Original Article

The Comparative Study of Obesity Differences for Schoolchildren between Turkman and Sisstanish Ethnic Groups in the North of Iran

*Gholamreza Veghari[1]   Shima Kazemi[2]   Hamideh Aslani[3]   Ladan Shomali[3]   Habibeh Moradian[3]

1- Ischemic Disorders Research Center, Golestan University of Medical Sciences, Gorgan, Iran
2- Deputy of Research and Technology, Golestan University of Medical Sciences, Gorgan, Iran
3-Education Organization of Golestan Province, Gorgan and Gomishan, Iran

*grveghari@yahoo.com

Abstract

Background and purpose: Overweight and obesity are the health problem in adolescents and the main purpose of this study was to evaluate this problem and some socio-demographic-related factors among two ethnic groups in Iranian northern primary school children in 2010.

Materials and Methods: This was a descriptive and cross-sectional study that performed on 4165 students (Turkman = 2852and Sisstani = 1313) from 112 schools in urban and rural area. The schools and students were chosen by cluster nad random sampling, respectively. Data collected by questioner which contain, questions on the social-economical condition of school children specially ethnicity, gender, location area, and economic status, for all samples through interview. Overweight and obesity classified based on the body mass index (BMI) cut off points of Centers for Disease Control values (in excess of the 85th and 95th percentiles, respectively). Spss.win16 software was used for analysis.

Results: Linear regression analyzes revealed that weight, height, and BMI increase 2.70 kg, 4.62 cm and 0.42 kg in boys ($P < 0.001$) and 3.12 kg, 5.19 cm and 0.52 kg in girls ($P < 0.001$) every year, respectively. In total, overweight was common in 8.4% and obesity was common in 11.9% of students and they were statistically significant among two ethnic groups ($P = 0.001$) so, in Turkman group (14.1%) is more than in Sisstanish ethnic group (10.6%). As a result of logistic regression analyzes, the risk of overweight and obesity was 1.847 (1.546-2.208, confidence interval [CI] 95%) in Turkman group compared to Sisstanish ethnic group and it was 2.297 (1.911-2.761, CI 95%) in good economic group compared to poor economic group.

Conclusion: Totally, one to seven of schoolchildren suffer from obesity and overweight and they were in Turkman ethnic group more than in Sisstanish ethnic groups. The important public health training about obesity for children especially in the urban area and high-income families emphasizes in this study.

[*Veghari G, Kazemi Sh, Aslani H, Shomali L, Moradian H.* **The Comparative Study of Obesity Differences for Schoolchildren between Turkman and Sisstanish Ethnic Groups in the North of Iran.** *IJHS 2015; 3(1): 52-59] http://jhs.mazums.ac.ir*

Key words: Overweight, Obesity, Schoolchildren, Ethnicity, Iran

1. Introduction

Obesity and overweight is well-known as a health problem in adult people in Iran (1,2) and other developing countries (3), but data on this problem and its social variation among children are still scarce. Adolescence seems to be one of the critical periods for the development of obesity, which is related to health criteria in adulthood (4).

Based on a recent study (5), overweight and obesity has been increasing among Iranian adolescents. One outcome of this trend is the alarming increase in prevalence of metabolic syndrome in Iranian population (2).

The strong relationship between socio-demographic factors and obesity has been shown in some studies (6,7), but it differ in this area. Data on children overweight and obesity and the possible role of social inequality on them, help to establish preventive program regarding chronic disease in adulthood.

Obesity rates differ among ethnic groups in US (8,9). In Sri Lanka, Australian children were seen the association between secular growth and genetic factors (10). In another study (11) recommended using FFM (Free fat Mass) instead of body mass index (BMI) in the field study. Fredriks et al. (12) believed that design a separate growth chart for Moroccan and Turkish children that are living in Netherlands is necessary.

Of 1,700,000 population in the Golestan province (north of Iran), 43.9% and 56.1% are living in urban and rural area, respectively. Agriculture is the main job in a rural area and different ethnic groups such as Fars-native, Turkman, and Sisstani are living in this region (13).

This research was conducted to compare the BMI distribution among three ethnic groups (Fars-native, Turkman, and Sisstanish) in Iranian northern primary school children and attempted to analyze socio-demographic related factors same as economic status, location area, and gender influence in physical growth in those children

2. Materials and Methods

This was a descriptive and cross-sectional study, which carried out on 4165 primary schoolchildren (Turkman = 2852 and Sisstani = 1313) from 112 schools of urban and villages in the north of Iran. Schools and students have been chosen by cluster sampling. Golestan province, Iran included 14 districts and initially, all of the primary schools was numbered in each district in villages and urban area. Then eight schools with equal in location area were randomly chosen from each district. After enrolling 112 schools, a systematic random sample of students were drawn from each school using the student class list. From each class, 15 subjects were chosen by systematic random sampling and in villages that are less than 15 students, all of them were chosen. Age and date of birth were obtained from the school's records. Of the total sample, 59 students (0.8%) were excluded because of missing one or more data. Finally, 4165 cases were chosen and we selected the Turkman and sisstanish ethnic groups students for comparing in this study.

The estimated sample size at the national level was based on stratification of respondents by urban/rural, gender and ethnicity of 14 district areas. With the resumption of 50% prevalence rate, a confidence level of 95% and a maximum marginal error about 0.02, the sample size was calculated 2401 subjects.

With regards cluster sampling methods, the sample size enlarged up three times of baseline sample size. For all of children a questionnaire which contain, questions on the social-economical condition of school children specially ethnicity, gender, location area and economic status. Unwilling students' parents excluded from the study. The

reliability was assessed using Cronbach's alpha coefficient and found to be 0.86.

Descriptive statistics on weight, height, and BMI measurements was performed. Overweight and obesity classified based on the Centers for Disease Control (CDC) values in excess of the 85th and 95th percentiles, respectively (14).

Economic status: Regards to Iranian lifestyle and the real income status of families, the economic ranking of them was assessed on the base of 12 items and principles. On the basis of those 12 items, the children's family was divided as (1) good, (2) intermediate, and (3) poor.

The ethnic groups in this study were defined: (1) Turkman: The inter marriage of this ethnic group with other ethnic group were rare; therefore, this ethnic group can be recognized as a pure race. (2) Sistanish ethnic group: This ethnic group was immigrated from Sisstan and Bluchestan province (the east of Iran) far earlier.

Anthropometric measurements of the children were performed in light dress and without shoes in the morning. Bodyweight was measured to the nearest 0.1 kg using a balanced-beam scale, and height was measured to the nearest 0.5 cm with standing up and head, back, and buttock on the vertical land of the height gauge.

SPSS for Windows (version 16, SPSS Inc., Chicago, IL, USA) was used for statistical data analysis. Chi-square test and logistic regression were used for analysis, and $P = 0.050$ included significations. Subjects who were not interested to contribute, have been excluded from this study

3. Results

Distribution of the baseline characteristics of the study population present in table 1. Totally, 40.6% and 51.9% of subjects was urban residence and male, respectively. The proportion of ethnicity was 68.5% and 31.5% in Turkman and Sisstanish ethnic groups, respectively, and mostly (63.9%) were in moderate economic status.

Table 1. Distribution of the baseline characteristics of the study population (N = 4165)

Variables	Number	Percent
Region		
Urban	1691	40.6
Village	2474	59.4
Gender		
Boy	2163	51.9
Girl	2002	48.1
Ethnicity		
Turkman	2852	68.5
Sisstani	1313	31.5
Economic status		
Low	775	18.6
Moderate	2661	63.9
Good	729	17.5

The mean of BMI based on age, sex, and ethnicity is presented in table 2. The mean of BMI have an ascending trend from 6 to 11 years; however this situation was not seen in female aged 7 years in Fars-native and Turkman. Wholly, the mean of BMI in Sisstanish ethnic group was lower than other ethnic groups.

Table 2. Mean and standard deviation of BMI among primary school children in two ethnic groups in the north of Iran

Age (Year)	Turkman (2852)					Sisstani (1313)				
	Male (1423)		Female (1429)		N	Male (740)		Female (573)		N
	Mean (SD)	N	Mean (SD)	N		Mean (SD)	N	Mean (SD)	N	
6	15.12 (2.07)	188	15.14 (2.78)	160	348	15.20 (2.23)	99	14.59 (1.71)	57	156
7	15.42 (1.73)	295	14.98 (2.05)	273	568	15.42 (1.93)	132	15.47 (2.25)	87	219
8	16.66 (2.75)[a]	271	16.04 (2.61)	261	532	15.54 (1.97)[a]	151	15.68 (3.01)	101	252
9	16.69 (2.33)[b]	280	16.38 (2.79)[d]	311	591	15.88 (2.05)[b]	126	15.61 (2.15)[d]	130	256
10	17.26 (2.43)[c]	260	17.22 (2.88)[e]	301	561	16.00 (2.46)[c]	146	16.38 (2.74)[e]	133	279
11	17.09 (2.46)	129	17.48 (3.11)	123	252	16.55 (2.22)	86	16.84 (2.35)	65	151

Similar letters are statistically significant different at $P < 0.005$; BMI: Body mass index; SD: Standard deviation

Table 3. The distribution of BMI among primary schoolchildren in two ethnic groups in the north of Iran

Gender	Ethnicity	CDC BMI distribution				Total
		< 5%	5-85%	85-95%	>= 95%	
Boy	Turkman	326 (22.9)	718 (50.5)	143 (10.0)	236 (16.6)	1423
	Sisstani	235 (31.8)	403 (54.5)	45 (6.0)	57 (7.7)	740
	Total	561 (25.9)	1121 (51.8)	188 (8.7)	293 (13.6)	2163
Girl	Turkman	372 (26.0)	776 (54.3)	115 (8.1)	166 (11.6)	1429
	Sisstani	169 (29.5)	322 (56.2)	46 (8.0)	36 (6.3)	573
	Total	541 (27.0)	1098 (54.9)	161 (8.0)	202 (10.1)	2002

BMI: Body mass index; CDC: Centers for disease control

Table 4. OR obtained from logistic regression for overweight and obesity among primary schoolchildren in the north of Iran

Risk factor	Variable	Crude		Economic status adjusted	
		OR (95% CI)	P-value	OR (95% CI)	P value
Ethnicity	Sisstani (Ref)	(1)		(1)	
	Turkman	1.847 (1.546-2.208)	0.001	1.698 (1.418-2.033)	0.001
Gender	Female (Ref)	(1)		(1)	
	Male	1.291 (1.109-1.504)	0.001	1.273 (1.092-1.484)	0.002
Location area	Rural (Ref)	(1)		(1)	
	Urban	1.673 (1.406-1.905)	0.001	1.144 (1.016-1.289)	0.026
Economic Status	Poor (Ref)	(1)			
	Intermediate	1.665 (1.382-2.008)	0.001		
	Good	2.353(1.821-3.39)	0.001		

CI: Confidential interval; OR: Odds ratios

The overall prevalence of overweight and obesity observed in 8.4% and 11.9%, respectively. Those ratios in male were 8.7% and 13.6% and in female were 8.0% and 10.1% in the same way. The differences of obesity were statistically significant between two ethnic groups (P = 0.001) and in Turkman children was more than in Sisstanish ethnic groups. Obesity was seen 5% and 1.4% in boys more than in girls in Turkman (P = 0.003) and Sisstanish ethnic groups (P = 0.319), respectively (Table 3).

Linear regression analysis revealed that weight, height, and BMI increase 2.70 kg, 4.62 cm and 0.42 kg in boys (P = 0.001) and 3.12 kg, 5.19 cm and 0.52 kg in girls for each year increase in age, respectively (P = 0.001).

Results of logistic regression analysis showed that the risk of overweight and obesity is, 1.847 (1.546-2.208 confidence interval [CI] 95%) in Turkman compare to Sisstanish ethnic group, 1.291 (1.109-1.504, CI 95%) in male compare to female, 1.673 (1.406-1.905, CI 95%) in urban compared to rural area and 2.353 (1.821-3.039, CI 95%) in good economic group compare to poor economic group. Results of logistic regression analysis adjusted economic status has been found that the risk of overweight and obesity was 1.698 (1.418-2.033, CI 95%) in Turkman compared to Sisstanish ethnic group, 1.273 (1.092-1.484, CI 95%) in male compare to female and 1.144 (1.016-1.289, CI 95%) in urban compared to rural area (Table 4).

In boys, the BMI distribution was consistent with CDC value in Turkman ethnic group but it was lower in Sisstanish ethnic group. In girls, the BMI distribution was higher with CDC value in Turkman ethnic group from 8 years old but it was lower in Sisstanish ethnic group (Figures 1 and 2).

4. Discussion

Our results clearly indicate that the prevalence of overweight and obesity was high in two

ethnic groups in the north of Iran and in Turkman ethnic is more than in Sisstanish ethnic groups. Economic status and urbanization are the risk factors for obesity.
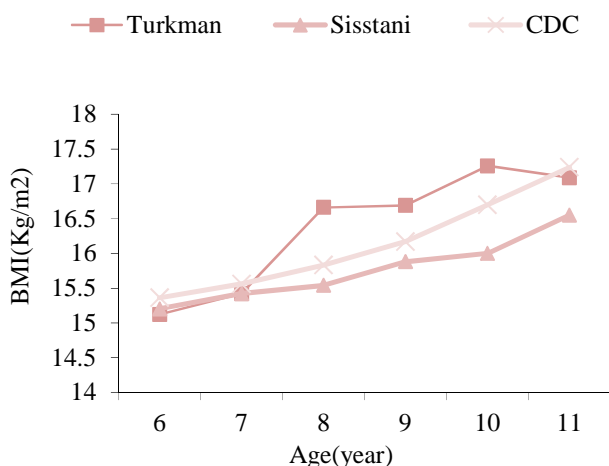

Figure 1. The comparision of boys' body mass index distribution between two ethnic groups and Centers for Disease Control value
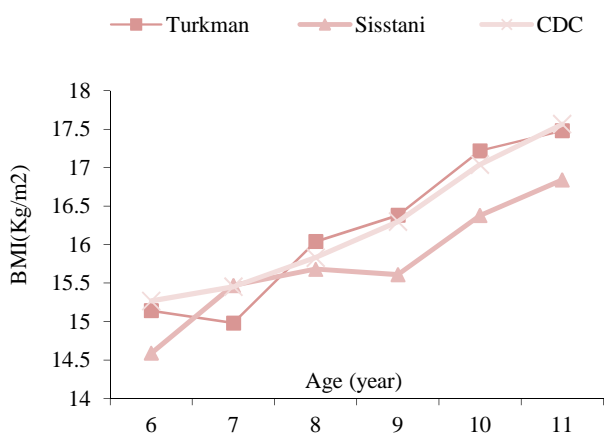

Figure 2. The comparision of girls' body mass index distribution between ethnic groups and Centers for Disease Control value

The prevalence of adolescent overweight and obesity increased during the last decade in Iran (15). Recent evidence suggests that Iran is in the nutrition transition phase and the outcome of this trend is a rapid increase in obesity and chronic disease (16) besides, obesity well-known as a health problem in the north of Iran (17).

The scarce studies evaluating obesity in adolescents have investigated a considerably high prevalence in developing countries. The study among 21111 school children aged 6-18 year in Iran according to CDC cut-offs, founded the prevalence of overweight and obesity 8.8% and 4.5%, respectively (18) and in 3-18 years old children in Tehran (2), the obesity was common in 5.2% . Evaluating of the atherosclerosis risk factors among 2-18 years old children in Isfahan (a capital city in Iran), according to the National Center for Health Statistics criteria, the overweight revealed in 8% of children (20). The prevalence of obesity in Kuwait is the highest in the Arab Peninsula (21) and obesity (13.1% of girls and 14.7% of boys) and overweight (31.8% of girls and 30% of boys) were seen high in 10-14 years old children using the CDC reference data (22). In the United Arab Emirates, according to the CDC criteria, 14% of adolescent girls were overweight, and 9% were obese (23). In Bahraini school children, according to the WHO criteria, the overall prevalence of obesity was 15% and 18% in boys and girls, respectively (24). In Saudi Arabian boys' school children aged 6-18 years, based on the CDC cut-off points, obesity prevalent in 15.8% of them (25).Compared with above studies, the prevalence of obesity in our study was higher than in both other parts of Iran and other regional countries.

In present study, the mean of BMI and prevalence of obesity were different between two ethnic groups. The prevalence of overweight was seen in Mexican American school children higher than in other ethnic groups in San Antanio (26) and American children, especially African-American and Hispanic children, are becoming heavier and fatter than other children in this area (27). Childhood overweight rapidly increased in United States from 1986 to 1998, especially within African American and Hispanic ethnic groups (28). There is no clear why the obesity

in Turkman group is higher than in Sisstanish ethnic group. Previous studies in the north of Iran (1,29) were reported the low socio-economic status and poor nutrition in Sisstanish ethnic group.

The role of economic status or ethnicity in secular growth differences in northern Iran has not been clarified in our study. While previous studies (29,30) approved the secular growth differences among ethnic groups that living in the north of Iran. In our study, as a result of regression logistic analyzes, the association between obesity and ethnicity unchanged, in spite of adjusted with economic status. Therefore, obesity differences between two ethnic groups may be related to their socio-economic status. The Wang study in USA (31) showed that income disparities probably cannot effectively reduce racial disparities in obesity. While, Gordon-Larsen (32) believed that efforts to reduce overweight disparities between ethnic groups must look beyond income and education and focus on the other factors, such as environment, conception, biology, and socio-culture.

In present study, good economic status strongly was a risk factor for obesity, and it may be a susceptible cause of more prone to obesity in urban than the rural population. Our results are consistent with some previous studies in Iran (29) and in other countries (6,7). While, the prevalence of adolescence obesity increased in the low socio-economic status more than in others in a 7-year period study. (33).

Indeed, we found the boys more than girls at risk of obesity. Studies in Tehran showed that overweight more prevalent in girls than boys (19) and gender disparity in obesity and metabolic syndrome were found in Iranian adult people (34). We cannot clearly to explain why obesity was more prevalent in boys than girls, while social factors, ethnicity, and food behavior may be influenced in this situation. Besides, possibly, CDC data are not suitable for comparing of our results and

should be considered in future studies. Previous study during 1997 to 2007 in this area (35) showed that physical growth in both gender is not similar, hence the weight in boys increased but unchanged in girls. Another study (30) reported that secular growth of children in different ethnic groups in this area was not alike.

In this study, we did not have fitting criteria for economic status. In addition, we did not provide a proper statistical test to consider the design effect caused by cluster sampling. They are our limiting study.

These data highlight the obesity as a health problem among Turkman and Sisstanish ethnic groups children in the north of Iran and it is more common in boys than girls and in Turkman children more than in Sisstanish children. Social differences associated with obesity in these residents. The present findings emphasize the important public health message of children especially in the urban area and high-income families in the north of Iran. However, more detailed studies are needed to clarify why boys' school children more prone to overweight and obesity.

References
1. Veghari G, Mansurian AR. Obesity among mothers in rural golestan-iran (south-east of

Caspian sea). Iran J Public Health 2007; 36(3): 71-6.

2. Azizi F, Rahmani M, Emami H, Mirmiran P, Hajipour R, Madjid M, et al. Cardiovascular risk factors in an Iranian urban population: Tehran lipid and glucose study (phase 1). Soz Praventivmed 2002; 47(6): 408-26.

3. Popkin BM. The nutrition transition and obesity in the developing world. J Nutr 2001; 131(3): 871S-3S.

4. Mijailovic V, Micic D, Mijailovi M. Effects of childhood and adolescent obesity on morbidity in adult life. J Pediatr Endocrinol Metab 2001; 14(Suppl 5): 1339-44.

5. Ayatollahi SM. Sizes and obesity pattern of South Iranian adolescent females. Ann Hum Biol 2003; 30(2): 191-202.

6. Sibai AM, Hwalla N, Adra N, Rahal B. Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study. Obes Res 2003; 11(11): 1353-61.

7. Musaiger AO. Overweight and obesity in the Eastern Mediterranean Region: can we control it? East Mediterr Health J 2004; 10(6): 789-93.

8. Freedman DS, Khan LK, Serdula MK, Ogden CL, Dietz WH. Racial and ethnic differences in secular trends for childhood BMI, weight, and height. Obesity (Silver Spring) 2006; 14(2): 301-8.

9. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. JAMA 2006; 295(13): 1549-55.

10. Wickramasinghe VP, Cleghorn GJ, Edmiston KA, Davies PS. Impact of ethnicity upon body composition assessment in Sri Lankan Australian children. J Paediatr Child Health 2005; 41(3): 101-6.

11. Rush EC, Puniani K, Valencia ME, Davies PS, Plank LD. Estimation of body fatness from body mass index and bioelectrical impedance: comparison of New Zealand European, Maori and Pacific Island children. Eur J Clin Nutr 2003; 57(11): 1394-401.

12. Fredriks AM, van Buuren S, Jeurissen SE, Dekker FW, Verloove-Vanhorick SP, Wit JM. Height, weight, body mass index and pubertal development references for children of Moroccan origin in The Netherlands. Acta Paediatr 2004; 93(6): 817-24.

13. Statistical Center of Iran. Selected Findings of the 2011 National Population and Housing Census. [Online]. [cited 2012]; Available from: URL: http://www.amar.org.ir/Portals/1/Iran/census-2.pdf

14. de Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. Bull World Health Organ 2007; 85(9): 660-7.

15. Hosseini M, Carpenter RG, Mohammad K, Jones ME. Standardized percentile curves of body mass index of Iranian children compared to the US population reference. Int J Obes Relat Metab Disord 1999; 23(8): 783-6.

16. Ghassemi H, Harrison G, Mohammad K. An accelerated nutrition transition in Iran. Public Health Nutr 2002; 5(1A): 149-55.

17. Veghari G, Joshaghani H, Niknezhad F, Sedaghat M, Hoseini A, Angizeh A, et al. Obesity in the north of Iran (south east of Caspian Sea). Bangladesh Med Res Counc Bull 2010; 36(3): 100-1.

18. Kelishadi R, Ardalan G, Gheiratmand R, Majdzadeh R, Hosseini M, Gouya MM, et al. Thinness, overweight and obesity in a national sample of Iranian children and adolescents: CASPIAN Study. Child Care Health Dev 2008; 34(1): 44-54.

19. Mohammadpour-Ahranjani B, Rashidi A, Karandish M, Eshraghian MR, Kalantari N. Prevalence of overweight and obesity in adolescent Tehrani students, 2000-2001: an epidemic health problem. Public Health Nutr 2004; 7(5): 645-8.

20. Kelishadi R, Hashemipour M, Sarraf-Zadegan N. Trend of atherosclerosis risk factors in children of Isfahan. Asian Cardiovascular Throrac Annals 2001; 9: 36-40.

21. Moussa MA, Shaltout AA, Nkansa-Dwamena D, Mourad M, Alsheikh N, Agha N, et al. Factors associated with obesity in Kuwaiti children. Eur J Epidemiol 1999; 15(1): 41-9.

22. Al-Isa AN, Thalib L. Body mass index of Kuwaiti adolescents aged 10-14 years: reference percentiles and curves. East Mediterr Health J 2008; 14(2): 333-43.

23. Al-Hourani HM, Henry CJ, Lightowler HJ.

Prevalence of overweight among adolescent females in the United Arab Emirates. Am J Hum Biol 2003; 15(6): 758-64.

24. Al-Sendi AM, Shetty P, Musaiger AO. Prevalence of overweight and obesity among Bahraini adolescents: a comparison between three different sets of criteria. Eur J Clin Nutr 2003; 57(3): 471-4.

25. al-Nuaim AR, Bamgboye EA, al-Herbish A. The pattern of growth and obesity in Saudi Arabian male school children. Int J Obes Relat Metab Disord 1996; 20(11): 1000-5.

26. Park MK, Menard SW, Schoolfield J. Prevalence of overweight in a triethnic pediatric population of San Antonio, Texas. Int J Obes Relat Metab Disord 2001; 25(3): 409-16.

27. Dwyer JT, Stone EJ, Yang M, Webber LS, Must A, Feldman HA, et al. Prevalence of marked overweight and obesity in a multiethnic pediatric population: findings from the Child and Adolescent Trial for Cardiovascular Health (CATCH) study. J Am Diet Assoc 2000; 100(10): 1149-56.

28. Strauss RS, Pollack HA. Epidemic increase in childhood overweight, 1986-1998. JAMA 2001; 286(22): 2845-8.

29. Veghari G, Asadi J, Eshghinia S. Impact of ethnicity upon body composition assessment in Iranian Northern children. J Clin Diagn Res 2009; (3): 1779-83.

30. Veghari G, Golalipour MJ. The comparison of nutritional status between Turkman and non-Turkman ethnic groups in north of Iran. Journal Applied Sciences 2007; 7(18): 2635-40.

31. Wang Y, Zhang Q. Are American children and adolescents of low socioeconomic status at increased risk of obesity? Changes in the association between overweight and family income between 1971 and 2002. Am J Clin Nutr 2006; 84(4): 707-16.

32. Gordon-Larsen P, Adair LS, Popkin BM. The relationship of ethnicity, socioeconomic factors, and overweight in US adolescents. Obes Res 2003; 11(1): 121-9.

33. Moore DB, Howell PB, Treiber FA. Changes in overweight in youth over a period of 7 years: impact of ethnicity, gender and socioeconomic status. Ethn Dis 2002; 12(1): S1-S6.

34. Azizi F, Emami H, Salehi P, Ghanbarian A, Mirmiran P, Mirbolooki M, et al. Cardiovascular risk factors in the elderly: the Tehran Lipid and Glucose Study. J Cardiovasc Risk 2003; 10(1): 65-73.

35. Veghari G, Saeedi M. The comparative study of body mass index distribution among preschool children in a 7 years period in north of Iran. Journal of Applied Sciences 2007; 7(18): 2681-5.