

# Overweight and obesity among Iranian female adolescents in Rasht: more overweight in the lower social group

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## Abstract

*Objective:* This study aimed to investigate the frequency of overweight and obesity among Iranian adolescent girls aged 14–17 years and its possible association with maternal education in Rasht city in 2005.

*Design:* A cross-sectional survey on 1054 schoolgirls.

*Setting:* High schools in Rasht city, Iran.

*Methods:* A multistage sampling method was used and 1054 randomly selected schoolgirls were studied. Data on age and mother's years of schooling were collected by questionnaire and body weight and height were measured. Overweight and obesity were defined using age- and sex-specific body mass index (BMI) cut-off points proposed by the International Obesity Task Force (IOTF), and compared with 85th and 95th BMI percentile curves of the IOTF reference population, respectively. Data analyses included two groups based on mother's years of schooling: less educated (<12 years) and more educated ( $\geq 12$  years).

*Results:* The overall prevalence of overweight and obesity in this population was 21.9 and 5.3%, respectively. Results of logistic regression analysis showed that the risk of overweight was higher for lower age group (odds ratio = 2.0, 95% confidence interval 0.18–3.09). Overweight was more common in girls with less educated mothers than in girls with more educated mothers (26.0 vs. 19.8%,  $P = 0.03$ ).

*Conclusion:* These data indicate that overweight is highly prevalent among adolescent girls, especially in lower social groups in Rasht, and the rate is exceeding those reported in other parts of the country. Preventive strategies need to be adopted to combat the epidemic of overweight and obesity in this population.

**Keywords**  
Adolescents  
Obesity and overweight  
Educational level  
Iran

While the high prevalence of overweight and obesity is confirmed in the adult populations of developing countries<sup>1</sup>, data on this problem and its social variation among children and adolescents are still sparse. Adolescence seems to be one of the critical periods for the development of obesity, which in turn is related to morbidity and mortality in adulthood<sup>2,3</sup>. Recent data indicate that overweight is increasing among children and adolescents in Iran<sup>4,5</sup>. One outcome of this trend is the alarming increase in prevalence of the metabolic syndrome in the Iranian population, especially among women<sup>6,7</sup>. Data on adolescent overweight and obesity, and the possible role of social inequity in this problem, will help to inform prevention programmes regarding chronic diseases in adulthood. Therefore the present cross-sectional study was conducted to provide information on: (1) the current weight status of Iranian girls aged 14–17 years in Rasht city; and (2) possible social differences in the prevalence of overweight and obesity in this population.

## Subjects and method

The study population was 14–17-year-old schoolgirls in Rasht city in 2005. Between December 2004 and April 2005, a random sample of 1115 schoolgirls studying in high schools with different socio-economic backgrounds in Rasht was selected with no exclusion criteria. The schools were selected using multistage cluster design.

Selection of the subjects was initially made by school level, not by age of the adolescents. Thereafter, the girls were classified into four age groups. Since for 61 students age was not within the range of the protocol, they were excluded and 1054 observations are included in data analyses. The numbers in different age groups were not balanced. The 14-year-old class included 18.9% of the girls, the 15-year-old class 31.4%, the 16-year-old class 34.9% and the 17-year-old class 14.6%.

Data on age and mother's education were collected. Anthropometric measurements were performed in the morning with adolescents lightly dressed and without

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shoes. Body weight was measured to the nearest 0.1 kg using a balance-beam scale; height was measured to the nearest 0.5 cm with the girls standing upright with head, back and buttocks on the vertical land of the height gauge. Body mass index (BMI) was calculated using the equation: weight (kg)/[height (m)]<sup>2</sup>. Age- and sex-specific BMI cut-off points proposed by the International Obesity Task Force (IOTF) were used to define overweight and obesity<sup>8</sup>. The 85th and 95th percentiles of BMI in the adolescent girls were compared with those of the reference population (IOTF)<sup>8</sup> as well as with corresponding values from similar studies in Tehran, the capital of Iran<sup>9</sup>, and Turkey<sup>10</sup>.

The prevalence of overweight and obesity among the study girls was also assessed according to their mother's level of education. Data analyses included two educational groups: girls whose mothers had <12 years of schooling, and those whose mothers had ≥12 years of schooling. These two educational groups are representative of high and low social class in Iran.

The study protocol was approved by the ethnical committee of Guilan University of Medical Sciences.

### Statistical analyses

Differences in the prevalence of overweight and obesity between low and high educational groups were tested using chi-square statistics. Logistic regression analysis was used to determine the relationship of age with overweight and obesity. Values are given as mean ± standard deviation. *P*-values less than 0.05 were considered to indicate statistical significance. Analyses were performed using the Statistical Package for the Social Sciences (SPSS 10.01 for Windows; SPSS Inc.).

### Results

Mean values of weight, height, BMI, percentage of overweight and percentage of obesity for adolescent girls as a function of age are given in Table 1. The overall prevalence of overweight and obesity in this population was 21.9 and 5.3%, respectively. Results of logistic regression analyses showed that the risk of overweight was higher in lower age groups (odds ratio = 2.0, 95% confidence interval 0.18–3.09). Figures 1 and 2 compare the 85th and 95th BMI percentiles of adolescent girls in the

present study with recently published data for Tehran and Turkey, and the IOTF curves. The results show that the 85th BMI percentile curve is highest for adolescent girls in Rasht. The prevalence of overweight and obesity in adolescents by mother's level of education is shown in Table 2. Girls with less educated mothers had a higher prevalence of overweight than girls with more educated mothers.

### Discussion

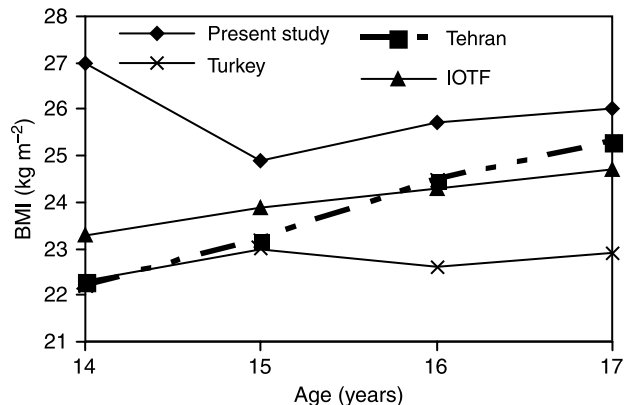
The prevalence of adolescent overweight has increased during the last 10 years in Iran<sup>9</sup>. Recent evidence suggests that the nutrition transition is accelerating in Iran and the outcome of this trend is a rapid increase in obesity and chronic diseases<sup>11,12</sup>. The present study clearly indicates that overweight is highly prevalent among female adolescent students in Rasht city. Age-adjusted BMI among these girls was not only higher than in the similar studies in other parts of the country<sup>13,14</sup>, but also higher than values from many European countries<sup>15</sup>. While we did not collect data on male adolescents, studies in Tehran showed that adolescent girls are more at risk for overweight than boys<sup>4,16</sup>. Similar sex differences in the prevalence of obesity and metabolic syndrome were also found in the adult population of Iran<sup>17</sup>. While it is difficult to explain the higher prevalence of overweight in adolescent girls, social factors may play an important role. Iran is an Islamic non-Arabic country and its social environment is very different to that in Western countries. Such social differences may be more notable for young women in that their Islamic dressing style in public, limited outdoor sport and leisure activities and lack of media images for conforming to an ideal body weight may have made them less concerned about thinness and a prudent diet with regard to obesity. Although there is no study to suggest what Iranian adolescent girls might think about ideal body weight, it seems there is less social pressure for thinness and dieting in such an environment. More studies are needed to clarify this matter.

In developed countries, adolescent girls from higher social class have lower mean BMI than adolescent girls from lower social groups<sup>18–20</sup>. Despite social differences in Iran versus Western countries, the same trend in overweight prevalence and association with mother's

**Table 1** Height, body weight, body mass index (BMI), overweight and obesity for adolescent girls by age

Age (years)	Height (cm)	Weight (kg)	BMI (kg m <sup>-2</sup> )	Overweight (95% CI)	Obesity (95% CI)
14 ( <i>n</i> = 200)	158.3 ± 5.0 (144.3–174.4)	56.4 ± 12.0 (36.1–105.7)	22.4 ± 4.2 (14.3–38.1)	25.0 (18.9–31.1)	7.0 (3.5–10.5)
15 ( <i>n</i> = 332)	158.8 ± 5.6 (136.0–170.6)	55.3 ± 10.1 (35.0–92.5)	21.8 ± 3.6 (14.2–36.2)	15.1 (11.3–18.7)	3.7 (1.6–5.6)
16 ( <i>n</i> = 368)	159.3 ± 5.7 (145.1–172.9)	56.3 ± 11.4 (15.9–40.0)	22.1 ± 3.9 (22.1–33.9)	12.5 (9.5–15.5)	5.9 (3.5–8.3)
17 ( <i>n</i> = 154)	158.3 ± 5.0 (147.4–170.0)	56.4 ± 11.0 (40.0–102.5)	22.4 ± 4.1 (16.6–36.4)	12.2 (7.0–17.6)	4.9 (1.7–8.7)

Data are mean ± standard deviation with minimum–maximum values given in parentheses for height, weight and BMI. For overweight and obesity, data are % with 95% confidence interval (CI) given in parentheses.

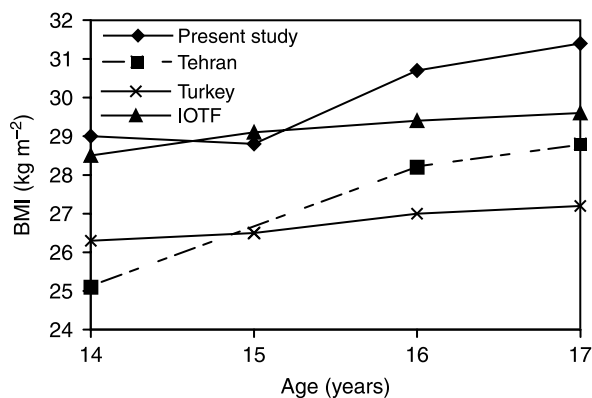


**Fig. 1** Comparison of the 85th percentile curve of body mass index (BMI) in adolescent girls of the present study with those from Tehran<sup>9</sup>, Turkey<sup>10</sup> and the International Obesity Task Force (IOTF) reference population<sup>8</sup>

education was found among the adolescent girls in the present study. There are fewer data regarding social differences and overweight among children and adolescents in developing countries. The present results confirm the findings from a report indicating that the level of mother's education is negatively associated with the prevalence of overweight in Iranian adolescents in Isfahan<sup>13</sup>. Our data are also concordant with the results of a similar study in middle-aged Iranian women, which reported that BMI is inversely related to educational level in Iranian women<sup>21</sup>. However, more detailed studies are needed to clarify why those adolescents of lower social class may be more prone to overweight and obesity.

Overweight was more common in 15-year-old girls than in other age groups in this population. At present no explanation can be seen for the higher prevalence of overweight in the younger girls of this study.

In conclusion, these data show that obesity and overweight are prevalent among female adolescents in Rasht city and that social differences in the frequency of overweight occur in this population. It should be noted



**Fig. 2** Comparison of 95th percentile curve of body mass index (BMI) in adolescent girls of the present study with those from Tehran<sup>9</sup>, Turkey<sup>10</sup> and the International Obesity Task Force (IOTF) reference population<sup>8</sup>

**Table 2** Overweight and obesity in total and by mother's level of education for adolescent girls in the study

	Overweight (95% CI)	Obesity (95% CI)
Low mother's education ( $n = 577$ )	26.0 (22.5–29.5)*	4.7 (2.9–6.5)
High mother's education ( $n = 497$ )	19.8 (16.2–23.2)*	2.9 (1.4–4.2)
Total ( $n = 1054$ )	21.9 (19.5–24.5)	5.3 (3.9–6.7)

Data are % with 95% confidence interval (CI) given in parentheses. \*,  $P = 0.03$ .

that obesity complications including coronary artery disease, the first cause of mortality in Iran, are widely prevalent in Iranian women<sup>15</sup>. The present findings highlight the important public health message of preventing overweight among female adolescents especially in the lower social class in Iran.

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