

OBESITY PATTERN IN SOUTH OF IRAN: 2002-2006

Hossein Farshidi⁽¹⁾, Marzieh Nikparvar⁽²⁾, Shahram Zare⁽³⁾,
Elham Bushehri⁽⁴⁾, Tasnim Eghbal Eftekhari⁽⁵⁾

Abstract

INTRODUCTION: The most important factor in mortality and morbidity and disability in most world countries is cardiovascular disease. Preventable risk factors include smoking, hyperlipidemia, hypertension, sedentary life and obesity. Unfortunately, in these eras, obesity is an important health challenge. We assessed the trend of obesity in the southern Iran community.

METHODS: Two cross-sectional community-based studies in 2002 and 2006 in 1% of community aged over 18 years residing in southern Iran were performed. City population was selected using cluster-based sampling. The questionnaires were filled by trained interviewers who went on house visits and obtained variables including age, sex, weight and height using standard measurements. Findings were divided according to WHO criteria as low-weight, normal-weight, overweight and extreme obesity, and morbid obesity; data were analyzed using descriptive statistics and SPSS software.

RESULTS: The population studied in 2002 and 2006 numbered 1500 (956 women and 544 men) and 1329 (943 women and 386 men), respectively. Body mass index in 2002 and 2006 was 24.29 ± 10.9 and 28.24 ± 4.3 kg/m², respectively which is statistically significant ($P < 0.5$). Despite the decrease in absolute obesity of the community, the population is faced with statistically significant obesity.

CONCLUSION: Multiple studies have shown the relation between sedentary life and weight gain and loss of health. In comparison with studies in different countries, obesity in south of Iran is alarming, especially as number of overweight women was twice that of men.

Keywords: Obesity, cardiovascular disease, body mass index.

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Introduction

Cardiovascular diseases (CVD) are the leading cause of death in developed countries.¹ Preventable cardiovascular risk factors are smoking, hypertension, low activity and sedentary life.² Obesity and overweight are among the most important health challenges affecting members of all age groups³⁻⁵ in most countries.⁶⁻⁸

Obesity not only causes abnormal body appearance, but also is independently correlated with diseases such as hypertension, diabetes, elevated blood cholesterol, sleep apnea, spine and joint diseases,⁹⁻¹² not to mention that mortality and morbidity are more prevalent than other causes in obese persons. Many epidemiologic studies show a close correlation be-

tween obesity and premature death caused by cardiovascular complications.¹³ Type of obesity and fat distribution may also have a role in cardiovascular disease; especially centripetal obesity is correlated with increased risk of cardiovascular disease both in men and women. There has been a shift towards sedentary lifestyles.¹⁵ Low physical activity is a major cause of obesity in all age and gender groups.¹⁶ In Iran too, it is among the most common risk factors of cardiovascular disease.^{17,18} This study assessed obesity and its epidemiological trend in southern Iran.

Methods and Materials

We conducted two cross-sectional community-based studies in 2002 and 2006. All individuals aged over 18

1) MD. Associate Professor, Cardiology Department, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

2) MD. Assistant Professor, Cardiology Department, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

E-mail: mnikparvar@hums.ac.ir

3) PhD. Associate Professor, Preventive Medicine, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

4) M.Sc. Health & Welfare Sciences School, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

5) MD. Research Assistant, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.

Corresponding author: *Hossein Farshidi*

years in 1% of the families residing in south of Iran (600 families) were studied; sample size in 2002 and 2006 was 1500 and 1329, respectively.

A multi-stage sampling technique was used. In the first stage, a random sample of 20% of the clusters based on governmental clustering system of the population was selected and in the second stage, 30% of families from each cluster were systematically chosen.

Five trained interviewers (3 women and 2 men, general physicians and nurses) during 25 days went on house visits with questionnaires and standard measurement equipment. The questionnaires were filled and variables including age, sex, weight and height were obtained. Variables in this study were age, sex, height and weight which were measured using the same equipment in both studies, i.e. a portable weighing scale on uncarpeted area. The equipment was calibrated once after 30 measurements. Height was measured by a right angle and metal tape (accuracy: 1 mm). During the measurements the subjects looked ahead while standing barefoot with their buttocks, scapulas and both heels adjacent to the wall. Examiners were taught how to conduct the measurements before the study. Body mass index (BMI) was calculated [weight (kg)/height² (m)] and the following WHO criteria were considered:

< 18.5 = low-weight

18.5-24.9 = normal

25-29.9 = overweight

30-34.9 = obese

35-39 = excessive obesity

> 40 = morbid obesity

Descriptive and comparative statistical analyses were conducted using SPSS.

Results

This two-dimensional cross-sectional study (2002, 2006) assessed obesity patterns in the over-18 population in southern Iran. The population studied in 2002 and 2006 numbered 1500 (956 women and 544 men) and 1329 (943 women and 386 male), respectively. Relative frequency in age groups of 18-24 years and above 64 years was less than in other age groups in both years of the study (Table 1).

Table 2 shows average and standard deviation of BMI from 2002 through 2006 and in different age groups. Mean BMI in all age groups except two groups of 45-54-year-old and over-64 individuals had significantly increased. Mean BMI of population in

2002 and 2006 was 24.29 ± 1.09 and 28.24 ± 4.3 , respectively, showing a statistically significant difference ($P < 0.05$). The most significant increase of BMI in 2002 through 2006 is seen in ages of 55-64 years (25.25 ± 6 and 28.35 ± 7.4) and in 25-34 years (26.7 ± 3.1 and 29.54 ± 7.1) ($P < 0.01$).

Table 3 shows mean body mass index in men and women in 2002-2006 in different age groups. BMI in men of all ages except 35-44 years and 45-54 years showed a significant increase, and the difference between mean BMI in 55-64-year-old men in 2002 (23.2 ± 9) and other age groups in 2006 (26.3 ± 13.57) was significant ($P < 0.01$).

Table 4 shows the prevalence of overweight and obesity in southern Iran during 2002-2006 in men and women. According to these results, overweight and obesity in men and women increased in 2006 compared to 2002. Conversely, the relative frequency of morbid obesity decreased in men and women. The frequency distribution and relative frequency of overweight and obesity in southern Iranian population in 2002-2006 according to sex and age groups are also shown in Tables 5, 6 and 7. Most of the increase in weight and obesity (except morbid obesity) occurred in men aged 35-54 years; similarly, increase in excessive obesity was seen in women aged 45-54 years. Differences between men and women aged 24-54 years with normal BMI also increased.

Discussion

Several studies have shown a correlation between sedentary lifestyle and overweight.²⁰

Despite increased awareness of the negative impact of obesity on health, obesity has increased in both men and women. Results of population studies in the United States (1960-1962) revealed weight gain in 31.6% and obesity in 13.4% of the population²¹ and repetition of this study in 2000 revealed overweight in 64.5% and obesity in 30.5% of the population.⁸

In our study, mean BMI in the population in 2002 was 24.29. While in 2006 mean BMI was 28.24 which show a significant increase in comparison with 2002. Women showed a significant increase in obesity. In 2002, 31.7% of the women in the population had BMI greater than 30, which shows an increase of BMI in women during 2002-2006. In 2006, approximately 58.2% of the population had a BMI greater than 25.

Table 1. Relative Frequency of the population according to different age groups (2002, 2006)

	Year	
	2002	2006

		Relative frequency	Number	Relative frequency	Number
Age group	18-24	2.03	32	10.8	162
	25-34	24.6	361	32.05	426
	35-44	25.33	380	27.16	361
	45-54	21.86	328	21.89	291
	55-64	12.33	185	11.58	154
	> 64	5.6	84	4.89	65
Total		100	1500	100	1329

Table 2. Comparison of mean and standard deviation of BMI in different age groups in 2002 and 2006.

Age group	2002	2006
18-24	23.36 ± 4.5*	20.45 ± 3.6
25-34	29.54 ± 7.1**	26.7 ± 3.1
35-44	28 ± 2.6*	26.85 ± 4.2
45-54	26.85 ± 6	25.25 ± 5.01
55-64	28.35 ± 7.4**	25.25 ± 6
> 64	26.49 ± 3.02	25.65 ± 2
Total	28.24 ± 4.3*	24.29 ± 4.3

*P < 0.05 ** P < 0.05

Table 3. Comparison of average and standard deviation of BMI in different age groups of men and women in 2002 & 2006.

Age Group	Men		Women	
	2002	2006	2002	2006
18-24	20.0 ± 7.1	22.383 ± 2*	20.9 ± 6.1	23.9 ± 5.59*
25-34	23.4 ± 6.03	24.551 ± 5.04*	30 ± 4.3	34.57 ± 5.03*
35-44	26.4 ± 7.6	27.44 ± 22.8	26.7 ± 9	26.7 ± 9
45-54	26 ± 5.1	25.05 ± 4.15	27.3 ± 7.1	27.3 ± 7.1
55-64	23.2 ± 9	26.3 ± 13.57**	28.9 ± 6	28.9 ± 6
> 64	21.6 ± 7	23.21 ± 3.37	29.7 ± 7.7	29.7 ± 7.7
Total	24.64 ± 6.53	25.65 ± 13.94*	23.65 ± 6.99	23.65 ± 6.99

*P<0.01 **P<0.05

Table 4. Comparison of relative frequency of men and women with different BMI in 2002 & 2006.

		Gender frequency			
		2002		2006	
		Women	Men	Women	Men
		Sum	Percentage	Sum	percentage
BMI (kg/m ²)	< 18.5 (low weight)	67	7	42	5.44
	18.5-24.9 (normal)	444	46.4	352	49.22
	25-29.9 (overweight)	304	31.7	350	34.97
	30-34.9 (obese)	87	9	160	8.55
	35-39.9 (excessive obesity)	30	3	29	1.55
	> 40 morbid obesity	24	2.5	10	26
Total		956	100	943	100

Table 5. Relative frequency in men with different BMI according to age

		BMI											
		Underweight		Normal		Over weight		Obese		Excessive obesity		Morbid obesity	
		< 18.5		18.5-24.9		25-29.9		30-34.9		35-39.9		> 40	
		Percentage		Percentage		Percentage		Percentage		Percentage		Percentage	
		2002	2006	2002	2006	2002	2006	2002	2006	2002	2006	2002	2006
Age group	18-24	10.9	0	13.37	3.24	0	0	0	0	0	0	0	0
	24-35	50.9	33.33	20	24.86	14.4	26.72	15.78	40.62	14.28	16.67	57.14	100
	35-44	25.45	23.81	24	28.65	36.23	34.35	31.57	21.87	28.57	33.33	28.57	0
	45-54	9	14.29	20.4	20.00	42	20.61	39.47	28.12	28.57	33.33	14.28	0
	55-64	3.63	23.81	17.72	15.68	7.24	12.98	13.15	9.37	28.57	16.67	0	0
	> 64	0	4.76	4.34	7.57	0	5.34	0	0	0	0	0	0
Total		100	100	100	100	100	100	100	100	100	100	100	100

Table 6. Relative frequency in women with different BMI according to age

		BMI											
		Underweight		Normal		Over weight		Obese		Excessive obesity		Morbid obesity	
		< 18.5		18.5-24.9		25-29.9		30-34.9		35-39.9		> 40	
		Percentage		Percentage		Percentage		Percentage		Percentage		Percentage	
		2002	2006	2002	2006	2002	2006	2002	2006	2002	2006	2002	2006
Age group	18-24	29	7.69	12.16	2.66	11.18	1.20	8	1.31	3.33	3.57	0	0
	24-35	22	58.97	21.39	34.32	34.12	37.84	17.24	22.88	20	21.43	29.16	50.00
	35-44	7.4	5.13	22.52	24.26	23	24.62	42.52	38.56	36.66	32.14	20.83	30.00
	45-54	20.89	15.38	16.89	22.78	22.36	21.62	17.24	26.14	23.33	28.57	25	0
	55-64	11.94	10.26	85.76	10.65	5.9	10.81	8	7.19	13.33	10.71	25	20.00
	> 64	5.9	2.56	11.26	5.33	3.2	3.90	6.89	3.92	3.33	3.57	0	0
Total		100	100	100	100	100	100	100	100	100	100	100	100

Table 7. Relative frequency of the population with different BMI according to age in 2002 and 2006

		BMI											
		Underweight		Normal		Overweight		Obese		Excessive obesity		Morbid obesity	
		< 18.5		18.5-24.9		25-29.9		30-34.9		35-39.9		> 40	
		Percentage		Percentage		Percentage		Percentage		Percentage		Percentage	
		2002	2006	2002	2006	2002	2006	2002	2006	2002	2006	2002	2006
Age group	18-24	21.31	4.92	12.62	3.19	7.69	0.85	5.6	1.06	2.7	2.86	0	0
	24-35	35.24	50.82	20.86	31.14	28	34.75	16.8	25.53	18.9	20.00	35.48	54.55
	35-44	15.57	11.48	23.14	26.08	27.14	27.51	39.2	35.11	35.13	31.43	22.58	27.27
	45-54	16.39	14.75	18.3	21.39	28.5	21.32	24	27.13	24.32	28.57	22.58	0
	55-64	8.19	14.75	16.55	12.20	6.33	11.30	9.6	7.98	16.21	14.29	19.35	18.18
	> 64	4	3.28	8.47	6.00	2.26	4.26	4.8	3.19	2.7	2.86	0	0
Total		100	100	100	100	100	100	100	100	100	100	100	100

More than 64.5% of the population in the year 2000 had a BMI greater than 25; this is similar to pattern of obesity elsewhere in the world. In 2002, nearly 34.1% of men had a BMI greater than 25 (nearly 9.1% had BMI greater than 30) but in 2006, 45.3% of men had a BMI greater than 25 (approximately 10.36% had BMI greater than 30). This study included individuals older than 18 years. Many studies have evidenced an alarming increase in childhood obesity. The economic burden of obesity-related complications in the United States equals that of smoking complications.^{19,22} Various studies have shown the effect of weight loss and

increased physical activity in decreasing cardiovascular diseases.²³

In Isfahan, Iran¹⁸ 16% of the population in 2001 had a BMI greater than 30. In the TGLS study in 2001²⁴ 40% of the community were overweight and 23.1% had a BMI greater than 30, which is higher than our study in 2002 and 2006.

Interestingly, in the TGLS study the number of overweight women was twice higher than that of overweight men. The same pattern was shown in control groups in our study in 2006.

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