⁹, in Italy 6.1%¹⁰, in Russia 11.8%¹¹ and to those in other parts of Greece (11.1%)¹².

Studying these children divided by gender, there were no statistically significant differences in BMI mean values between boys and girls on the whole and in different age groups ($p > 0.05$). Moreover, in each age group, there were no significant differences in BMI values between children of schools of different areas of Thessaloniki ($p > 0.05$). These results show that in this western lifestyle city, children have a common way of living and eating, which leads to certain common BMI values for age and to certain percentages of obesity, regardless of the area of the city (city center or suburbs) the children live in.

The results of the present study lead to the conclusion that schoolchildren of the city of Thessaloniki, in Northern Greece present high percentage of overweight and obesity. That high prevalence in this part of Greece is comparable to that of other European countries, while higher than that of Northern European countries. Boys are as overweight and obese as

girls are. Percentages are not significantly different throughout the areas of the city of Thessaloniki.

Further study on lifestyle and eating habits of the children of this city, the second in population in

Greece, will probably reveal useful results, for the application of proper intervention programs, aiming in the prevention of adult obesity and its consequences on public health.

Συχνότητα παιδικής παχυσαρκίας σε σχολεία της Βόρειας Ελλάδας.

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ΠΕΡΙΛΗΨΗ: Μελετήθηκε η συχνότητα της παχυσαρκίας σε 592 μαθητές ελληνικών σχολείων (ηλικίας 7-15 ετών). Υπολογίστηκαν ο δείκτης μάζας σώματος (BMI) και τα ποσοστά υπέρβαρων και παχύσαρκων παιδιών για κάθε ηλικιακή ομάδα. Υψηλό ποσοστό παιδιών είναι υπέρβαρα και παχύσαρκα. Δεν παρατηρήθηκε σημαντική διαφορά στις τιμές του BMI ανάμεσα σε παιδιά σχολείων του κέντρου της Θεσσαλονίκης και των περιχώρων, αλλά και ανάμεσα στα δύο φύλα.

Λέξεις Κλειδιά: Παιδική παχυσαρκία, Επιδημιολογία, BMI, Ελλάδα.

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