Prevalence of Obesity and Overweight among Adolescents of Birjand, East of Iran

Fatemeh Taheri[1], Tayebeh Chahkandi[2*], Toba Kazemi[3], Bita Bijari[4]

1. Atherosclerosis and Coronary Artery Research Center, Professor of Pediatric, Birjand University of Medical Sciences (BUMS), Birjand, Iran.
2. Atherosclerosis and Coronary Artery Research Center, Associate Professor of Pediatric, Birjand University of Medical Sciences (BUMS), Birjand, Iran.
3. Atherosclerosis and Coronary Artery Research Center, professor of Cardiology, Birjand University of Medical Sciences (BUMS), Birjand, Iran.
4. Atherosclerosis and Coronary Artery Research Center, Assistant Professor of Community Medicine, Birjand University of Medical Sciences (BUMS), Birjand, Iran.

[*]**Correspondence:**
Tayebeh Chahkandi (MD), Birjand Atherosclerosis and Coronary Artery Research Center, Pasdaran Avenue, Birjand ,South Khorassan, Iran.
Email: na_chahkandi@yahoo.com.
Tel: (98) 915 314 3285
Fax: (98) 561 444 5402

Received: 27 June 2015

Accepted: 14 August 2015

Published in September 2015

Abstract

Objective: The prevalence of overweight and obesity in adolescents is increasing worldwide. The main aim of this study was to determine the prevalence of obesity and overweight among adolescent students11-19 year old in Birjand, east of Iran.

Materials and Methods: This cross-sectional study in 2012 was conducted on 2453 students (1296 girls and 1157 boys) who had been selected through multi stage cluster sampling from Middle and High school schools of Birjand. Obesity and overweight were defined according to CDC criteria, 85-95th percentile was taken as overweight and >95th percentile was defined as obese with respect to age and sex. The obtained data was analyzed by SPSS software (V:15).T-test and chi-square were used for statistical analys is $P \leq 0.05$ was considered as the significance level.

Results: 7.3% of students (8.4% of boys and 6.4% of girls) were overweight and 8.2% of students (i.e. 8.1% of boys and 8.3% of girls) were obese.

Conclusion: Considering the high prevalence of obesity and overweight among adolescents of Birjand, therefore, prevention of childhood obesity is a high priority. For this purpose, it is recommended that necessary information and healthy lifestyle education should be provided to families.

Keywords: Adolescent, Obesity, Overweight.

Introduction

Obesity and overweight in children and adolescents are one of the most serious public health challenges of the 21st century, such that increased more twofold fold from 20 years ago (1). The numbers have doubled Childhood Obesity as the global principal health problem is steadily involving many low- and middle-income countries, particularly within urban areas (2-5).Obesity is a principal risk-factor for chronic diseases. Obesity in adolescents is associated with increasing the metabolic syndrome risk, hypertension, and diabetes I and II. Obesity has a decisive role in the development of metabolic syndrome. Moreover, obesity in childhood and adolescence appears to track into adulthood and it is associated with cardiovascular complications, diabetes, hypertension,

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depression, mortality and morbidity of adulthood (6-12).

In children suffered from severe obesity take greater risks than obese children. Those ones with Body Mass Index (BMI) above the 99th percentile had higher prevalence of metabolic syndrome, higher mean blood pressures, and insulin levels, lower mean high-density lipoprotein (HDL) cholesterol levels, and greater risk of cardiovascular disease (13). The pathogenesis of obesity is multifactorial (including genetic predisposition and environmental factors). The combination of genetic propensity to store fat, unhealthy nutrition, reduced physical activity, Socioeconomic Status, tradition and culture promote overweight and obesity (6). In Iran as like as many of other developing countries, prevalence of obesity in children and adolescents has been increased (14-19).

Birjand is the capital of the south Khorasan Province, in the east of Iran. Since South Khorasan province is one of the most deprive area of Iran (16)the present study aimed at assessing prevalence of overweight and obesity among middle and high school students of Birjand in 2012.

Materials and Methods

The present cross-sectional study was carried out on 2453 students aged 11-19 years (1296 girls, 1157 boys) of Birjand, during November to February 2012. Subjects were selected through multi stage cluster sampling. First of all, considering the distribution of Middle and High schools in different districts of the city, 14 girls' schools (7 Middle and 7 High schools) and 14 boys' schools (7 Middle and 7 High schools) were selected.

In following, based on the student population of each school and its ratio to the total population of students, some students were selected from each class. In this step, 2800 students were selected and a questionnaire with consent form was sent to each one's parent. The parents were demanded to fill out the demographic and consent forms and return them to school if they agreed with their kid's participation in the plan; and if their kid did not have any chronic disease or endocrine disorder such as diabetes or he/she was not in treatment for corticosteroids. After that, 2590 questionnaires were filled out and returned to schools. In the next step, two trained nurses, after getting the permission of the education office and ensuring coordination with it, referred to the selected schools and recorded the weight and height of the participated students through the standard way and recorded each one in the respective form. A few of the cases were excluded because of defects in the information offered and the final considering population of the subjects was 2545 students. Weighing of the students by German Seca digital scale with 100 gram calibration weight was done, while they were barefoot and wore light clothing. The height of each student was also measured in standard manner; with an error of 0.5 cm. At the end, BMI was calculated. In order to determine overweight and obesity, the percentages of Center for Diseases Control and Prevention (CDC) were employed. 85-95 percentiles were taken as overweight with respect to age and sex; and $\geq$ 95 percentile was defined as obese. Statistical analysis was done by means of SPSS software, data checked for normality by Kolmogorov-Smirnov test. Comparing variables were performed using X2 and T-test. $P \leq 0.05$ was taken as the significant level.

Results

In this study, 2453 adolescent students of Birjand including 1296 girls and 1157 boys were studied. The response rate was 87.6%. Mean age of the students was 14±1.9 yrs. Their age ranged between 11-19 years. Mean BMI of the students was 20.22±4.01. Mean BMI in girls was significantly higher than one of the boys (20.58±3.84 in girls, 19.79±4.17 in boys (P=0.001). Table 1 shows the mean BMI in the subjects according to age and sex. As shown, the relationship between sex and BMI was significant in 11-13 years. BMI in girls was higher than boys, especially for 11-13 yrs. Table 2 indicates relative and absolute

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Table1. Comparison of mean BMI in 11-18 years old students by age and gender.

Age groups	Boys n=1157		Girls n=1296		*P*-value
	n	Mean ± SD	n	Mean ± SD	
11	105	17.96±3.42	130	19.22±3.32	0.004*
12	197	18.71±4.06	223	19.71±3.87	0.008*
13	262	19.13±3.90	224	20.41±4.02	0.001*
14	164	20.14±3.91	197	20.67±3.76	0.18
15	137	20.78±4.28	161	21.20±3.45	0.35
16	166	21.39±4.52	146	21.47±3.83	0.85
17	101	20.87±3.46	147	21.40±3.72	0.27
18	25	21.86±4.83	68	21.50±4.23	0.33
Total	1157	19.79±4.17	1296	20.58±3.84	0.001*

*:significant

Table2. Prevalence of overweight and obesity in our subjects according to age and sex

Age groups	Boys n=1157			Girls n=1296			*P*-value
	n	OW%	OB%	n	OW%	OB%	
11-12	302	5.3	8.9	353	6.5	5.7	0.23
13-14	426	11	8	421	7.6	9.5	0.18
15-16	303	7.3	8.9	307	7.2	9.8	0.93
17-18	126	9.5	4.8	215	2.8	8.4	0.01*
Total	1157	8.4	8.1	1296	6.4	8.3	0.17

OW= Overweight, OB= Obesity

frequencies of overweight and obesity according to age and sex. In table 2 obesity or overweight prevalence was compared with the gender group in different ages. It can be resulted that the prevalence of overweight and obesity in male and female were not significantly different (*P*=0.17) with exception of 17-18 years. For this age group boys suffered more overweight and girls more obesity (*P*=0.01).

Discussion

The present study showed that the prevalence of overweight and obesity in Birjand adolescences was 7.3% and 8.2%, respectively. Two other studies by Taheri et al on 2-5 and 6-11 years old children reported that overweight was 10.6% and 9.6%, and obesity was 7.6% and 9.2%, respectively (20,21). The high prevalence of other risk factors in adolescents of Birjand was reported. So that, abdominal obesity and pre diabetes have been reported in 16.3 % (20% of boys and 13.2% in girls) and 7.5% adolescents of Birjand, respectively (22,23). Also, 34.3 %(31.3% girls and 37.6% boys) of adolescents had at least one dyslipidemia (24).

Another study conducted by Taheri in adolescents of Birjand in 2002, reported that overweight of students aged 11-15 and 15-18 are 5.2% and 6.1%, respectively; and their obesity is 2.1% (16).Comparing the findings of two studies, indicates that the prevalence of obesity in Birjand adolescents has been severely increasing (16). It should be noted that other studies in Iran reported the increasing of obesity trend in Iranian children (14-19,25) For example, in Tehran 15% of the 10 years, students were prone to overweight, 4.2% of them had medium overweight, and 4.6% of the cases were acutely overweight (19) in Basiratnia study conducted on 11-17 years old students Shiraz city located in south of Iran, prevalence of overweight and obesity was 13% and 7%, respectively (25).

In the present study, there was no significant difference in the prevalence of overweight and obesity among boys and girls that is similar to a Shiraz study on 11-17 years old students (25). In Pakistan research, prevalence of obesity was higher in boys (%15) than that in girls (8%) (26). In Adesins study, mean BMI in girls was significantly higher than that of boys from 11 years of age throughout adolescence. His justification was higher

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stature in boys, increase fat mass and decreased physical activity in girls (27).

The prevalence of children obesity in the other Asian countries has been investigated (25,27-29,31). In the Bangladesh, the prevalence of obesity in 10-13 year olds was reported to be 10.7% (28). The prevalence of overweight and obesity in 7-14 years old Chinese students were reported about 11.1% and 7.2% respectively (29). The prevalence of overweight, obesity, and severe obesity of Saudi Arabia adolescents were reported to be 23.1%, 9.3%, and 2% respectively (31). In Ahmed study on Pakistani school children, prevalence of overweight (8%) and obesity (12%) was also high (26). Prevalence of overweight in Adesins study on Nigerian adolescents aged 10-19 years, was 6.3% (27) but prevalence of obesity was very low (1.8%) in comparison to results reported by more affluent industrialized countries like USA (15%), UK (20%), France (14%), Russia (6.7%), and China (3.6%) (27).

High and growing prevalence of obesity in children of developing countries has been reported. For example, in Mexico, Brazil, India, and Argentina the reported quantities are 41.8%, 22.1%, 22%, and 19.3%, respectively. Obesity in Brazilian children increased from 4.1% to 13.9% between 1974 and 1997; about children of Thailand, it increased from 12.2% to 15.6% between 1991 and 1993; and in Indian cases it increased from 9.8% to 11.7% between 2006 and 2009 (2). Prospective study by Ogden et al, showed, increasing in children with high BMI over a 30 year period (1965-1994) (32). Cheng Ye reported, a positive secular trend of BMI among Chinese Children and Adolescents, during 1985-2000 and 2000-2010 (28).

The rapid increase in childhood obesity of developed countries since the 1960s, that had been more than developing countries, now has slowed within its cease or declining trend. In American children and adolescents, it was found that between 2009 and 2010, 31.8% of them suffered overweight and obesity and 16.9% of subjects were obese (15% of girls and 18.6% of boys). From 2007 to 2010 the situation has not been changed (34). Another study on New Yorker children indicates that obesity in them decreased between 2006-2007 and 2010-2011, so that it dropped from 21.9% to 20.7%.A study on Danish Children and Adolescents, showed, decreasing trend of overweight and obesity (35).

The growing prevalence of overweight and obesity in Birjand adolescents can be due to behavioral factors Such as Patterns of inactivity (television, video game, or computer viewing) and an unhealthy lifestyle. Other factors are over consumption energy-dense, low-fiber, high-fat diet such

Conclusion

Our results revealed a high prevalence of overweight and obesity in Brijand adolescents. As regards, life style plays important role in the development of obesity, hence the first step is to modify lifestyle. Diet modifications, including avoiding fast food and high-calorie foods and strategies to encourage physical activity or limit sedentary activity are very useful. For this purpose, it is important to educate adolescents and their families and to increase the awareness of all members of society about the factors and consequences of obesity

Wide scale interventionist activities by the health system in the schools and in the community is essential. More research is required to investigate the reasons for the rising trend of obesity in the region. Ultimately periodical studies to evaluate the prevalence of overweight and obesity is recommended.

Acknowledgement

The researchers feel themselves obliged to the Education Office; and schools' principals and students who participated in the project. They also thank Mr H. Nasrabadi and other executive co-workers who cooperated with gathering of necessary data.

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