European Journal of Clinical Nutrition (2007) 61, 1072–1074
 0954-3007/07 $30.00
www.nature.com/ejcn

ORIGINAL ARTICLE

Prevalence of overweight and obesity in a national representative sample of Greek children and adolescents

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Objective: The aim of this study was to examine the prevalence of overweight and obesity in Greek school age children and adolescents.
Design: Nationwide representative survey.
Setting: Primary and secondary schools all over Greece.
Subjects: In all, 6448 students (50.4% boys, 49.6% girls) 6–17 years old.
Method: A nationwide multistage procedure was followed to obtain a representative sample of youths. Body mass and height were measured by trained personnel. Data were collected between October 1990 and May 1991.
Results: According to the 12-month-International Obesity Task Force cutoff values, the overall prevalence of overweight was 17.3% (16.9% for boys, 17.6% for girls). The rate of obesity was 3.6% (3.8% for boys, 3.3% for girls). The prevalence of overweight and obesity was decreasing with age in girls (6–9 years: 23.2 and 6.7%, respectively, 10–17 years: 14.8 and 1.6%, respectively). In boys, the prevalence of overweight was higher in 10–17 years (19.3 and 2.7%, for the rate of overweight and obesity, respectively) than in 6–9 years (12.1 and 5.9%, respectively).
Conclusion: The prevalence of overweight and obesity in Greek children and adolescents is comparable to that reported for most European countries.
Sponsorship: None
European Journal of Clinical Nutrition (2007) **61,** 1072–1074; doi:10.1038/sj.ejcn.1602619; published online 24 January 2007

Keywords: overweight; obesity; children; adolescents; representative survey

Introduction

The prevalence of pediatric obesity has been increased in most western countries over the past years (Lobstein *et al*., 2004). Obesity in childhood tracks in adulthood and this may be a serious threat to health as obesity is associated with dyslipidaemia, hyperinsulinaemia and other metabolic and vascular abnormalities (Nassis *et al*., 2005; Krekoukia *et al*., 2007).

Data on pediatric and adolescent obesity in Greece are sparse and have been collected from non-representative samples (Mamalakis *et al*., 2000; Krassas *et al*., 2001). To the best of our knowledge, only one study has examined the prevalence of overweight and obesity in Greek children and adolescents in a national representative sample (Karayiannis *et al*., 2003). In that study, however, body weight and height were self-reported. In addition, data are limited to 11.5-, 13.5- and 15.5-year-old boys and girls. The aim of the present study was to examine the prevalence of overweight and obesity in a national representative sample of Greek 6- to 17-year-old boys and girls. In our study, trained personnel measured body weight and height.

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Contributors: GG carried out data handling, contributed to data analysis and to the writing of the paper. GPN performed data analysis and wrote the paper.
Received 3 July 2006; revised 17 November 2006; accepted 17 November 2006; published online 24 January 2007

Methods

Participants

A nationwide multistage procedure was followed and a representative sample of Greek 6- to 17-year-old students was produced. Sample selection was based on the 1981 National survey of the Hellenic National Statistics Service (HNSS). According to the HNSS, 58.2% of students were living in urban, 13.3% in semiurban and 28.5% in rural areas. Owing to administrative and technical problems students from night, technical and private schools were excluded. The percentage of students attending these schools was 9% (HNSS). Students from all parts of Greece and from the islands were included. The sample produced consisted of 7454 students, which corresponds to 0.5% of the population at these age groups. Owing to several reasons, such as students' absence at the day of measurement, unwillingness to participate and difficulties to reach the school in the winter and so on, 6448 students completed this study (50.4% boys, 49.6% girls; 61.1% from urban, 12.1% from semiurban and 26.3% for rural areas). Data were collected between October 1990 and May 1991 as a part of another study aiming to evaluate the fitness level of Greek school age youths. Approval to contact the study was granted by the University of Athens, Greece.

Anthropometric measurements and assessment of overweight and obesity

Standing height was recorded to the nearest 0.1 cm with a stadiometer whereas children were standing barefoot. Body mass was determined to the nearest 0.1 kg using a balance scale with the subject in light clothing. Body mass index (BMI) was calculated as body mass (kg) divided by height (m) squared. Trained physical education teachers collected all data. Participants were classified as overweight and obese according to their BMI using the 12-month cutoff values adopted by the International Obesity Task Force (Cole *et al*., 2000).

Results

Data were normally distributed (Table 1). The overall prevalence of overweight was 17.3% (16.9% for boys, 17.6% for girls) and the rate of obesity 3.6% (3.8% for boys, 3.3% for girls). The prevalence of overweight and obesity was decreasing with age in girls (Figure 1). In 6- to 9-year-old girls the prevalence of overweight and obesity were 23.2 and 6.7%, respectively. In 10–17 years, the corresponding rates were 14.8 and 1.6%. In boys, the prevalence of overweight was higher in 10–17 years (19.3 and 2.7%, for the rate of overweight and obesity, respectively) than in 6- to 9-year-old (12.1 and 5.9%, respectively). The prevalence of combined overweight and obesity did not differ between urban and semiurban/rural areas ($x^2 = 3.358$, $P = 0.50$).

Table 1 Anthropometric characteristics of Greek children and adolescents (mean ± s.d.)

Gender (age, years)	N	*Body weight (kg)*	*Body height (cm)*	*BMI (kg/m²)*
Boys				
6	183	23.9 ± 3.6	121.1 ± 5.1	16.25 ± 1.92
7	267	25.8 ± 5.0	124.7 ± 5.7	16.47 ± 2.41
8	280	28.9 ± 5.5	130.4 ± 5.9	16.88 ± 2.36
9	280	31.1 ± 5.9	134.1 ± 5.4	17.25 ± 2.59
10	310	35.2 ± 6.7	139.6 ± 6.1	17.96 ± 2.65
11	282	39.3 ± 8.5	144.6 ± 6.5	18.67 ± 3.02
12	278	44.0 ± 8.7	151.5 ± 7.0	19.06 ± 2.93
13	264	50.0 ± 10.4	157.8 ± 8.7	19.94 ± 3.09
14	275	56.4 ± 10.9	165.9 ± 8.0	20.40 ± 3.11
15	283	61.6 ± 11.4	170.6 ± 7.4	21.08 ± 3.13
16	274	66.8 ± 10.3	173.7 ± 6.1	22.08 ± 2.91
17	271	69.5 ± 10.3	175.7 ± 6.2	22.46 ± 2.85
Girls				
6	192	24.0 ± 3.9	119.8 ± 5.1	16.67 ± 2.12
7	257	25.6 ± 4.6	123.6 ± 5.1	16.71 ± 2.34
8	270	29.0 ± 5.6	128.8 ± 5.3	17.40 ± 2.64
9	266	31.3 ± 6.3	133.6 ± 6.3	17.43 ± 2.66
10	280	35.3 ± 7.1	139.9 ± 6.3	17.91 ± 2.71
11	285	39.6 ± 8.2	146.4 ± 7.3	18.35 ± 2.83
12	269	44.7 ± 9.1	152.4 ± 6.9	19.12 ± 3.06
13	283	49.1 ± 8.5	156.8 ± 6.3	19.90 ± 2.85
14	286	54.1 ± 8.1	160.0 ± 5.9	21.10 ± 2.84
15	267	55.2 ± 7.1	161.4 ± 5.4	21.20 ± 2.44
16	272	56.8 ± 7.7	161.8 ± 5.6	21.70 ± 2.60
17	274	56.8 ± 7.3	162.2 ± 5.8	21.56 ± 2.36

Abbreviations: BMI, body mass index; s.d., standard deviation.

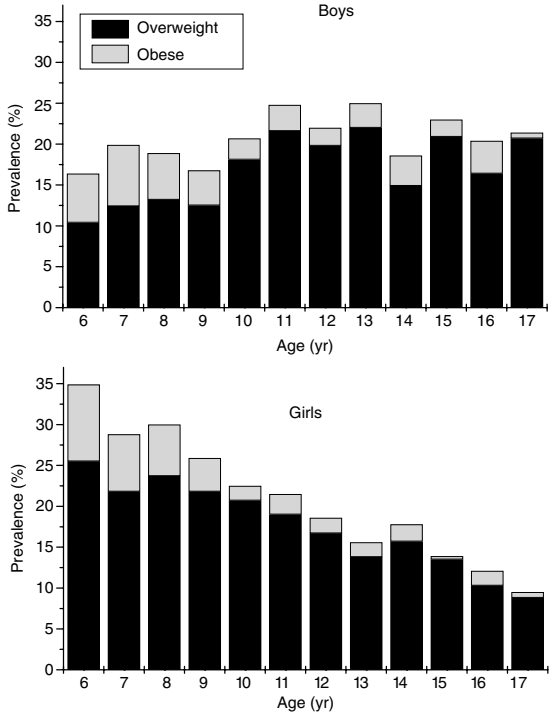

Figure 1 Prevalence of overweight and obesity in Greek 6- to 17-year-old boys (upper part) and girls (lower part).

Discussion

The overall prevalence of overweight and obesity was 17.3 and 3.6%, respectively, in this representative sample of 6- to 17-year-old Greek children and adolescents. The rate of overweight and obesity was similar in boys and girls. In girls, however, the prevalence of overweight and obesity was higher in 6 years old and was decreasing thereafter (Figure 1). No such trend was observed in boys.

This finding is consistent with previous data from different regions of Greece (Mamalakis *et al*., 2000; Krassas *et al*., 2001) and from Cyprus (Savva *et al*., 2002). Dieting with advanced age in girls could be an explanation for the decline in overweight and obesity after 11 years of age in the present study. Indeed, the percent of girls reporting to be on a diet to lose weight was increasing with age in a representative survey of 11.5- to 15.5-year-old Greek students whereas no such trend was found in boys (Yannakoulia *et al*., 2004).

Compared with the results reported by Karayiannis *et al*. (2003), similar values were found for the prevalence of overweight and obesity in boys but higher values were reported for girls in the present study. This discrepancy might be attributed, in part, to the fact that body weight and height were self-reported in the study of Karayiannis *et al*. (2003). The rate of overweight and obesity in Greek 6- to 17-year-old boys and girls is comparable to that observed in most (Rolland-Cachera *et al*., 2000; Kautiainen *et al*., 2002; Savva *et al*., 2002; Lobstein *et al*., 2003; Moreno *et al*., 2005) but not all European countries (Stamatakis *et al*., 2005). The fact that overweight and obesity were higher in the younger ages in girls suggests that additional actions should be adopted for the treatment of obesity in these age groups.

This is the first study in a nationwide representative sample of Greek youth but data collection took place about 15 years ago. The 12-month cutoff points were used in the present study for the assessment of overweight and obesity. A recent study has shown that using 12- versus 6-month age intervals may underestimate the prevalence of overweight and obesity by 1.4% (Kremer *et al*., 2006), and this should also be taken into account when interpreting these findings. Potential confounders were not included in the analysis and this is a limitation of the study. A previous study with data from Greece has shown that low fruit intake and physical activity and high TV viewing time were associated with elevated risk of overweight in 11.5- to 15.5-year-old students (Janssen *et al*., 2005).

More detailed data can be provided to anyone who intends to compile European or global data related to pediatric obesity.

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