

In a study in Iran, prevalence of overweight and obesity in children aged 6-18 years was 10.1% and 4.79% according to national cut-offs [8].

Some studies in different populations have assessed the prevalence of overweight among children [2-4,8-10]. It is known that the prevalence of overweight differs by race, sex, and geographic location [7]. Few data on obesity prevalence, based on the optimum definition using body mass index (BMI), exist for children in developing countries[11].

Overweight or obese children are at risk for high blood pressure, dyslipidemia and diabetes type II [5,12-15]. These children may eventually become overweight or obese adults [16-19]. Many studies have shown that schools can play an important role in improving lifestyle and children's behavior and subsequently prevent overweight and obesity [20-22].

Assessment of body composition can be performed by direct (e.g. estimation of lean body mass) or indirect (e.g. weight for height measurement) methods. The indirect methods are less precise but less expensive and simpler than the direct methods, especially for children [23].

Measuring students' height, weight, and BMI in schools is an important approach to identify the prevalence of overweight and obesity and then try to reduce it [20,21,24,25].

BMI has been recommended by many authors for evaluation of childhood obesity [26] and The American Academy of Pediatrics (AAP) recommend annual assessments of BMI as a strategy for preventing and combating childhood obesity [27].

Reference values for BMI have been measured in many developed countries such as America, Germany, and Britain [23,28,29]. International obesity task force (IOTF) and center of disease control and prevention (CDC) have defined reference values for different parts of the world [30,31]. In Iran, these reference values have been measured in different studies [8,32].

There are few studies in Iran about the prevalence of obesity among pre-school children[8,33]. We conducted this study to assess body mass index of school children in all grades aged 7-18 years from different ethnicities in Iran and compare it with Iranian and IOTF standard values.

Subjects and Methods

In a cross-sectional study 30092 Iranian children aged 7-18 years in six ethnicities (i.e. Fars, Kurd, Lor, Baluch, Turk, and Arab) were assessed. 204 subjects without data on date of birth were excluded from the study, so the final data set used in the analysis consisted of 29988 children (14924 boys and 14964 girls) in six ethnicities. Sample size was measured using ISO 15535 Method[34].

Subjects were selected by multistage random cluster sampling from different parts of Iran. We selected a province as the representative of each ethnicity: Yazd (Fars), Sistan (Balouch), Kurdistan (Kurd), Lorestan (Lor), Zanjan (Turk), and Khozestan (Arab). In each province persons who were native (those whose grandparents were from that ethnicity according to their parents' testimony) were selected, non-native children and those with doubtful ethnicity were excluded from the study. We selected about 200 cases in each grade (from 1-12) from 12 primary, 8 intermediate and 10 high schools in different urban and rural parts of each province.

Then body weight, height and BMI were measured for all subjects. Measurements were made in winter and spring 2009 in a 6 month period.

Body weight was measured using a digital weight scale (Laica, Italy, accuracy: 100 grams) and height was measured by an anthropometer designed by researchers and validated by a pilot study (accuracy: 5 millimeters). Children wore light indoor clothing and no shoes during measurements.

Mean, standard deviation and key percentiles (5, 50, 85, and 95) were measured for weight, height and BMI. Prevalence of obesity (BMI>95th percentile) and overweight (BMI>85th percentile) was measured and compared among different Iranian ethnicities.

Cut-off points for defining obesity and overweight were based on the Iranian data from Hosseini et al[29] and international obesity task force (IOTF) standard values data[28]. Although according to Kelishadi et al[8] the standard values of CDC were closer to the measurements of our population, we used IOTF standard values to compare BMI of our children with an international standard.

Data was analyzed by SPSS (ver. 16). Independent samples t-test was used for comparison of means between two genders and one way ANOVA was used for the comparison of means among different ethnicities.

We obtained an informed consent from parents after explanation of the procedure.

Findings

A total of 29988 Iranian children (14924 boys and 14964 girls), 7-18 years old in six ethnicities including 4895 Fars, 4872 Kurd, 4908 Lor, 5389 Baluch, 5119 Turk, and 4705 Arab children entered the study.

Table 1 shows the mean and standard deviation for weight, height and BMI in all age groups and key percentiles (5, 50, 85 and 95) for BMI in two genders separately. BMI in 8 and 18 year-old boys was significantly higher than in girls ($P=0.002$, and $P<0.001$, respectively); and 12, 13, 14, 15, and 16

year-old girls had a higher BMI than boys ($P=0.02$ for 12, and $P<0.001$ for others).

Figure 1 shows the gender- and age-specific mean BMI among school children of six ethnicities. There was a significant BMI difference in boys and girls in different ethnicities ($P<0.001$). Baluch boys and girls had the lowest BMI in all age groups, but the highest BMI was seen in different ethnicities for different ages (e.g. Arab girls had the highest BMI in 8, 9, 12, 13, and 16 year olds, and the highest BMI in 7 and 11 year olds was observed in Turk boys).

Considering IOTF, 2774 (9.27%) of Iranian children were overweight (10.49% of boys and 8.07% of girls), and 965 (3.22%) of them were obese (3.75% of boys and 2.71% of girls). But if we consider national standard (1999), these prevalence rates will be much higher. According to this standard 3787 (12.67%) of Iranian children were overweight (11.82% of boys and 13.50% of girls), and 3128 (10.47%) of them (12.06% of boys and 8.9% of girls) were obese. Tables 2 and 3 show the prevalence of overweight and obese boys and girls in different ethnicities, respectively.

Table 1: Descriptive statistics for weight, height and body mass index in Iranian children

Age	Sex	Weight(kg)	Height(m)	Body Mass Index				
		Mean (SD*)	Mean (SD*)	Mean (SD*)	5 th	50 th	85 th	95 th
7	Boys	22.25 (4.38)	1.20 (0.06)	15.22 (2.06)	12.85	14.95	16.58	18.43
	Girls	21.70 (4.97)	1.19(0.06)	15.06 (2.17)	12.43	14.70	16.72	18.83
8	Boys	25.49 (5.62)	1.26(0.06)	15.79 (2.43)	13	15.34	17.57	20.84
	Girls	24.53 (5.00)	1.25(0.06)	15.50 (2.40)	12.61	15.08	17.55	19.89
9	Boys	28.86 (6.52)	1.32(0.06)	16.24 (2.61)	13.36	15.67	18.25	21.10
	Girls	28.28 (6.50)	1.31 (0.06)	16.22 (2.77)	13.14	15.43	18.89	21.67
10	Boys	32.08 (7.54)	1.37 (0.06)	16.87 (3.05)	13.60	16.15	19.73	23.08
	Girls	31.59 (7.36)	1.36 (0.06)	16.72 (3.00)	13.28	15.98	19.68	22.63
11	Boys	36.36 (9.08)	1.43 (0.07)	17.38 (3.37)	13.45	16.41	20.76	24.21
	Girls	36.00 (9.32)	1.43 (0.07)	17.52 (3.29)	13.55	16.76	20.93	24.02
12	Boys	39.87 (10.16)	1.47 (0.08)	18.13 (3.62)	14.07	17.21	21.63	25.25
	Girls	41.66 (9.82)	1.49 (0.07)	18.49 (3.51)	13.98	17.85	22	25.50
13	Boys	45.39 (11.61)	1.54 (0.09)	18.74 (3.63)	14.26	17.97	22.53	25.92
	Girls	46.52 (10.93)	1.53 (0.06)	19.63 (3.890)	14.82	18.90	23.46	27.13
14	Boys	51.07 (13.50)	1.61 (0.09)	19.50 (4.00)	14.72	18.58	23.12	27.70
	Girls	50.25 (10.15)	1.56 (0.05)	20.45 (3.61)	15.61	19.73	24.33	27.02
15	Boys	55.23 (13.08)	1.66 (0.08)	19.86 (3.96)	15.14	18.98	23.35	28.74
	Girls	52.31 (10.03)	1.57 (0.05)	21.00 (3.69)	16.05	20.28	24.97	27.98
16	Boys	58.88 (12.70)	1.69 (0.07)	20.31 (3.74)	15.88	19.51	23.56	28.20
	Girls	53.41 (10.11)	1.58 (0.05)	21.32 (3.73)	16.44	20.66	25.04	28.33
17	Boys	62.91 (12.44)	1.72 (0.06)	21.11 (3.73)	16.54	20.32	24.76	28.22
	Girls	53.76 (9.85)	1.58 (3.05)	21.34 (3.57)	16.65	20.74	25.06	28.03
18	Boys	64.53 (13.10)	1.72 (0.06)	21.60 (3.98)	16.85	20.74	25.10	29.35
	Girls	52.69 (9.69)	1.58 (0.05)	21.00 (3.54)	16.42	20.35	24.24	28.11

* SD: standard deviation

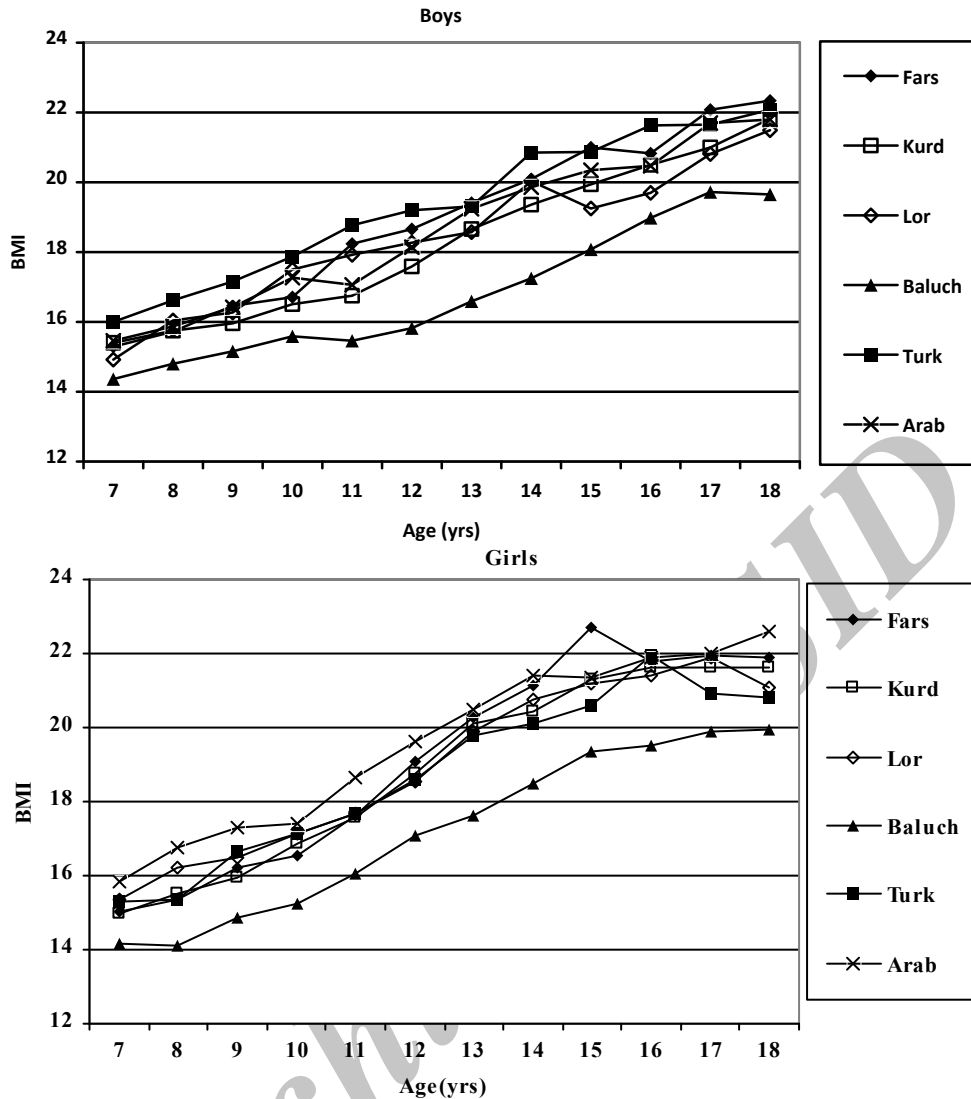


Fig. 1: BMI (Body Mass Index) versus Age (years) for Boys and Girls across six ethnicities: Fars, Kurd, Lor, Baluch, Turk, and Arab.

Discussion

Child obesity is an epidemic with serious social, economic, and health consequences having the potential to continue into adulthood^[25], so identification of children who are overweight or obese based on different age, gender, and ethnicity and intervention to prevent the development of obesity-related conditions is important.

Parents' occupation, education and urbanization are major risk factors for childhood obesity in developing countries^[1,11]. It is known that the prevalence of overweight differs by race, sex, and geographic location^[7].

This is the first study for comparing BMI among different ethnicities from a large national sample in Iran. Although Kelishani et al have assessed the prevalence of overweight and obesity in a large national sample, they haven't compared their results among different ethnicities^[8].

In our study, centiles of BMI were higher than the study of Hosseini et al in all age groups^[32], and they were much closer to the international standards which shows a tendency to increase BMI among Iranian children during the last decade.

Centiles of BMI were also higher than those of Vietnamese and Chinese children^[1,35]. Prevalence

Table 2: Prevalence of overweight and obesity among boys of six ethnic groups

Age (year)	Fars		Kurd		Lor		Baluch		Turk		Arab	
	IRN*	IOTF*	IRN	IOTF	IRN	IOTF	IRN	IOTF	IRN	IOTF	IRN	IOTF
7 (OW**)	12.1	3.0	9.9	4.4	7.9	4.8	3.4	1.0	19.6	6.7	9.4	3.9
7 (Ob**)	4.3	2.1	5.4	1.5	7.9	3.5	1.7	0.7	9.1	3.5	5.9	2.5
8 (OW)	9.7	9.7	17.7	4.3	12.9	12.9	9.0	5.4	15.9	9.9	13.7	6.8
8 (Ob)	12.8	3.1	6.2	1.9	18.8	5.9	5.4	0	16.4	6.9	10.2	3.9
9 (OW)	10.9	7.8	16.3	5.8	11.8	7.4	12.3	4.7	17.1	16.2	12.6	10.5
9 (Ob)	13.0	4.7	6.8	1.1	11.8	3.9	5.2	.5	22.2	3.7	13.7	2.1
10 (OW)	7.1	13.6	9.9	7.3	14.6	17	6.7	2.9	17.7	17.7	8.8	11.0
10 (Ob)	16.2	1.9	10.9	2.6	22.2	4.1	4.6	1.3	23.6	4.5	18.2	6.1
11 (OW)	13.4	16.0	12.1	7.1	14.4	17.8	4.8	3.9	17.6	20.9	12.9	9.1
11 (Ob)	23.5	6.7	9.1	2.0	22.5	3.8	4.8	0.5	26.4	5.5	11.5	2.4
12 (OW)	11.6	16.9	8.6	7.2	10.1	13.2	4.8	0.8	17.8	18.8	12.1	11.7
12 (Ob)	20.0	4.4	9.9	2.6	17.6	4.8	2.4	1.6	21.6	5.3	15.0	4.4
13 (OW)	12.1	21.1	11.0	11.9	10.6	13.7	6.0	5.3	13.8	12.8	14.3	16.5
13 (Ob)	21.5	4.9	13.7	2.6	12.8	4.0	4.7	1.3	14.3	4.9	17.7	3.8
14 (OW)	11.3	15.7	14.1	9.0	15.3	20.8	5.8	5.4	16.8	15.8	14.0	15.5
14 (Ob)	17.4	6.5	8.5	4.5	15.3	4.4	4.5	1.3	17.9	8.2	14.7	5.4
15 (OW)	15.8	14.7	10.2	10.7	4.7	6.1	3.8	5.0	16.2	13.8	9.4	11.2
15 (Ob)	15.8	9.8	7.0	2.8	6.6	3.8	5.0	2.9	12.9	6.2	11.6	6.7
16 (OW)	11.5	11	10.6	8.7	4.8	6.9	7.5	7.9	16.3	13.8	10.8	5.9
16 (Ob)	11.5	5.0	6.8	2.4	6.9	1.6	5.0	1.7	13.3	7.7	5.9	3.9
17 (OW)	9.5	13.1	11.5	12.5	12.2	7.9	5.9	7.4	17	18.3	13.9	10.2
17 (Ob)	17.6	9.0	7.3	1.6	6.1	1.7	7.8	3.4	2.6	3.0	10.2	4.6
18 (OW)	18.5	13.9	11.9	11.1	14.8	7.5	5.1	5.2	14	11.4	14.0	13.2
18 (Ob)	15.1	7.4	11.1	2.5	8.0	3.1	5.1	0	12.8	5.1	12.1	5.2

* IRN: Iranian definition from Hosseini et al^[29], IOTF: International obesity task force values from Cole et al^[28]

** OW: overweight, Ob: Obesity

Table 3: Prevalence of overweight and obesity among girls of six ethnic groups

Age (year)	Fars		Kurd		Lor		Baluch		Turk		Arab	
	IRN*	IOTF*	IRN	IOTF	IRN	IOTF	IRN	IOTF	IRN	IOTF	IRN	IOTF
7 (OW**)	13.2	2.9	9.5	5	18.9	8	6.4	2.8	12.4	7.1	15.7	7.8
7 (Ob**)	4.4	2.5	5.5	2.5	7.1	2.8	2.8	.4	7.1	2.1	9.3	4.4
8 (OW)	10.8	7.4	13.4	10.1	18.7	13.9	5	1.9	12.9	4.9	16.3	10.4
8 (Ob)	7.8	2	8.4	.6	13.4	1.9	2.3	.8	4.9	1.2	17.3	9.9
9 (OW)	15.1	10.7	14.2	9.6	13.3	11.8	9.7	3.1	20.3	12.1	19.9	17.5
9 (Ob)	9.8	2.4	8.8	1.3	12.8	3.6	2.6	.4	12.9	4.7	20.4	7.3
10 (OW)	15.7	12.2	17.2	11.6	15.1	12.5	5.7	3.9	15.2	14.3	16.6	12.2
10 (Ob)	10.7	2.5	12.6	2.5	14.1	4.7	3.9	.4	15.7	3	15.6	4.4
11 (OW)	14.9	15.3	15.3	12.6	14.9	12.3	9	5.4	15.6	15.1	20.3	19.3
11 (Ob)	15.3	3.3	12.1	4.2	11.3	3.1	4.5	.9	13.2	2.4	18.9	4.7
12 (OW)	16.9	17.5	17	14.2	17.2	11.6	7.7	6	16.1	12.9	19.7	19.7
12 (Ob)	16.9	5.4	15.3	4	11.9	2.6	6.9	1.7	11.3	1.6	23.5	6.1
13 (OW)	19.9	21.4	16.7	16.2	15.7	18.2	8.7	6	16.6	13.3	18.4	17
13 (Ob)	17.4	6.5	16.2	4.9	15.3	3.8	3.2	4	10.4	3.8	17	7.5
14 (OW)	19.1	19.5	15.5	15.9	19.5	20.5	9.6	8.2	16.8	14.4	20	20.7
14 (Ob)	14.2	4.1	7.1	3.5	10	3.5	1.4	.5	5.8	1.4	12.4	4
15 (OW)	16.2	23.2	14.3	18.8	15.8	22.1	9.3	9.7	12.6	14.1	16.9	21.5
15 (Ob)	18.7	9.6	8.5	2.7	8.4	.5	2.4	1.2	4.5	2	6.2	0
16 (OW)	13.2	17.6	9.8	13	12.1	16.5	4.3	5.5	11.5	16.4	14.3	20.1
16 (Ob)	7	4.8	6.5	5.4	3.4	1.9	1.6	1.6	6.6	4.9	6.1	4.1
17 (OW)	11.8	14.9	8.2	13.1	11.4	16.9	6.1	8.2	7.4	10.4	14.9	19.6
17 (Ob)	3.6	3.1	4.1	3.3	3.9	3.9	1.6	1.6	2.6	2.2	3.1	3.1
18 (OW)	10.2	13.2	5.8	10.3	6.5	7.8	5.1	5.6	3.8	7	17.4	16.7
18 (Ob)	3.4	2.6	4.7	3.8	.9	0	1	1.2	1	1.3	8.7	11.1

* IRN: Iranian definition from Hosseini et al^[29], IOTF: International obesity task force values from Cole et al^[28]

of overweight and obesity was higher than that of Chinese children [35].

We found a prevalence of 12.67% and 10.47% for overweight and obesity according to national cut-off points, which was higher than the results of Kelishadi et al [8].

We found a significant difference between various ethnicities within Iran which was consistent with last studies [35,36]. In our study, mean BMI in Baluch children was lower than in other ethnicities, which may be due to ethnicity or geographical area.

It seems that Iran has experienced a rapid "nutrition transition" during the last decade, with urbanization and decreases in physical activity, and increases in calorie and fat intake.

Our study had some limitations. We used BMI which is an indirect measure of overweight and obesity. We couldn't measure the percentiles of BMI by Lamda-Mu-Sigma (LMS) method, because the software was not available to us. There were some children from a hybrid ethnic group and we could not exclude all of them. Some observed differences are probably due to geographical difference which was not considered in this study. These data can be used for planning nutritional strategies for children and as basic information for later studies.

Conclusion

It is concluded from this study that BMI has increased in children of our population and prevalence of overweight and obesity has increased during last years.

Acknowledgment

This work was supported by Iranian Ministry of Health and Shahid Sadoughi University of Medical Sciences. The study was approved by ethics committee of Shahid Sadoughi University of Medical Sciences.

We thank all of the students who participated in this study and all managers and employees of the

schools. In addition, we thank Mohammad Javad Zare who helped us in designing the study and we are grateful to Hesam Akbari, Abbas Hosseini, Somayeh Montazeri, Maliheh Dehghan, and Mrs. Sadeghian who helped us in this study.

Conflict of Interest: None

References

1. Aurelius G, Khanh NC, Truc DB, et al. Height, weight, and body mass index (BMI) of Vietnamese (Hanoi) schoolchildren aged 7-11 years related to parents' occupation and education. *J Trop Pediatr* 1996; 42(1):21-6.
2. Molaison EF, Kolbo JR, Meyer MK, et al. Prevalence of overweight among elementary and middle school students in Mississippi compared with prevalence data from the youth risk behavior surveillance system. *Prev Chronic Dis* 2006;3(3):A84.
3. Hedley A, Ogden C, Johnson C, et al. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA* 2004; 291(23):2847-50.
4. Ogden CL, Carroll MD, Curtin LR, et al. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA* 2006;295(13):1549-55.
5. Centers for Disease Control and Prevention (CDC). Assessment of Body Mass Index Screening of Elementary School Children. *MMWR Morb Mortal Wkly Rep* 2009;58(17):460-3.
6. Grunbaum JA, Kann L, Kinchen S, et al. Youth risk behavior surveillance-United States, 2003. *MMWR Surveill Summ* 2004;53(2): 1-96.
7. Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999-2000. *JAMA* 2002; 288(14):1728-32.
8. Kelishadi R, Ardalan G, Gheiratmand R, et al; Caspian Study Group. Thinness, overweight and obesity in a national sample of Iranian children and adolescents: CASPIAN Study. *Child Care Health Dev* 2008;34(1):44-54.
9. Nelson JA, Chiasson MA, Ford V. Childhood overweight in a New York City WIC population. *Am J Public Health* 2004;94(3):458-62.
10. Hoelscher DM, Day RS, Lee ES, et al. Measuring the prevalence of overweight in Texas schoolchildren. *Am J Public Health* 2004; 94(6):1002-8.
11. Martorell R, Khan L, Hughes ML, Grummer-Strawn LM. Overweight and obesity in pre-school

- children from developing countries. *Int J Obes* 2000;24(8):959-67.
12. Freedman DS, Dietz WH, Srinivasan SR, Berenson GS. The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. *Pediatrics* 1999; 103(6):1175-82.
 13. Freedman DS. Clustering of coronary heart disease risk factors among obese children. *J Pediatr Endocrinol Metab* 2002;15(8):1099-108.
 14. Freedman DS, Dietz WH, Tang R, et al. The relation of obesity throughout life to carotid intima-media thickness in adulthood: the Bogalusa Heart Study. *Int J Obes Relat Metab Disord* 2004;28(1):159-66.
 15. Odegaard AO, Koh WP, Vazquez G, et al. BMI and diabetes risk in Singaporean Chinese. *Diabetes Care* 2009;32(6):1104-6.
 16. Krebs NF, Jacobson MS. Prevention of pediatric overweight and obesity. *Pediatrics* 2003; 112(2):424-30.
 17. Whitaker RC, Wright JA, Pepe MS, et al. Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med* 1997;337(13):869-73.
 18. Guo SS, Huang C, Maynard LM, et al. Body mass index during childhood, adolescence, and young adulthood in relation to adult overweight and adiposity: the Fels Longitudinal Study. *Int J Obes Relat Metab Disord* 2000;24(12):1628-35.
 19. Freedman DS, Khan LK, Serdula MK, et al. Interrelationships among childhood BMI, childhood height, and adult obesity: the Bogalusa Heart Study. *Int J Obes Relat Metab Disord* 2004; 28(1):10-6.
 20. Nihiser AJ, Lee SM, Wechsler H, et al. BMI Measurement in Schools. *Pediatrics* 2009;124 (Supple 1):S89-S97.
 21. Gortmaker S, Peterson K, Wiecha J, et al. Reducing obesity via a school-based interdisciplinary intervention among youth: Planet Health. *Arch Pediatr Adolesc Med* 1999; 153(4):409-18.
 22. Kelishadi R, Ardalan G, Gheiratmand R, et al; CASPIAN Study Group. Association of physical activity and dietary behaviours in relation to the body mass index in a national sample of Iranian children and adolescents: CASPIAN Study. *Bull World Health Organ* 2007;85(1):19-26.
 23. Hammer LD, Kraemer HC, Wilson DM, et al. Standardized percentile curves of body-mass index for children and adolescents. *Am J Dis Child* 1991;145(3):259-63.
 24. Ikeda JP, Crawford PB, Woodward-Lopez G. BMI screening in schools: helpful or harmful. *Health Educ Res* 2006;21(6):761-9.
 25. Johnson A, Ziolkowski GA. School-based body mass index screening program. *Nutr Today* 2006; 41(6):274-9.
 26. Himes JH, Dietz WH. Guidelines for overweight in adolescent preventive services: recommendations from an expert committee. *Am J Clin Nutr* 1994;59(2):307-16.
 27. Krebs NF, Jacobson MS, American Academy of Pediatrics Committee on Nutrition. Prevention of pediatric overweight and obesity. *Pediatrics* 2003; 112(2):424-30.
 28. Schaefer F, Georgi M, Wuehl E, et al. Body mass index and percentage fat mass in healthy German schoolchildren and adolescents. *Int J Obes* 1998; 22(5):461-9.
 29. Cole TJ, Freeman JV, Preece MA. Body mass index reference curves for the UK. *Arch Dis Child* 1995; 73(1):25-29.
 30. Cole TJ, Bellizzi MC, Flegal KM, et al. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ* 2000; 320(7244):1240-5.
 31. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM. CDC growth charts: United States. *Advanced Data* 2000; 314:1-27.
 32. Hosseini M, Carpenter RG, Mohammad K, Jones ME. Standardized percentile curves of body mass index of Iranian children compared to the US population. *Int J Obes* 1999;23(8):783-6.
 33. Ziaoddini H, Kelishadi R, Kamsari F, et al. First nationwide survey of prevalence of weight disorders in Iranian children at school entry. *World J Pediatr* 2010;16(3):223-7.
 34. International Standard Organization, ISO 15535: 2006. General requirements for establishing anthropometric databases. 2006; Geneva, Switzerland.
 35. Yan WL, Zheng YJ, Wu J, et al. Ethnic differences in body mass index and prevalence of obesity in school children of Urumqi City, Xinjiang, China. *Biomed Environ Sci* 2006;19(6):469-73.
 36. Dorosty AR, Siassi F, Reilly JJ. Obesity in Iranian children. *Arch Dis Child* 2002;87(5):388-91.