

REVIEW ARTICLE

Investigation of the Prevalence of Obesity in Iran: a Systematic Review and Meta-Analysis Study

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Abstract- Obesity is one of the main public health problems which underlie many chronic illnesses and socioeconomic difficulties. According to the literature review, there are limited data on the prevalence of obesity in different parts of Iran as well as its trend and prevalence among different age and gender groups. The aim of this study was to estimate the obesity prevalence in Iran using meta-analysis. All the corresponding articles published in the external and internal journals, final reports of research projects, articles of related congresses and the reference index of the correlated papers published between 1995 and 2010 were collected via the electronic research engines (PubMed, Scopus, SID, Magiran, IranMedex). Data were analyzed using meta-analysis (random effects model) and meta-regression. A total of 144 articles with the sample size of 377858 people (134588 males and 164858 females) were enrolled in the study. The prevalence of obesity in populations above the age of 18 was estimated as 21.7% (CI 95%: 18.5% - 25%) and in populations below 18 as 6.1% (CI 95%: 6.8%-5.4%). Meta-regression analysis showed an ascending trend in the prevalence of obesity in Iran. The prevalence rates of obesity according to the BMI index, NCHC and percentile above 95 were 17.4%, 7.6% and 7.4%, respectively. The BMI mean was 19.3 in populations below the age of 18 (CI 95%: 17-21.6) and 25.2 in those above the age of 18 (CI 95%: 27.1-23.3). Considering the increasing rate of obesity in Iran and its effects on the public health, corresponding health authorities should revise the obesity preventive programs and, using public health interventions, reduce the rate of obesity in the country.

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Keywords: Iran; Meta-analysis; Obesity; Overweight; Prevalence

Introduction

Obesity and overweight are the world's fifth cause of mortality, and 2.6 million people annually die due to this disorder. Moreover, 44% of cases of diabetes, 23% of ischemic heart diseases and ~ 7-41% of cancers have been attributed to obesity and overweight (1). Obesity is currently the most common metabolic disorder in many countries (2-4). Therefore, obesity prevention has turned into an important health priority. Obesity affects both high-income and low- and medium-income countries (5,6), and almost all age, gender, ethnic, and socioeconomic groups (7). Obesity is a multi-factorial

disorder (10-12), but nutritional shift to high fat and energy foods and low physical activity as a result of increased urbanization and industrialization are among the factors contributing the increase in the rate of obesity in many countries (10-12). Obesity is also a major health problem in Iran. Approximately 70% (385,000) of all recorded mortalities in 2002 in Iran have been attributed to chronic diseases, the most important reason of which is obesity and overweight (7,8). Considering the accelerated nutritional transition and growing prevalence of obesity in Iran, having precise, updated data about the prevalence of obesity in the country may help health researcher and policy makers to initiate appropriate

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studies and policies to prevent obesity or its complications. There is another meta-analysis of obesity in Iran using articles published by the end of 2007 (13). Since then several other relevant articles have been published. In this study, we report a meta-analysis of obesity prevalence in Iran using articles published up to July 2011.

Materials and Methods

Literature search method

To identify articles published between 1990 and 2011 reporting on prevalence of obesity in Iran, we searched the Pubmed, Google Scholar, Scopus, Scientific Information Database (SID; a database for articles published by Iranian investigators), and Magiran (another Iranian database) using a combination of Iran and the following terms: obesity, body mass index, epidemiology, risk factors, and obesity prevalence. We also manually searched the bibliographies of the relevant original and review

Definition of obesity

The articles that determined obesity based on anthropometric measures (height and weight) were included in this study. The index used in the articles, according to the definition of the World Health Organization, was defined as $BMI \geq 30$ for adult populations (at least 18 years of age). For people under 18, most articles used the criteria of Centre for Disease Control (CDC 2000) and International Obesity Task Force which defined obesity according to the $BMI \geq$ percentile 95th of the BMI in the respective population.

Data extraction

All the articles reporting the obesity prevalence were reviewed by two independent reviewers. All the articles that did not have the required quality, those that assessed the obesity prevalence in a non-randomly sample, had a small study population (less than 100 people) or did not mention the place and time of data collection were excluded from the study. Data on first author, year of study, study area, age range of participants, number participants (also by sex), and BMI (overall and by sex and age group) were extracted by two reviewers and verified by a third reviewer. Age groups were divided into 2 groups: age under 18 \leq years and above 18 years old.

Data analysis

The variance of each study for the prevalence of

obesity (percent of obesity (yes/no)) was computed using binomial distributions, respectively. Based on obesity prevalence or mean BMI, study sample size and variance of each article was weighted and the prevalence rates were then combined using the random effects models. The heterogeneity among articles was assessed by the I² and Q² statistics. Subgroups analyzes were conducted by age group, sex, the method of definition of obesity. Two-sided $P < 0.05$ was considered as statistically significant. To assess the obesity trend and the inconsistency of the articles results, the Empirical Bayesian model of meta-regression method was employed.

Results

A total number of 144 articles, with 377,858 participants (164,216 women and 134,588 men) were included in this study (Table 1). The sample size of these articles varied between 110 people and 89,404 and was above 1000 people in 50% of the studies. The obesity prevalence and sample size were reported for women in 99 articles and for men in 74 articles. Prevalence of obesity for children and adolescents (age \leq 18 years) was reported in 70 articles (53.8%), while in 41 articles (31.5%) the age of study participants was $>$ 18 years. In the rest of the articles, results were reported for a combination of these age groups. Overall, the reported obesity rate in the included articles varied between 1.1% and 67%. Using random effects models, the percentage of individuals with obesity in Iran (1995–2011) was estimated at 12.3 (95% CI: 11.0 – 13.7) (Table 2).

This percentage (95% CI) was in women, 14 (11.6 – 16.4), 10.7 (8.8 – 12.5) in men, 6.1 (4.5–6.8) in age \leq 18 years, and 21.7 (18.5–25) in age $>$ 18 years. In meta-regression models, the correlation between year of study and percentage of obesity in Iran between 1995 and 2011 ($\% \text{ obesity} = -2.15 + 0.001 \text{ year}$) was not statically significant ($P = 0.74$). This correlation is shown in Figure 1. The percentage of obesity in 66 articles according to $BMI >$ percentile 95th was 7.4 (6.5–8.3), in 61 articles with $BMI > 30$, 17.4 (15.0–20.0). In adjusted meta-regression models, from year of data collection, age group, the method used to define obesity, and sample size, only age group showed a statistically significant association with percentage of obesity in women ($P = 0.001$). There was also a correlation between age group and obesity in men, but this was not statistically significant (Table 4). The correlation between study size and percentage of obesity is shown in Figure 2.

Table 1. Characteristics of retrieved articles*

First author, year of	Region	BMI	Age	Sample size			% Obese		
				Women	Men	Total	Women	Men	Total (95% CI)
Dorosti, 1995	Gilan, Sistan	>P ₉₅	4-5	881	847	1755	8.7	7.5	8 (7-9)
Dorosti, 1995	Gilan, Sistan	>P ₉₅	2-3	1283	1277	2560	7.6	5.2	6.4 (5-7)
Barzigar, 1996	Gilan	>30	>25	973	1357	2423	11.5	34	24.6 (23-26)
Ghorbani, 1996	Semnan	>30	2-55	975	946	1921	12.6	27.1	19.8 (18-22)
Allahverdian, 1998	Tehran	>P ₉₅	10-19	177	244	421	5.1	2.8	3.8 (2-6)
Azizi, 1998	Tehran	>30	20-80	808	1294	2102	16.5	32.7	26.9 (25-29)
Mirmiran, 1998	Tehran	>P ₉₅	10-19	1541	1724	3199	6.9	4	5.4 (5-6)
Mozafari, 1998	Yazd	>P ₉₅	7-11	230	233	463	4.3	3.4	3.9 (2-6)
Nasr Abadi, 1998	Iran		>2	6083	7960	14043	9.9	26.7	14.4 (19-20)
Soheylifar, 1998	Hamedan	NECH	6-11	1000	1000	2000			3.5 (3-4)
Azad Bakht, 1999	Tehran	>30	20-70	4168	5820	9984	29.1	14.2	20.41(20-21)
Azizi, 1999	Tehran	>30	>60	911	855	1766	43.6	51.7	46.9 (45-49)
Azizi, 1999	Tehran	>30	30-69	2992	4041	7033	16.3	35.8	27.5 (26-29)
Mirmiran, 1999	Tehran	>P ₉₅	6-16	339	393	732	5.5	3.7	4.5 (3-6)
Mojibian, 1999	Yazd	>30	15-65		570	570		16.3	16.3 (13-19)
Akhavantayyeb, 2000	Esfahan	>30	>19	6141	6373	12514	9.3	23.4	15.5 (15-16)
Bazan, 2000	Gilan	>P ₉₅	14-17		400	400		5.3	5.3 (3-7)
Fakhrzade, 2000	Boshehr	>30	>18	1437		1437	10.2		10.2 (9-21)
Gamshidian, 2000	Tehran	>30	40-60		749	749		41.4	41.4 (38-45)
Hoshyar Rad, 2000	Iran	NECH	<5	1248	1221	2505			5.2 (4-6)
Karandish, 2000	Tehran	>P ₉₅	11-16	1068	1253	2321	7.3	8.3	7.8 (7-9)
Mortazavi, 2000	Sistan Balochestan	>30	18-43	292	428	720	1	1.4	1.3 (0-2)
Akbari, 2001	Lorestan	>30	14-18		986	986		7.3	7.3 (6-9)
Asar, 2001	Khozestan	>P ₉₅	7-14	2293	2500	4793	2	2.5	2.2 (2-3)
Azizi, 2001	Tehran	>30	20-80	808	1294	2102	20.8	20.3	20.5 (19-22)
Kalishadi, 2001	Esfahan	>P ₉₅	11-18	1000	1000	2000	1.9	2.9	2.4 (2-13)
Karajibani, 2001		>30	11		2067	2067		1.4	1.4 (1-2)
Kavian, 2001	Tehran	>30	25-45		503	503		11	11 (8-14)
Kelishadi, 2001	Esfahan	>P ₉₅	11-18	1000	1000	2000	2.3	2	2.2 (2-3)
Khabazkhob, 2001	Tehran	>P ₉₅		1869	2583	4452	9	18.4	13.6 (13-15)
Khoshfetrat, 2001	Zarrinshahr	>P ₉₅	14-16			348			5 (3-7)
Mozafari, 2001	Tehran	>P ₉₅	7-12	1800		1800		7.7	7.7 (6-9)
Poorghasem, 2001	Azarbayjan	>P ₉₅	14-18		1518	1518		3.6	3.6 (3-5)
Safari, 2001	Systan	>30	45-60			8800	12.9	30.5	21.7 (21-23)
Sezavar, 2001	Ardebil	>30	20-80	200	184	384	13.5	19	15.9 (12-20)
Shahgholian, 2001	Charmahal	>P ₉₅	7-14			27.72			9.9 (9-11)
Dorosti, 2002	Tehran	>P ₉₅	8-10		835	835		6.6	6.6 (5-8)
Mirmiran, 2002	Tehran	>P ₉₅	6-16	312	361	673	6.3	5.2	5.7 (4-7)
Montazeri, 2002	Sistan Balochestan	>30	11-14		687	687		1.7	1.7 (1-3)

Continues of table 1. Characteristics of retrieved articles

First author, year of	Region	BMI	Age	Sample size			% Obese		
				Women	Men	Total	Women	Men	Total (95% CI)
Taheri, 2005	Birjand	>P ₉₅	15-18			2230	2.8	1.8	8.3 (2-3)
Vaghari, 2005	Golestan	NCHS	<5			2875			4 (3-5)
Zare, 2005	Shiraz	>P ₉₅	17-47		920	920		14	14 (12-16)
Ahmadi, 2006	Sannandaj	>P ₉₅				694	18.2	10.7	3.2 (2-5)
Amidi, 2006	Esfahan		14-18		384	384		1.0	1.0 (0-2)
Farshidi, 2006	Hormozgan	>30	<63	681	1397	2087	7	14.7	12.2 (11-14)
Haji Faraji, 2006	Tehran	>P ₉₅	13.3	388	392	780			13 (11-15)
Hajian, 2006	Mazandaran	>P ₉₅	7-12	400	600	1000	8.8	3.8	5.8 (4-7)
Hajian, 2006	Babol	>P ₉₅	7-12			1000		3.8	5.8 (4-7)
Hajifaraji, 2006	Tehran	>P ₉₅	11-18	392	388	780	15.4	10.8	13 (11-15)
Najafi, 2006	Khorramabad	>30	25-64	478	532	1010	8.1	24.9	11.4 (9-13)
Sarshar, 2006	Gonabad	>30	15-65			440			14.5 (11-18)
Sarvghadi, 2006	Tehran	>30	>50	1566	1825	3331			29.2 (28-31)
Akhi, 2007	Sari	NECH	6-18	1320		1320		4.2	4.2 (3-5)
Behbahani, 2007	Tehran	>P ₉₅	6-11	960	840	1800	6	3.5	4.8 (4-6)
Brzin, 2007	Tehran	>30	18-25	643		643	9.5		9.5 (7-12)
Dahri, 2007	Mashhad	>P ₉₅	11-15		1300	1300		10.3	10.3 (9-12)
Esteghamati, 2007	Iran	>30	15-64			5287			22.3 (21-23)
Golestan, 2007	Yazd	>30	11-13	395	399	794	8.8	¼	6.5 (5-8)
Mohammadian, 2007	Gorgan	>P ₉₅	11-13		884	884		6.3	6.3 (5-8)
Reza Zade, 2007	Tehran	>30	20-50		460	460		8.0	8.0 (6-11)
Salem, 2007	Rafsanjan	>30		126	568	694			1.4 (1-2)
Seyyed Amini, 2007	Gorgan	>P ₉₅	7-11		300	300		3.6	3.6 (1-6)
Amir Khizi, 2008	Tabriz	>30	14-18			370			15.9 (12-20)
Barzin, 2008	Tehran	>30	18-25		926	926		3.1	3.1 (2-4)
Delvarian Zadeh, 2008	Shahrod	>P ₉₅	11-14		418	418		1.7	1.7 (0-3)
Hakim, 2008	Dezfol	>P ₉₅				400			12 (9-15)
Mohammadi, 2008	Navahi Markazi	>30		6081	6335	12416	40.7	44	22.2 (21-23)
Mollaee, 2008	Gorgan	>30	>18	86	120	207			19.8 (14-25)
Saberi, 2008	Kashan		30-39			429			23.1 (19-27)
Salem, 2008	Kerman	>P ₉₅	7-12			1275			9.2 (8-11)
Tohidi, 2008	Shiraz	>30	19-95			855	10.5	21.9	17.9 (15-2)
Azad Bakht, 2009	Esfahan	>30	18-28		289	289			9.24 (6-13)
Damirchi, 2009	Tehran	>30	21-71			1218			40.6 (38-43)
Nabavi, 2009	Semnan	>P ₉₅	7-12	193	207	400	17.9	10.4	14.3 (11-18)
Naghashpoor, 2009	Khozestan	>30	18-80	68	184	252	17.9	30.8	32.7 (27-38)
Sotodeh, 2009	Tehran	>30	20-65		704	704		67	67 (64-7)
Zarei, 2009	Sabzevar	>P ₉₅	12-14	650		650	7.1		7.1 (5-9)
Abedi, 2010	Mazandaran	>30			116	116		6.9	6.9 (2-12)
Vafa, 2010	Tehran	>30	7	236	277	513	18.6	19.1	11.7 (9-14)
Amini 2000	Tehran	>30	10-15			398	6.5	13	10 (7-13)

Continues of table 1. Characteristics of retrieved articles

First author, year of	Region	BMI	Age	Sample size			% Obese		
				Women	Men	Total	Women	Men	Total (95% CI)
Azarbayjani 2009					325	325		13	13 (9-17)
Dorosti 2008	Iran	>P ₉₅	7-12			6700			6.3 (6-7)
Fallah 2005	Damghan	>P ₉₅				150	3	3	4 (2-7)
Far Bakhsh 2004	Tehran	>30	15-44			2969			4.6 (4-5)
Behzadnia 2012	Sari	>P ₉₅	7-12	356	297	653			12 (9-15)
Kakhak 2010	Sabzevar	>P ₉₅	12-14			368			3.7 (2-6)
Karbasi 2005	Yazd	>P ₉₅	<6	200	200	400	5.5	2	3.8 (2-6)
Mir Miran 2003	Tehran	>30	10-69	565	725	1290			14.1 (12-16)
Mirzaee 2010	Yazd		6-7			2768	2.6	2.3	2.4 (8-1)
Mirzaeian 2010	Najaf Abad	>30	15-18		550	550		6	6 (4-8)
Moghadasi 2010	Shiraz	>P ₉₅	14-16			808			6.0 (4-8)
Mohamad 1999	Tehran	>30	15-49			2859			16.4 (15-18)
Mostafavi 2005	Fars	>P ₉₅	13-18	377	426	803	2.6	3.2	2.9 (2-4)
Navaee 1990		>30				2033			31 (29-33)
Saberi 2008		>30	30-39			429			23.1 (19-27)
Shamsi 2009	Sabzevar	>P ₉₅	<35			382			48.1 (43-53)
Soleymani 2007	Bam	>30		139	188	327			2.1 (1-4)
Taghi Heydari 2011	Tehran	>30				288	2.6	2.2	2.4 (1-4)
Vahidi Nia 2011	Hamedan	>P ₉₅	>2			614			5.2 (3-7)

BMI: body mass index (kg/m²); CI: confidence interval; NCHS: National Center for Health statistics; P₉₅: percentile 95th

* Age is in years unless indicated as months (Mo.). Iran in the Region column refers to studies in the entire country. 95% CIs were rounded to the nearest integer

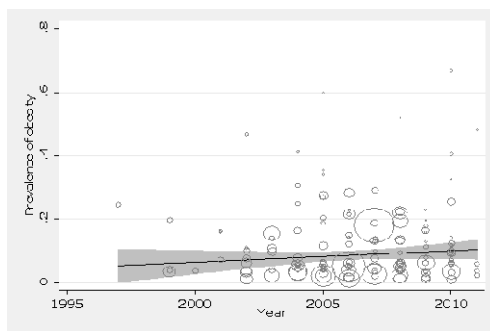


Figure 1. Trend of prevalence of obesity in Iran, 1995 – 2011

Table 2. The weighted point estimates (95% CI) for percentage of individuals with obesity in Iran (1995 – 2011) by sex and age

	No of studies	% of obesity (95% CI)
Total	144	12.3 (11.0 – 13.7)
Sex		
Women	96	14 (11.6 – 16.4)
Men	72	10.7 (8.8 – 12.5)
Age		
≤ 18 years	73	6.1 (5.4 – 6.8)
> 18 years	46	21.7(18.5-25)

BMI, body mass index (kg/m²); CI, confidence interval; NCHS: National Center for Health statistics

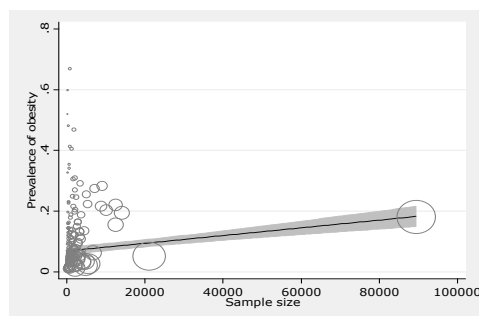


Figure 2. Prevalence of obesity in Iran, 1995 – 2011, by study size

Table 3. The weighted point estimates (95% CI) for percentage of individuals with obesity in Iran (1995 – 2011) by age and definition of obesity

Definition of obesity	No of studies	% of obesity (95% CI)	No of studies	% of obesity (95% CI)
		Women		Men
BMI > percentile 95th	39	6.1(4.8 – 7.5)	28	6.1(5-7.3)
NCHS	2	6(4.4 – 7.5)	-	-
BMI > 30	41	23.3(18 – 26.6)	30	14.8(11.8 – 17.8)
Other indices	4	11(1-26.6)	1	9.9(9.1 – 10.7)
Age ≤ 18 years		Girls		Boys
BMI > percentile 95th	35	4.8 (3.7 – 5.8)	25	5.6 (4.5 – 6.7)
NCHS	2	6(4.4 – 7.5)	-	-
BMI > 30	5	5.8(2.9 – 8.7)	3	10.8 (5.4 – 16.2)
Age > 18 years		Women		Men
BMI > percentile 95th	2	18.4(9.7 – 29.7)	1	12(9.6 – 14.4)
BMI > 30	29	25.2 (19.8 – 30.4)	22	15.0 (11.6 – 18.4)

BMI: body mass index (kg/m^2); CI: confidence interval; NCHS: National Center for Health statistics

Table 4. The unadjusted and adjusted regression coefficients and corresponding P values for correlation between potentials influential factors and obesity prevalence using meta-regression models

Factors	Women				Men			
	Unadjusted	P	Adjusted	P	Unadjusted	P	Adjusted	P
Year of data collection	0.00047	0.97	0.0036	0.43	0.0002	0.44	0.0037	0.25
Age group	0.18	<0.001	0.17	<0.001	0.072	<0.001	0.040	0.20
Definition of obesity	0.12	<0.001	0.022	0.48	0.083	<0.001	0.046	0.17
Sample size	0.00000485	0.13	0.00000491	0.70	0.0000011	0.56	-0.00076	0.36

Discussion

Considering the growing rate of obesity prevalence in Iran, and the increasing rate of health and socio-economic problems as its consequences, study on obesity and accessing comprehensive and precise data are critical to comment on the public health status and to determine the relevant health policies and obesity preventive procedures. In this regards, the World Health Organization is persistently encouraging countries to

calculate the burden of disease in the national level as the best guidance for policy-making means in the health system. In this study, the total rate of obesity in Iran was estimated as 12.3% which was calculated as 21.7% for people above 18 and as 6.5% for people less than 18 years of age. In the review study of Amirzade who had analyzed the obesity data until 2005, the rate of obesity among people above 18 was estimated as 21.5% and in those under 18 as 4.5% (13). This difference was due to the data extent and the three folds increase in the sample

size of the current study compared to the previous study. However, given this three folds increase in the sample size, the rate of obesity among people under 18 was still higher than the previous study (6.5% vs. 5.5%) which is considerable. In the study of Steghamati and others in 2005, the obesity rate was estimated as 14.6% for males and 30.6% for females. The study of Rashidi *et al.*, in 2005, however, the obesity rate was estimated between 22% and 45% in the age range of 15-70 years (13) and the study of NHANES in America reported the obesity rate for the age range of 20-74 years as being 34% for females and 31.7% for males (14).

In a review study in America, the rate of obesity prevalence among American children and adults has doubled from 1970 till 2007, so that 66% of adults and 16% of children were obese and 34% of children were at the risk of being overweight (15). According to an European review study, the obesity rate has been reported between 7% in Sweden and 45% in Lithuanian women so that this rate has been calculated as 4% to 28.3% in males and 6.2% to 36.5% in females (16). The rate of obesity during 2007-2008, however, has been reported as 35.5% among American women and 32.2% among American males. These results were higher than those estimated for males and females in Canada and most European regions (17). Different obesity rates are dependent upon age, gender, race and ethnicity, lifestyle and the socio-economic status which are the facts influencing the difference in the statistical data on the prevalence rate of obesity across the world. Totally, comparing the statistical data on obesity in America, European countries and Iran it is concluded that the rate of obesity in Iran is continuing to increase, obesity has a wide geographical dispersion across the country and that the preventive programs in Iran have succeeded in the relative control of obesity in Iran. Given the influence of some factors including individual, demographic, environmental, international and educational factors on the epidemiology of obesity, the industrial, economical, international and governmental health agencies, public health institutes, all segments of the society, families and finally the individuals should make effort to have active roles in the prevention and control of obesity. In fact, the provided data reflect the urgent need to obesity preventive strategies which should be based on the environmental factors as well as individual and public issues. A massive international program also must be designed to avoid obesity epidemic in the future generation.

This study showed a positive association between the prevalence rate of obesity and age which may also be

associated with the increased incidence of heart diseases. The educational interventions, therefore, seems to be necessary to modify lifestyles.

References

1. Obesity and overweight. World health organization. (Accessed in May 2014, 20, at <http://www.who.int/topics/obesity/en>).
2. Caterson ID, Gill TP. Obesity: epidemiology and possible prevention. *Clin Endocrinol Metab* 2002;16(4):595-610 .
3. James WPT. The epidemiology of obesity: the size of the problem. *J Intern Med* 2008;263(4):336-52.
4. Tanner RM, Brown TM, Muntner P. Epidemiology of Obesity, the Metabolic Syndrome, and Chronic Kidney Disease *Curr Hypertens Rep* 2012;14(2):152-9.
5. Kenneth G. MacDonald, Jr. Overview of the Epidemiology of Obesity and the Early History of Procedures to Remedy Morbid Obesity. *Arch Surg* 2003; 138(4):357-60.
6. Nguyen DM, El-Serag HB. The epidemiology of obesity. *Gastroenterol Clin North Am* 2010;39(1):1-7.
7. Stice E, Shaw H, Marti CN. A Meta-Analytic Review of Obesity Prevention Programs for Children and Adolescents: The Skinny on Interventions that Work. *Psychol Bull* 2006; 132(5):667-91.
8. Donald F, Behan H, Cox S. Obesity and its Relation to Mortality and Morbidity Costs. Society of Actuaries. (Accessed in May 2014, 20, at www.soa.org/files/pdf/research-2011-obesity-relation-mortality.pdf).
9. Avenell A, Broom J, Brown TJ, et al. Systemic review of long-term effects and economic consequence of the treatment for obesity and implications for health improvement. *Health Technol Assess* 2004;8(21): iii-iv, 1-182 .
10. James PT. Obesity: the worldwide epidemic. *Clin Dermatol* 2004;22(4):276-80
11. Anderson PM, Butcher KE. Childhood obesity: trends and potential causes. *Future Child* 2006;16(1):19-45
12. Brantley PJ, Myers VH, Roy HJ. Environmental and lifestyle influences on obesity. *J La State Med Soc* 2005; 157(1):S19-27.
13. Mirzazadeh A, Sadeghirad B, Haghdoost AA, et al. The Prevalence of Obesity in Iran in Recent Decade; a Systematic Review and Meta-Analysis Study. *Iranian J Publ Health* 2009;38(3):1-11.
14. Esteghamati A, Meysamie A, Khalilzadeh A, et al. Third national surveillance of risk factors of non-communicable diseases (SuRFNCD-2007) in Iran: Methods and results on prevalence of diabetes, hypertension, obesity, central

- obesity, and Dyslipidemia. *BMC Public Health* 2009;9:167.
15. Youfa WM, Beydoun A. The Obesity Epidemic in the United States—Gender, Age, Socioeconomic, Racial/Ethnic, and Geographic Characteristics: A Systematic Review and Meta-Regression Analysis. *Epidemiol Rev* 2007;29:6-28.
 16. Berghöfer A, Pischon T, Reinhold T, et al. Obesity prevalence from a European perspective: a systematic review. *BMC Public Health* 2008;8:200.
 17. Flegal KM, Carroll MD, Ogden CL, et al. Prevalence and Trends in Obesity among US Adults, 1999-2008. *JAMA* 2010; 303(3):235-41.
 18. Naghashpour M, Shakerinejad G, Haghhighizadeh M, Hajinajaf S, Jarvandi F. Prevalence of Obesity and its Association with Demographic Indices in Referents to University Jahad Khozestan Clinic. *Jundishapur Sci Med J* 2011; 10(1):21-35.
 19. Nabavi M, Karimi B, Ghorbani R, et al. The prevalence of obesity and associated factors in students aged 7-12. *Payesh* 2010; 4(9):443-51.
 20. Vafa M, Afshari Sh, Moslehi N, et al. Relationship between infant nutrition feeding and childhood obesity in first grade Tehraian students of primary schools, 2009. *IJEM* 2011;12(5):505-12.
 21. Damirchi A, Mehrabani J. Overweight and hypertension and their risk factors among adult males. *Olympic Q* 2009;17(3):87-103.
 22. Golestan M, Akhavan Karbasi S, Fallah Tafti M, et al. Prevalence of obesity, overweight and underweight in guidance school students. *JSSU* 2008;16(2):31-5.
 23. Sotoudeh G, Niyazi E, Khosravi S, et al. Prevalence and determinants of obesity and overweight in pre- and post-menopausal women in Islamshahr: a population-based study. *Hayat* 2010;16(2):47-54.
 24. Hajian KO, Sajadi P, Rezvani P. Prevalence of overweight and underweight among primary school children age 7-12 years (Babol; 2006). *JBUMS* 2008;10(3):83-91.
 25. Mohammadian S, Khoddam H, Kaveh M. Related factors of obesity and overweight among secondary school girls (Gorgan-Iran). *J Gorgan Univ Med Sci* 2010;12(3):57-63.
 26. Haeri Behbahani B, Dorosty A, Eshraghian M. Assessment of obesity in children: Fat Mass Index versus Body Mass Index. *Tehran Univ Med J* 2009;67(6):408-14.
 27. Abadi A, Houshiar A, Hajifaraji M, et al. The Association of Overweight and Obesity with Menarche Age and Nutritional Status in Girls Aged 11–15 in Mashhad. *Med J Mashhad Univ Med Sci* 2011;53(4):245-53.
 28. Dorosty AR, Karamsoltani Z, Jazayeri A, et al. Association between obesity, food security and related family factors. *SJSPH* 2008;6(1):1-9.
 29. Abdollahi AA, Bhnampur N, Vagari G, et al. The Correlation Between Age, Gender and Education with Obesity in Urban Population of Golestan Province. *IJEM* 2010;12(3):276-82.
 30. Ziaee V, Fallah J, Rezaee M, et al. The relationship between body mass index and physical fitness in 513 medical students. *Tehran Univ Med J* 2007;65(8):79-84.
 31. Abedi GH, Mohammadpour A, Rostami F, et al. Study of Consumption Pattern of Food and Obesity of Female Students of Mazandaran University of Medical Sciences. *J Mazandaran Univ Med Sci* 2011;20(80):77-80.
 32. Barzin M, Mirmiran P, Afghan M, et al. Distribution of 10-year risk for coronary heart disease and eligibility for therapeutic approaches among Tehranian adults. *Public Health* 2011;125(6):338-44.
 33. Zare N, Keshavarzi S, Zeighami B. Some risk factors of obesity in rural women of Zarrindasht: using linear regression odds ratio. *Tabib-e-Shargh* 2007;9(2):133-40.
 34. Akhavan-Karbasi S, Fallah R, Golestan M, et al. Prevalence and risk factors of obesity and overweight among primary school children in Yazd. *JSSU* 2009;16(5):8-13.
 35. Ahmadnia A, Emamghole KT, Ahmadnia H, et al. An Investigation about Anthropometric Indicator for Inhabitants of Zanjan in Comparison with NCHS Standards. *ZUMS J* 2010;18(71):70-80.
 36. Najafi S, Momennasab M, Tarahi MJ. Prevalence of obesity and overweight among 25 - 64 years old adults in Khorramabad. *Iran J Diabetes Lipid Disord* 2009;8(2):167-76.
 37. Mozafari H, Nabaei B. Assessment of underweight and overweight in elementary school-girls in Tehran. *Payesh J* 2001;1(4):15-9.
 38. Khabazkhoob M, Fotouhi A, Moradi A, et al. Thinness and Obesity Based on Body Mass Index in Dezfool Schoolchildren in 2004. *IRJE* 2008;3(3-4):35-43.
 39. Soheilifar J, Sadri GH. Prevalence of obesity in Hamadan primary schools' students in 1998. *Sci J Hamadan Univ Med Sci* 2000;7(16):15-9.
 40. Barzin M, Mirmiran P, Ramezankhani A, et al. Prevalence of Obesity in Young Tehranian Males (18-25y) Entering Military Service (Shahrivar 1386). *IJEM* 2009;10(6):605-13.
 41. Sarvghadi F, Rambod M, Hosseinpanah F, et al. Prevalence of obesity in subjects aged 50 years and over in Tehran. *IJEM* 2007;9(1):99-104.
 42. Janghorbani M, Amini M, Willett WC, et al. First Nationwide Survey of Prevalence of Overweight,

- Underweight, and Abdominal Obesity in Iranian Adults. *Obesity* (Silver Spring) 2007;15(11):2797-808.
43. Tohidi M, Kalantar-Hormozi MR, Adinehpour A, et al. Prevalence of overweight and obesity in adults in the city of Shiraz in 2008. *Iran J Diabetes Lipid Disord* 2009;Special Issue:43-8.
 44. Zarei M, Hamedinia M, Haghi A, et al. Epidemiology of obesity and thinness and its relation to dietary patterns in adolescents 14-12 years of Sabzevar. *Quarterly monitoring* 2011;10(2):243-53.
 45. Khabazkhoob M, Fotouhi A, Hashemi H, et al. Obesity and over weight in Tehran population, 2001. *Iran J Diabetes Lipid Disord* 2008;7(3):315-24.
 46. Mohammadifard N, Shams HR, Paknahad Z, et al. Relationship between obesity and cardiovascular risk factors in adults living in central Iran: Results of Isfahan Healthy Heart Program. *Iran J Nutr Sci Food Technol* 2009;3(4):19-28.
 47. Houshyar Rad A, Dorosty AR, Kalantari N, et al. Prevalence of stunting, underweight, wasting and overweight among iranian under-five-year-old children (2000-2002). *J Nutr Sci Food Technol* 2009;3(4):49-56.
 48. Azarbajani MA, Alipour S, Bakhshandeh H, et al. The relation between daily physical activity and obesity in 11-year old girls. *Teb Va Tazkiyeh* 2009;18(4 and 3):19-22.
 49. Rezazadeh A, Rashidkhani B, Omidvar N. Association of major dietary patterns with socioeconomic and lifestyle factors of adult women living in Tehran, Iran. *Nutrition*. 2010;26 (3):337-41.
 50. Seidamini B, Moradi A, Malek A, et al. Correlation between obesity and overweight with attention deficit among elementary schools girls. *J Gorgan Uni Med Sci* 2009;11(1):39-42.
 51. Salem Z, Rezaeian M. Blood pressure status and its association with obesity and abdominal obesity in students of Rafsanjan University of Medical Sciences in 2007. *J Rafsanjan Uni Med Sci* 2008;7(3):157-64.
 52. Mohtasham Amiri Z, Madah M. Prevalence of overweight and obesity among female medical students in Guilan-2003. *IJEM* 2006;8(2):157-62.
 53. Azadbakht L, Zaribaf F, Haghightdoost F, et al. Association of dietary diversity score with obesity and central adiposity among female university students in Isfahan, Iran. *Iran J Nutr Sci Food Technol* 2010;5(2):27-4.
 54. Nasiri Rineh H, Salarkiya N. The prevalence of obesity and overweight in young women aged 18-25 in Tonekabon 2005. *JBUMS* 2007;9(3):47-53.
 55. Mirzaeian S, Fakhari M, Hosseini R, et al. Association between duration of breastfeeding and subsequent overweight and obesity in female adolescents. *Iran J Nutr Sci Food Technol* 2011;6(2):65-74.
 56. Ahmadi S, Shahsavari S, Ahmadi H, et al. Prevalence of Overweight, Obesity and Underweight Among High School Students in Sanandaj: 2006-2007. *IJEM* 2010;12(2):153-9.
 57. Amidi Mazaheri M, Hoseini M: Prevalence of underweight, overweight and obesity among high school girls in Isfahan. *J Health Syst Res* 2010;6(1):1-6.
 58. Ghanbari H, Nuri R, Moghadasi M, et al. Prevalence of Obesity and Some Associated Factors Among 8-12 Year Old Boy Students in Shiraz. *IJEM* 2013;15(1):14-20.
 59. Doost-Mohammadian A, Keshavarz A, Dorosty A, et al. Survey of the nutritional status and relationship between physical activity and nutritional attitude with index of BMI-for-age in Semnan girl secondary school, winter and spring, 2004. *Koomesh* 2005;6(3):187-94.
 60. Solaimanizadeh L, Solaimanizadeh F, Javadi M, et al. The study of body mass index in students of Bam educational centers. *J Shahrekord Univ Med Sci* 2008;9(4):59-66.
 61. Taheri F, Kazemi T, Taghizadeh B, et al. Prevalence of Overweight and Obesity in Birjand Adolescents. *IJEM* 2008;10(2):121-6.
 62. Mohammadi F, Omidvar N, Houshyar Rad A, et al. Association of food security and body weight status of adult members of Iranian households. *J Nutr Sci Food Technol* 2008;3(2):41-53.
 63. Eshghinia S Veghari G, Gapparof M.G. The effect of weight loss on components of the metabolic syndrome among obese women. *Proceedings of 2nd International Congress of Metabolic Syndrome, Obesity & Diabetes*. 2010 June 16-18. Zanjan, Iran. Zanjan: University of Medical Sciences; 2010.
 64. Saberi H, Moraveji A, Parastouie K. Metabolic syndrome among professional bus and truck drivers in Kashan 2008. *ISMJ* 2009;12(2):126-32.
 65. Esmaeilzadeh A, Azadbakht L, Khoshfetrat M, et al. Major dietary patterns, general and central adiposity among Tehran female teachers. *J Health Sys Res* 2011;6(4):676-89.
 66. Rafiei M. Prevalence of low Birth weight and obesity and some concomitant Factors in live off spring in 2006 and compare with 2002 result's Arak Tallegghani Hospital. *Iran J of Podiatr* 2007;17(1):47-53.
 67. Delvarian-Zadeh M, Khosravi A, Bolbolhaghghi N, et al. Relationship between anthropometric parameters with menarche age of school girls (11-14 years old) in Shahroud. *Knowledge Health* 2008;3(3-4):43-7.
 68. Mirmiran P, Esmaeelzadeh A, Azadbakht L, et al. Macronutrient intake in relation to body mass index: Tehran Lipid and Glucose Study (TLGS). *IJEM* 2003;5(3):195-202.

69. Amirkhizi F, Siassi F, Djalali M, et al. Assessment of body mass index and its relationship with iron status indices among women in rural areas of Kerman province, Iran. *Koomesh* 2007;9(1):41-6.
70. Farbaksh F, Shafieezadeh T, Ramezankhani A, et al. Association between body mass index (BMI) and sociodemographic factors among Iranian females aged 15-44 years. *Pajouhesh* 2007;31(2):133-9.
71. Khoushfetrat MR, Rahmani Kh, Kalantari N, et al. The association of total energy, macronutrients intake and meal-derived energy with body mass index. *J Qazvin Univ Med Sci* 2006;10(40):36-44.
72. Sharifi A, Amani R, Hamidipour N. Prevalence of Obesity and its Related Lifestyle Pattern in Male Personnel of Jundi-Shapour University of Medical Sciences - 2005. *IJEM* 2008;10(3):235-9.
73. Sarshar N, Khajavi A. The prevalence of obesity in females of 15-65 years of age in Gonabad, Iran. *Horizon Med Sci* 2006;12(3):38-43.
74. Soheilifar J, Emdadi M. Relation between breast feeding with overweight and obesity in Hamadan primary school children. *Scientific J Hamadan Univ Med Sci* 2005;12(2):54-7.
75. Agheli N, Assefzadeh S, Rajabi M. The prevalence of cardiovascular risk factors among population aged over 30 years in Rasht and Qazvin. *J Qazvin Univ Med Sci* 2005;9(2):59-65.
76. Zieaei V, Kelishadi R, Ardalan G, et al. Physical activities in Iranian students CASPIAN study. *IJP* 2006;16(2):157-64.
77. Fallah b, Keshavarz S, Hosseini M, et al. Comparison of nutritional status and related factors among pupils aged 11-14 year olds in public and private schools of Damghan (2005). *Koomesh* 2007;8(2):53-60.
78. Ostad Rahimi A, Zarghami N, Alani B, et al. Prevalence of Vitamin D Deficiency and Some of its Risk Factors in Reproductive Age Women in Tabriz. *Clinica Chemica Acta* 2005;355:S254.
79. Vahidi Nia AA, Sardarian K. Assessment of nutritional status in rural regions of Hamadan city/Iran, 2003. *ISMJ* 2006;8(2):187-93.
80. Bayegi F, Dorosti Mottlagh AR, Eshraghian MR, et al. Familial risk factors of obesity in Neishabour school children. *Payesh* 2009;8(3):289-96.
81. Akha O, Teimoorzadeh M, Kashi Z, et al. A Study on 6-18 years-old girl students about weight and height in Sari. *J Mazandaran Univ Med Sci* 2008;18(67):50-7.
82. Hajifaraji M, Esfarjani F, Roustae R, et al. Assessment of anthropometric status of adolescents in public guidance schools in East Tehran, 2006. *AJM* 2006;2(2):37-43.
83. Amini M, OmidvarN, kimiagar M. Prevalence of overweight and obesity among junior high school students in a district of Tehran. *J Res Med Sci* 2007;12(6):315-9.
84. Ebrahimzadeh B, Kalantari N, Abadi A: The prevalence of obesity and its relative factors among less than 5 years aged children, Bandar Turkmen district, Iran. *J Kerman Univer Med Sci* 2012;19(4):384-91. Behzadnia S, Vahidshahi K, Hamzeh Hosseini S, et al. Obesity and related factors in 7-12 year-old elementary school students during 2009-2010 in Sari, Iran. *Med Glas (Zenica)*. 2012; 9(1):86-90.
85. Azadbakh L, Mirmiran P, Azizi F. Prevalence and associates of obesity in Tehran adults: Tehran Lipid and Glucose Study. *IJEM* 2004;5(4):379-87.
86. Heydari ST, Ayatollahi SMT, Zare N. Diagnostic Value of Bioelectrical Impedance Analysis versus Body Mass Index for Detection of Obesity among Students. *Asian J Sports Med* 2011;2(2):68-74.
87. Hakim S, Dorosty AR, Eshraghian MR. Association of Food Insecurity and Household Socio-Economic Status with the Body Mass Index among Urban Women in Dezful. *J Sch Public Health Inst Public Health Res* 2010;8(2):55-6.
88. Mohammad K, Golestan B, Majdzade R, et al. Socioeconomic Status and Obesity Relationship in Non-Menopause Women Aged 15-49 Years in Tehran, Iran. *Iran J Public Health* 2009;38(3):84-9.
89. Hosseini Kakhk AR, Safari M, Hamidnia MR. Health-related fitness factors in adolescent boys in Sabzevar. *J Sabzevar Univ Med Sci* 2011;18(1):55-66.
90. Shamsi A, Ebadi A. Risk Factors of Cardiovascular Diseases in Elderly People. *IJCCN* 2011;3(4):187-94.
91. Dorosti Motlagh AR, Houshyar Rad A, Mohammad pour Ahranjani B, et al. Determination of the most prevalent body mass index standard references to define obese Iranian school-age children. *J Nutr Sci Food Tech* 2009;4(2):71-80.
92. Navaii L, Mehrabi Y, Azizi F. An epidemiologic study of hyperlipidemia, obesity, and hypertension in Tehran villages. *IJEM* 2000;2(4):253-62.
93. Rahmati F, MoghadasTabrizi Y, Shidfar F, et al. Prevalence of obesity and hypertension among Tehran university students. *Payesh* 2004;3(2):123-30.
94. Barzigar A, Shojaei Tehrani H. Prevalence of atherosclerosis risk factors in Sowme Sara district of Gilan in 1996. *J Kerman Univ Med Sci* 1997;4(4):182-89.
95. Ghorbani R, Nazari AA. Prevalence of obesity and some factors associated with in Semnan population aged 20-55 years. *Koomesh* 2000;1(2):19-24.
96. Mozaffari H, Keshavars SA, Dehkordi H, et al. The prevalence of obesity among primary school students and

- its relationship to their parents' obesity. *J Shahid-Sadoughi Univ Med Sci Health Serv* 1999;2(1):17-24.
97. Mohammadi N, Shobeiri F, Kherolahi A, et al. Frequency of Over Weight & Obesity of Women in Referents to Medical and Health Centers in Hamadam City. *Nasim-Danesh (Sci J Hamadan Nurs Midwifery Faculty)* 2011, 19(36):36-41.
 98. Allahverdian S, Mirmiran P, Rahmani M, et al. Assessment of nutrient intake and obesity in a group of Tehranian adolescents Tehran Lipid & Glucose Study. *IJEM* 2000;2(3):175-85.
 99. Mojibian M, Ghilian Z. Prevalence of obesity among women in Yazd city in 2000. *J Shahid-Sadoughi Univ Med Sci Health Services* 2000;9(4):36-42.
 100. Sezavar H, Mohammadi MA. Prevalence of obesity and its association with cardiovascular risk factors in Ardabil city in 2000. *Scientific J Ardabil Univ Med Sci* 2002;2(1):21-6.
 101. Dorosty AR, Siassi F, Reilly JJ. Obesity in Iranian children. *Arch Dis Child* 2002;87:388-91.
 102. Azizi F, Emami H, Salehi P, et al. Risk factors of cardiovascular disease among elderly in Tehran (Tehran Lipid Glucose Study). *IJEM* 2002;5(1):3-14.
 103. Mortazavi Z, Shahrakipoor M. Body Mass Index in Zahedan University of Medical Sciences Students. *Tabib-e-Shargh* 2002;4(1):81-6.
 104. Fakhrazadeh H, Batoei M, Faridnia P, et al. Overweight and obesity in oil industry workers on Kharg Island. *ISMJ* 2002;5(1):73-81.
 105. Kavian F, Kimiagar M, Golestan B, et al. The prevalence of obesity and body fat distribution among female's workers in Shaheed Beheshti University of Medical Sciences. *Pajouhandedh* 2002;25:459-63.
 106. Gargari BP, Behzad MH, Ghassabpour S, et al. Prevalence of overweight and obesity among high-school girls in Tabriz, Iran, in 2001. *Food Nutr Bull* 2004;25(3):288-91.
 107. Taheri F. Epidemiologic study of obesity in school age children in Birjand. *J Birjand Univ Med Sci* 2002;9:18-22.
 108. Akhavan Tabib A, Kelishadi R, Sadri G, et al. Healthy Heart Program: Obesity in center of Iran. *J Qazvin Uni Med Sci* 2003;26:27-35.
 109. Kelishadi R, Pour MH, Sarraf-zadegan N, et al. Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan Healthy Heart Program-Heart Health Promotion from Childhood. *Pediatr Int* 2003;45(2):435-42.
 110. Shahgholian N, Aein F, Deris F. 90th percentile of body mass index (BMI) and some obesity risk factors among 7-12 years old school children, Chaharmahal & Bakhtiary, 2002. *J Shahrekord Univ Med Sci* 2004;5(4):42-8.
 111. Akbari S. The prevalence of obesity and its association with unovulation in female students of Khoram Abad high-schools. *Yafteh* 2003;4(1):33-8.
 112. Tabatabaei M, Dorosty AR, Siassi F, et al. Using different reference values to determine prevalence of obesity among school children in Ahwaz. *SJSPH* 2004;2(1):11-8.
 113. Gheibi SS, Fakoor Z, Alizadegan M, et al. The prevalence of obesity among girl students in Urmia in 2002-3. *Iran J Pediatr* 2003;13(1):1-8.
 114. Mirmiran P, Mohamadi F, Mehrabi Y, et al. Alarming trend of waist circumference in Tehranian children and adolescents: Tehran Lipid and Glucose Study. *IJEM* 2004;6(3):249-55.
 115. Jamshidian-Tehrani M, Kalantari N, Azadbakht L, et al. Osteoporosis risk factors in Tehrani women aged 40-60 years. *IJEM* 2004;6(2):139-45.
 116. Karandish M, Mohammadpour-Ahranjani B, Kalantari N, et al. The Prevalence of Overweight and Obesity among Adolescent Students in Tehran. *Hakim* 2004;7(3):38-43.
 117. Mirmiran P, Mir Bolooki MR, Mohammadi Nasrabadi F, et al. Prevalence of thinness, overweight and obesity in Tehran adolescents: Tehran Lipid and Glucose Study. *IJEM* 2004;5(4):371-7.
 118. Mozaffari H, Dehghani A, Afkhami M, et al. The prevalence of obesity in primary school students in Yazd province. *Proceedings of the 8th Iranian Congress of nutrition*. 2004 Sep 6-9. Tehran, Iran. Tehran: University of Medical Sciences; 2004.
 119. Shahidi N, Mirmiran P, Amirkhani F. Prevalence of obesity and abdominal obesity and their association with diet pattern of male adolescent in Tabriz. *Res Med* 2004;28(4):255-63.
 120. Vaghari GH. Obesity among mothers in rural Golestan. *SJSPH* 2005;3(1):21-8.
 121. Heshmat R, Fakhrazadeh H, Pour-Ebrahim R, et al. Cardiovascular risk factors study in the inhabitants of Tehran University of Medical Sciences population Lab: Statistical design and sampling. *IJDLD* 2004;3(0):21-6.
 122. Azizi T, Harati H, Mirbolooki M, et al. Association of different anthropometric measures and type 2 diabetes in an Iranian urban population. *IJEM* 2005;7(2):103-10.
 123. Bazhan M, Kalantari N, Ghaffarpoor M, et al. Prevalence of obesity, fat distribution and its relationship with food consumption pattern in secondary school girls in Lahijan. *IJEM* 2005;7(1):37-46.
 124. Kelishadi R, Sadri G, Tavasoli A, et al. Cumulative prevalence of risk factors for atherosclerotic cardiovascular diseases in Iranian adolescents. *J Pediatr* 2005;81(6):447-53.
 125. Asar S, Asghari S. Prevalence of obesity & overweight

- among 7-14 years old students in the city of Ahwaz. *Sci Med J Ahvaz Univ Med Sci* 2005;44(1):11-20.
126. Dorosty Motlagh AR, Hodjat P. The prevalence of obesity and its association with the parents obesity in primary school girls in Tehran in 2002. *Scientific J Tehran Univ Med Sci* 2005;62:942-7.
 127. Azizi F, Mirmiran P, Azadbakht L. Trends in Overweight, Obesity and Central Fat Accumulation among Tehranian Adults between 1998-1999 and 2001-2002: Tehran Lipid & Glucose Study. *Ann Nutr Metab* 2005;49(1):3-8.
 128. Mostafavi H, Dabagh Manesh M, Zare N. Prevalence of obesity and over weight in adolescents and adult population in Shiraz. *IJEM* 2005;25(1):57-66.
 129. Rahmani Nia F, Daneshmandi H, Darbani H. Determination of overweight and obesity prevalence among male students and its relationship with physical activity- level. *Harkat* 2005;23(1):47-60.
 130. Valizadeh M, Sohbatlou F, Mosavi Nasab N. The anthropometric measures (weight, height and body mass index) of middle school girls in Zanjan 2004-5. *Sci J Zanjan Med Uni* 2005;13(1):30-6.
 131. Safari S, Sheikh Aleslam R, Abdolahi Z, et al. The prevalence of over-weight and obesity among elderly individuals in spring 2001. *Proceedings of the 9th Iranian Congress of nutrition. 2006 Sep 4-7. Tabriz, Iran. Tabriz: University of Medical Sciences, 2006.*
 132. Karaji Bani M, Montazeri Far F, Mohammadi M, et al. The prevalence of obesity and wasting in primary school girls in the city of Zahedan. *Tabib-e-Shargh* 2005;4:289-96.
 133. Khaji A, Khodaei S, Kar Bakhsh M, et al. Blood pressure and obesity in young adolescents in Tehran. *Iran J Pediatr* 2006;16(1):45-50.
 134. Alavi Naieny AM, Dorosti Motlagh AR. Survey of obesity, underweight and associated factors in elderly people, using some of anthropometric indices in Isfahan city, 2004. *J Mazandaran Univ Med Sci* 2006;16(52):117-23.
 135. Mozafari M, Nosrati S, Purmansour G, et al. Factors affecting the prevalence of obesity among 15-49 years old women referred to urban health clinics in Ilam in 2004. *J Ilam Univ Med Sci* 2006;14(1):8-17.
 136. Mazloomzadeh S, Moosavi A, Dinmohammadi H. Epidemiology of overweight and obesity in Zanjan province 2005. *Scientific J Zanjan Med Uni* 2005;14(1):57-64.
 137. Bahrami H, Sadatsafavi M, Pourshams A, et al. Obesity and hypertension in an Iranian cohort study; Iranian women experience higher rates of obesity and hypertension than American women. *BMC Public Health* 2006;6(1):1-9.
 138. Montazerifar F, Karajibani M, Dashipour A. The prevalence of obesity and wasting and their correlation with food intake in female junior school students in Zahedan, 2004. *ISMJ* 2006;1(1):66-76.
 139. Golchin S, Fallah H. Height, weight, BMI and nutrient intake among 11-14 year-old adolescent in nongovernmental schools, Dameghan. *Proceedings of the 9th Iranian Congress of nutrition. 2006 Sep 4-7. Tabriz, Iran. Tabriz: University of Medical Sciences, 2006.*
 140. Sharabi M, Safavi M, Zarezadeh M, et al. Prevalence of over-weight and obesity among children aged 2-6 years in kindergartens. *Proceedings of the 9th Iranian Congress of nutrition. 2006 Sep 4-7. Tabriz, Iran. Tabriz: University of Medical Sciences, 2006.*
 141. Safarian M, Moradi R, Shakeri MT, et al. Prevalence of over-weight and obesity in adolescent girls in Mashahd. *Proceedings of the 9th Iranian Congress of nutrition. 2006 Sep 4-7. Tabriz, Iran. Tabriz: University of Medical Sciences, 2006.*
 142. Mortazavi Z, Shahrakipoor M. Body Mass Index in Zahedan University of Medical Sciences Students. *Tabib-e-Shargh* 2002;4(1):81-6.
 143. Vaghari GR, Marjani AJ, Kordjazi ML. Prevalence of obesity in inder 5-year-old children in rural areas of Gorgan. *Proceedings of the 9th Iranian Congress of nutrition. 2006 Sep. 4-7. Tabriz, Iran. Tabriz: University of Medical Sciences, 2006.*
 144. Farshidi H, Zare S, Booshehri E. Association of different anthropometric measures and blood pressure in adult population of Bandar-abbas city. *Hormozgan Med J* 2006;10:111-8.
 145. Mozaffari H, Nabaei B. Obesity and related risk factors. *Indian J Pediatr* 2007;74:265-7.
 146. Karam Soltani Z, Dorosty Motlagh AR, Eshraghian MR, et al. Obesity and food security in Yazd primary school students. *TUMJ* 2007;65(7):68-76.
 147. Hajian K, Heidari B. Prevalence of obesity, central obesity and the associated factors in urban population aged 20-70 years, in the north of Iran: apopulation-based study and regression approach. *Obes Rev* 2007;8(1):3-10.
 148. Jafari Rad S, Keshavarz SA, Dorosty AR. Factors The nutritional factors by body mass index in young women in high school in Sari, 2003. *Iran J Nutr Sci Food Indust* 2007;2(1):51-6.