

# The Comparative Study of Obesity among Mothers with Different Ethnic Groups in Northern IRAN

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## Abstract

**Background:** To evaluate the prevalence of obesity and some related factors in the villages around Gorgan which is a multi-racial and capital city of Golestan Province, northern Iran.

**Methods:** This was a cross-sectional study with 2854 women participated. Interviewers recorded the data using the questionnaire. Subjects were weighed on scales and had their height, waist, and hip circumferences. Economic status was categorized based on 10 consumer items considered necessary for modern-day life (Low  $\geq 3$ , Moderate = 4-6 and Good = 7-10). Three ethnic groups were compared in this study: Fars (native), Turkman and Sistani. This study carried out in rural area of Golestan Province in 2004.

**Results:** Body Mass Index (BMI) in ranges of (25-29.9), (30-39.9) and ( $\geq 40$ ) was observed in 28.3%, 15.9% and 0.5% of the subject, respectively. The frequency of BMI over 25 among Fars(native), Turkman and Sistani mothers was 64.3%, 43.4% and 32.9%, respectively and statistical differences was significant ( $P < 0.02$ ). In 39.1% of these women, the Waist to Hip Ratio (WHR) exceeded 0.8 and the index was higher in Turkman women compared with other groups. The frequency of economic status was 34.7%, 50.8% and 55.9%, respectively, without any significant difference. The prevalence of obesity in literate women was significantly higher than in illiterate women ( $P < 0.04$ ).

**Conclusion:** Obesity is a common health problem among women in the rural areas of Gorgan and this abnormality is varied among three different ethnic groups in this region.

**Keyword:** Obesity, Women, Body Mass Index, Waist to Hip Ratio, Rural health, Iran

## Introduction

Obesity is the disease of twenty first century; it is increasing in the world. Obesity is not only is a disease but also related to the diseases such as diabetes type-II. The reason for the obesity can be defined as the imbalanced between taking food and consuming calorie. If a person either taking a lot of food or having a low physical activity, he/she should be directed to limit his/her food and increase his/her activities to lose weight, if this method was not successful, the obese person is considered to be in a state of pathological obesity (1). There are different factors, which are responsible for the weigh increase and obesity in human. The metabolic factors such as leptin, in one hand, behavior change, and lower physical activity in other hand are among the factors responsible for the overweight and obesity (2). On the basis of WHO report, obesity

is being increased in the world (3). There are some scatter studies in Iran which show that obesity is also health problem in this country (4). In regard to the bad side-effect of obesity and reducing the normal life-span, it seems necessary to provide some measures to recognize the people at risk and the pre-existing factors responsible for this abnormality.

There are various methods for the determination of obesity and overweight and also the type of obesity, the most common from is the body mass index (BMI). This index is used for the determination of degree of obesity and overweight. The other method is to determine the waist to hip ratio (WHR) (5). In the present study the above indices were used. The WHR  $> 0.8$  is considered to be the border-line for afflicting cardiovascular disease in women, such subjects need to be looked after and treated (6-8).

Gorgan, is the capital city of Golestan Province in the north of Iran and according to the report of Iranian statistical center (9) has a population of more than 300,000 and is one of the agricultural region of the country, and on the basis of above report the villages population in this town is 56.1% as whole, which are mainly engaged in agricultural occupation. There are different ethnic groups living in this region. The main ethnic groups are: Fars (native), Turkman, Sistani and Bluch. Sistani and Turkman ethnic groups are mainly the residents of the villages. Due to the restriction in executing epidemiological projects, there was not any study on the obesity in the villages of this town, up till now; therefore it was necessary to design a research project to determine the obesity status, type of the obesity, and their relation with some effective variable on obesity. This idea was implemented in a research investigation which was comprehensively studied the nutritional status of rural area of Gorgan.

### Materials and Methods

This was a cross-sectional study, and the sample population was all of the mothers with children under five years of age and 2854 subjects from 20 villages around Gorgan were chosen by component type sampling (cluster and simple sampling). The data were recorded by 20 trained interviewers using a questionnaire. Subjects were weighted by balance and their height, waist as well as hip circumference were measured by a tape meter. Pregnant women were not included in this study. Economic status was categorized based on possession of 10 consumer items considered necessary for modern-day life, such as telephon, running water, gas pipeline, personal house, color television, computer, video, private car, cooler, according to this list, the economic status of sample population in this study were as follows: low  $\geq 3$ , moderate = 4-6, and good = 7-10: the educational level and the ethnicity of mothers were the other variable of this re-search. In this study the ethnicity defined as follows

- 1) Fars ethnic group (native). People resided in this region since long time and they are considered to be the native resident of this region.

- 2) Sistani ethnic group: people immigrated to this region from Sistan and Bluchestan Province during past decades.

- 3) Turkman ethnic group: this group do not have family relation with other ethnic group, therefore can be considered as an independent race, and are residing in a particular rural area.

Weight measurement without shoes and clothing was carried out using a balance and recorded nearest the 0.5 kg height, waist and hip measured nearest the 0.5 cm, while the participant were standing on their feet. Waist circumference was measured using a steel tape measuring over the iliac and lower border of the ribs. Hip circumference was measured at the widest point over the buttocks (10). WHR (Waist and Hip Ratio) was obtained by dividing the mean waist circumference by mean hip circumference. WHR 0.8 and over classified as overweight and obese (3, 10).

BMI was calculated as weight (kg)/height (m<sup>2</sup>). Those with a BMI of 25.0-29.9 kg/m<sup>2</sup> were classified as overweight, whilst those with a BMI  $\geq 30.0$  kg/m<sup>2</sup> were classified as obese and BMI  $\geq 40$  classified as pathologic obese(3).

Those women who could not write and read were considered to be illiterate, and those with primary level of education and higher than that as literate.

$\chi^2$  test and correlation coefficient were used to compare the different groups and determine the relationship between variables. A consent from all participants was taken.

### Results

The mean and standard deviation of mother age in this study were  $28.2 \pm 6.11$  yr. The mothers' age range was 14-39 yr. The Fars (native) group had the highest level literacy compare to the other groups. Sistani group had the lowest economical situation compare to others (Table 1). As a whole, the overweight and obesity among Fars women (native) was more than the other two ethnic groups, which showed a meaningful statistical difference among the three ethnic groups ( $P < 0.02$ ) (Table 2). The scale of obesity among women with higher education was more than others. There was a meaningful statistical correlation between illiterate

women and the women with either high school or more education level ( $P < 0.04$ ) (Table 3). According to our definition of economic status, the scale of obesity was higher among mothers

with better economic status (Table 4). The highest and the lowest WHR index belonged to the Turkman and Sistani women, respectively (Table 5).

**Table 1:** The comparison of three groups on base of literacy and economic status

Ethnicity	No.	Literacy Situation				Economic Situation			
		Illiteracy	Primary school	Secondary school	High school	college	Poor	Moderate	Good
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Fars (native)	613	19 (3.1)	218(35.4)	282(46)a	92(15)a	2(3)a	218(35.5)	357(58)	40(6.5)
Turkman	1039	301(28.9)	618(59.3)	83(8)	33(3.2)	4(0.4)	182(17.5)	748(71.8)	112(10.7)
Sistani	1170	361(33.3)	624(52.9)	137 (11.7)	49 (4.1)	3(0.3)	724(61.4)b	436(36.9)	20(1.7)
Others	32	11(34.3)	14(43.8)	6(18.8)	1(3.1)	0(0)	22(68.8)	10(31.2)	0(0)
Total	2854	692(24.1)	1474(51.3)	508 (18.1)	175 (4.2)	9(0.3)	1146 (39.6)	1551 (54.3)	172( 6.1)

a: The Fars(native) group had the highest level literacy compare to the other groups and  $\chi^2$  test is significant between three groups ( $P = 0.001$ ).

b: Sistani group had the lowest economical situation compare to others and  $\chi^2$  test is significant between three groups ( $P = 0.001$ ).

**Table 2:** BMI comparison of mothers according to their ethnicity

Ethnicity	n (%)	BMI (kg/m <sup>2</sup> )				
		< 18.5a	18.5 - 24.9	25 - 29.9b	30 - 39.9c	40≤d
Fars(native)	611(21.5)	17(2.8)	202(33.1)	206(33.7)	179(29.3)	7(1.1)
Turkman	1028(36.2)	59(5.7)	492(47.9)	303(29.5)	168(16.3)	6(0.6)
Sistani	1163(41)	93(8)	686(59)	279(24)	103(8.9)	2(0.2)
Others	36(1.3)	5(13.9)	16(44.4)	12(33.3)	3(8.3)	0(0)
Total	2838	174(6.1)	1396(49.2)	800(28.2)	453(16)	15(0.5)

a: Underweight showed in Sistani group more than others.

b:  $\chi^2$  test is significant among three groups ( $P = 0.02$ ).

c:  $\chi^2$  test is significant among three groups ( $P = 0.02$ ).

d: Pathological obesity mainly was found among Fars(native) group.

**Table 3:** BMI comparison of mothers according to literacy

Level of literacy	n (%)	BMI (kg/m <sup>2</sup> )				
		< 18.5	18.5– 24.9	29.9- 25	30- 39.9a	≥ 40
Illiterate	686 (24.2)	59(8.6)	359(52.3)	171(24.9)	94(13.7)	3(0.4)
Primary school	1453(51.3)	81(5.6)	719(49.5)	407(28)	237(16.3)	9(0.6)
Secondary school	511(18.1)	24(4.7)	237(46.4)	164(32.1)	84(16.4)	2(0.4)
High school	172(6.1)	10(5.8)	74(43)	54(31.4)	33(19.2)	1(0.6)
College	8(0.3)	0	3(37.5)	3(37.5)	2(25)	0(0)
Total	2830	174(6.1)	1392(49.2)	799(28.2)	450(15.9)	15(0.5)

a: There was a meaningful statistical difference between illiterate women and the women with high school, diploma and higher than that ( $P = 0.04$ ).

**Table 4:** BMI comparison of mothers according to the economical status

Economic status	n(%)	BMI (kg/m <sup>2</sup> )				
		< 18.5 a n (%)	18/5-24/9b n (%)	29/9-25c n (%)	30-39/9d n (%)	≥ 40e n (%)
Good	167(6)	7(4/2)	67(40/1)	56(33/5)	37(22/2)	0
Midle	1537(55.1)	84(5/5)	673(43/8)	490(31/9)	279(18/2)	11(0/7)
Poor	1085(38.9)	81(7/5)	627(57/8)	241(22/2)	132(12/2)	4(0/4)
Total	2789	172(6/2)	1367(49)	787(28/2)	448(16/1)	15(0/5)

a,b,e : There is no statistical significant among three economic status .

c,d : There is a statistical significant among three economic status ( $P= 0.0001$ ).

**Table 5:** WHR comparison of mother according to their ethnicity

Ethnicity	n	WHR	
		0.8>a n (%)	0.8≤ b n (%)
Fars(native)	613	393(64.1)	220(35.9)
Turkman	1039	640(61.6)	399(38.4)
Sistani	1170	891(76.2)	279(28.3)
Others	32	20(62.5)	12(37.5)
Total	2854	1944(68.1)	910(31.9)

a,b:  $\chi^2$  test is significant among three groups ( $P= 0.005$ ).

## Discussion

Due to limited studies in the rural area, the comparison of the results from this study with other studies in Iran some how is difficult, but the finding of this project showed that obesity and overweight are one of health difficulty among the village women in Gorgan. We found that there were 16 obese women from every 100 subjects, and one pathological obesity from every 200 subjects, which needed to be treated. The problem of obesity among the Fars women (native) is bigger than Turkman and Sistani women. This study dose not involve all of the nutritional behavior variable, which lead to obesity and overweight, therefore, further investigations are required, to determine the effective factors on the weight increase of Fars women (native), than the other two groups.

In this study there was a meaningful direct correlation between the level of literacy and overweight, in one hand, and economical status

and overweigh on other hand. It was also recorded that the Fars women had higher literacy, therefore the excessive weight in the Fars mother could be related to that of the level of education. The study done by Bouchard et al. (11) showed that the pattern of obesity in the family was genetic dependant, but this genetic factor required a proper and special environment. They believe that the genetic factors responsible for the obesity demonstrate itself when the above factors placed in proper environment. In spit of having a better economic situation than the other two groups, the obesity and overweight incidence among Turkman women are lower than Fars ethnic group. The genetic and nutritional behaviors could be effective factors in this regard. The findings of a study in Belgium which was carried out on three generations in one society (12) indicated that the genetic factor was a powerful tool in the incidence of obesity. In our study also there was a meaningful difference between the different ethnic groups, but the environmental factors among them were also varied. Further studies are required to determine the effect of obesity on the incidence of obesity among above groups. WHR ratio more than 0.8 is considered as a border line of risk factor in women (10, 13). Another study on Japanese women also confirmed the above border line (6). In the present study, WHR of more than 0.8 were seen in 1/3 of all women, this ratio was higher in Turkman women than the other two groups. Another study (14) indicated that obesity due to hip circumference was about 67.2%, and this type of obesity had a correlation with age increase.

The results from this investigation indicate that the incidence rate of obesity and overweight among village women of Gorgan are high. According to these findings that show a positive correlation between the scale of obesity and overweight with the level of literacy and economic status of mothers. If the same trends are continued, it is expected in near future that the region will face much more difficulty due to side-effect of obesity and overweight.

The pattern of obesity in the three ethnic groups of Fars (native), Turkman, and Sistani which constitute the dominant population of this town are different, this may be due to environmental factors which in addition to genetic factor play effective roles in this heterogeneity. Keeping in mind that mothers play an important role in forming children's mind in which nutrient to choose, how many times, and how much to eat, therefore consequently mothers are the symbols of their children in this regard (15).

In conclusion it is suggested that:

Mothers are given a proper nutritional training, as a preventative measures to combat obesity in the family, and the subsequent benefit of these measures which is given to the public health in the society. Although in this study, the single women and mothers who did not have children less than five years of age, were not covered, but the results of this research may be extended to the majority of women in fertility ages in the rural area of Gorgan. Obesity and overweight among rural mothers are the major problems in region.

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### References

1. Laqnatra I (2000). Nutrition for weight management. In: *Krauses Food, nutri-*

*tion and Diet therapy*. Eds, Mahanlk, Escott-Stump. 10<sup>th</sup> ed. USA, W.B. Saunders Co, pp: 486- 516.

2. Auwerx J, Staels B (1998). Leptin. *Lancet*, 7; 351(9104): 737-42.
3. World Health Organization (1998). Obesity: Preventing and managing the global epidemic. *World Health Organization*; Geneva.
4. Rashidi A, Mohammadpour-Ahranjani B, Vafa MR, Karandish M (2005). Prevalence of obesity in Iran. *Obes Rev*, 6(3): 191-92.
5. Licata G, Argano C, Di chiara T, Parinello G, Scaglione R (2006). Obesity: a main factor of metabolic syndrome? *Panminerva Med*, 48(2): 77-85.
6. Ito H, Nalasuga K, Ohsgma A, Kaji Y, Harada M, Fukunaga M, Jingu S, Sakamoto M (2003). Detection of cardiovascular risk factor by indices of obesity obtained from anthropometry and ualenergy x-ray absorptiometrg in Japanses individuals. *Int J obes Relat Metab Disord*, 27(2): 232-37.
7. Lapidus L, Bengtsson C, Larsson B (1984). Distribution of adipose tissue and risk of cardiovascular disease and diet: a 12 yr follow up of participants in the population study of women in Gothenburg. Sweden. *Br Med J*, 289: 1257-61.
8. Bary Ga, Gray Ds (1988). Treatment of obesity: an overview. *Diabetes Metab Rev*, 4: 653-79.
9. Statistical Center of Iran (2006). Population and Housing Census. Available from: [www.sci.org.ir](http://www.sci.org.ir)
10. Dalton M, Cameron AJ, Zimmet PZ, Shaw JE, Jolley D, Dunstan DW, Welborn TA (2003). Waist circumference, waist-hip ratio and body mass index and their correlation with cardiovascular disease risk factors in Australian adults. *J Intern Med*, 254(6): 555-63.
11. Bouchard C, Perusse L (1988). Heredity and body fat. *Annu Rev Nutr*, 8: 259-77.
12. Guillaume M, Lapidus L, Backers F, Lambert A, Bjorntop P (1996). Famil-

- ial trends of obesity through three generation: the Belgian–Luxembourg child study. *Int J Obes*, 19: S5-S9.
13. Dobbelstegn CJ, Joffers MR, MACLEAN DR, Flomrdew G (2001). A comparative evaluation of waist circumference, waist-to-hip ratio and body mass index as indicators of cardiovascular risk factor .The Canadian Health Surveys. *Int J Obes*, 25: 652-61.
  14. Azizi F, Allahverdian S, Mirmiran P, Rahmani M, Mohammadi F (2001). Dietary factors and body mass index in a group of Iranian Adolescents; Tehran Lipid and Glucose Study. *Int J Vitam Res*, 71: 123-27.
  15. Fisher JO, Birch LL (1999). Restricting access to foods and children eating. *Appetite*, 32: 405-19.

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