Research Article

A cross-sectional study to determine sex-wise prevalence of obesity in adults of Kashmiri population

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ABSTRACT

Background: Aim of current study was to determine the prevalence of obesity in both sexes in persons aged 18-45 years.
Methods: Multistage and multiphasic sampling technique was utilized in this study to screen the obese subjects of both males and females based on WHO classification of obesity according to BMI of 18-45 years of age. Each household was visited and only the subjects having age of 18-45 years were included in this study and this comprised of 5107 subjects, then identified obese cases with the help of height and weight techniques. Only those people who had simple obesity were included in the study. People having secondary obesity, drug induced obesity and pregnant ladies were excluded from this study. The data was collected and analysed using statistical software and chi square and proportional statistical test were applied.
Results: Out of 5107 screened population, 2652 were males and 2455 were females and the prevalence of male obesity in study population is 6.41% and that of females is 7.74%.
Conclusion: The sex has a significant impact on obesity. We reported in our study a prevalence of obesity is more in females as compared to males. A lack of physical activity as well as low frequency of employment makes females more susceptible to obesity.

Keywords: Prevalence, Obesity, Multistage and multiphasic sampling technique, Kashmiri population

INTRODUCTION

Obesity is a nutritional disorder that spans all ages and ethnicities and affects both sexes. World health organization (WHO) in 2000 called an international consultation on obesity to review epidemiological data worldwide, which concluded that obesity is a rapidly growing epidemic and at the same time acknowledged its status as disease.[1] Due to obesity, many complications arises like diabetes mellitus type 2, hypertension, stroke, hyperlipidaemia, osteoarthritis, coronary heart diseases, cancer (Post-menopausal breast carcinoma, endometrial, ovarian, gall-bladder and colon), gall stones, sleep apnea.[2-5]

Obesity results when the size or number of fat cells in a person's body increases. There are many different ways to classify obesity. In accordance with endocrine and pathogeny of the metabolic disease, obesity can be divided into simple obesity, secondary obesity and drug-induced obesity. (1) Simple obesity: also known as diet-induced obesity (95%) The simple obesity are generally caused by the heredity factor, the nutrition surplus and a lack of exercise, and characterized by the even distribution of the whole body fat. (2) Secondary obesity:

secondary obesity is metabolic disorder resulted by endocrine or metabolic diseases and genetic diseases. (3) Drug-induced obesity: for example, the use of adrenal cortex hormones drugs (such as prednisone, dexamethasone and hydrocortisone, etc.) to treat anaphylactic disease, rheumatoid arthritis, bronchial asthma and other diseases. In general, when patients stop using these drugs, obesity will disappear by itself.

The prevalence of obesity is increasing throughout the world's population. In Asia, the prevalence of obesity has rapidly increased.[6,7] The obesity epidemic moves through a population in a reasonably consistent pattern over time and this is reflected in the different patterns in low- and high income countries. In more affluent countries, it is associated with lower socioeconomic status, especially in women, and rural communities.[8,9] The sex differences are less marked in affluent countries and obesity is often common amongst adolescents and younger children. Women in all regions are generally more obese than men and the prevalence for those on low income is still increasing. However, the rate of obesity among women with high income is becoming stable or even declining.[10] It is acknowledged that increases in abdominal fatness (particularly, intra-abdominal fat) pose a greater risk to health than increases in fatness around the hips and limbs. In general, the causes of weight gain and abdominal weight gain are the same and it is the characteristics of the individuals (such as sex, age, menopausal status) that influence the distribution of the fat that is gained.

As populations become more urban and incomes rise, diets high in sugar, fat and animal products replace more traditional diets that were high in complex carbohydrates and fibre.[11,12] A high BMI is associated with higher blood pressure and risk of hypertension, higher total cholesterol, LDL-cholesterol and triglyceride levels and lower HDL-cholesterol levels. The overall risk of coronary heart disease and stroke, therefore, increases substantially with weight gain and obesity.[13] Gall bladder disease and the incidence of clinically symptomatic gallstones are positively related to BMI.[13] There is evidence to suggest increased cancer risk as BMI increases, such as colorectal cancer in men, cancer of the endometrium and biliary passage in women, and breast cancer in post-menopausal women.[13,14] Obese people are also at increased risk of gout, sleep apnea, obstetric and surgical complications.[12] The direct costs of obesity are predominantly from diabetes, cardiovascular disease and hypertension. Indirect costs, which are far greater than direct costs, include workdays lost, physician visits, disability pensions and premature mortality which all increases as BMI increases.[15]

Obesity has reached epidemic proportions in India in the 21st century; affecting 5% of the country's population.[16] India is following a trend of other developing countries that are steadily becoming more obese. Morbid obesity has acquired epidemic proportions in the country. This is only the tip of an ice berg and the incidence is growing,

according to medical experts.[16] Unhealthy, processed food has become much more accessible following India's continued integration in global food markets.

Assessment of obesity

One of the most commonly applied methods is calculating body mass index (BMI) for which we need to check weight and height recordings.[17] Both the measurements i.e. height and weight are necessary to record. Ideally BMI must be in normal range, that's between 18.5 to 24.9 kg/m^2.[18] If BMI is less than 18.5 kg/m^2, there is no risk of obesity, but definitely the person is under-nourished (malnourished) and susceptible to various diseases due to deficiency of various nutrients. But if BMI is above 25 kg/m^2, then the person has risk of getting other diseases and proportionately more, with increasing BMI.

Table 1: WHO classification of adults according to BMI.[19,20]

Classification	BMI (kg/m^2)	Risk of co-morbidities
Underweight	<18.5	Low (but risk of other clinical problems increased)
Normal range	18.5-24.9	Average
Overweight	≥25.0	
Pre-obese	25.0-29.9	Increased
Obese class I	30.0-34.9	Moderate
Obese class II	35.0-39.9	Severe
Obese class III	≥40.0	Very severe

METHODS

This is a population based cross sectional study conducted over a period of one year from February 2009 to March 2010; the study was conducted in selected villages and one town of district Anantnag of Kashmir valley. Multistage and multiphasic sampling technique was utilized in this study to screen the obese subjects and in which first of all people in the selected sample had been assessed for obesity, based on WHO classification of obesity according to BMI of 18-45 years of age.

With the view to assess the epidemiology of obese, district Anantnag was selected to screen obese cases both males and females. The approach to the study was made by selecting 3% sample of villages from all the blocks excluding urban areas. First of all the sampling frame was prepared where from a sample villages and urban areas were randomly selected. All the households falling in the selected rural and urban areas, which were 4020 in number were completely enumerated and after line listing the households, each household was visited and only the subjects having age of 18-45 years were included in this study and this comprised of 5107 subjects, then identified obese cases with the help of height and weight techniques. Only those people who had simple obesity

were included in the study. People having secondary obesity, drug induced obesity and pregnant ladies were excluded from this study.

Anthropometric data

Standard techniques were adopted for obtaining anthropometric measurements. Weight was measured with light clothing but without shoes to the nearest 0.1 Kg. using a portable standard weight scale. Height had been measured using a portable height scale. The subjects were instructed to stand bare feet with their head in an upright position. The reading was noted to the nearest 0.1 cm. From the ratio of weight to height square, the Body Mass Index (BMI) will be determined where BMI = Weight (kg) /Height^2 (m). The scales were checked for accuracy before starting the survey and after and then rechecked periodically.

Statistical analysis

Entire data was subjected to suitable standard statistical technique. Univariate analysis was done applying specific tests, wherever applicable.

RESULTS

In the Table 2, out of 5107 (18-45 years) screened population 2652 (51.92%) of the participants were males and 2455 (48.08%) of participants were females.

Table 2: Distribution of population as per sex.

Sex	Frequency (n)	Percentage (%)
Male	2652	51.92
Female	2455	48.08
Total	5107	100

Table 3: Distribution of population as per residence.

Residence	Males		Females		Total	
	n	%	n	%	n	%
Rural	1957	38.32	1843	36.09	3800	74.41
Urban	695	13.61	612	11.98	1307	25.59
Total	2652	51.93	2455	48.07	5107	100

Table 3 shows the distribution of screened population in rural and urban population. 1957 (38.32%) of the participants are rural males, 695 (13.61%) are urban males, 1843 (36.09%) are rural females and 612 (11.98%) are urban females. 3800 (74.41%) are rural representation and 1307 (25.59%) are urban representation.

Out of 5107 screened population, 2652 were males and 2455 were females and the prevalence of male obesity in study population is 6.41% and that of females is 7.74% (Table 4).

Table 4: Sex-wise prevalence of obesity in study group.

Sex	Population in the age-group 18-45	Obese population	Prevalence
Male	2652	170	6.41%
Female	2455	190	7.74%
Total	5107	360	7.05%

$X^2 = 3.44$, df = 1, P = 0.064

Table 5: Sex-wise prevalence of obesity in urban population.

Sex	Population in the age-group 18-45	Obese population	Prevalence
Male	695	54	7.76%
Female	612	55	8.98%
Total	1307	109	8.34%

There were total of 1307 participants of urban population, out of which 695 were males and 612 were females. The prevalence of obesity in urban males is 7.76% and that of urban females is 8.98%.

Table 6: Sex-wise prevalence of obesity in rural population.

Sex	Population in the age-group 18-45	Obese population	Prevalence
Male	1957	116	5.92%
Female	1843	135	7.32%
Total	3800	251	6.61%

Table reflects sex-wise prevalence of obesity in rural group. A total of 251 obese populations were observed in 3800 rural population giving a total prevalence of 6.61%. Male prevalence is observed to be 5.92% and female prevalence as 7.32%.

DISCUSSION

The present study is a cross sectional study conducted at district Anantnag of Kashmir province where in 5107 people in the age group 18-45 were included. Out of 5107 people selected, 2652 (51.92%) were males and 2455 (48.08%) were females. Habibullah et al.[21] in 2009 reported similar trends in their study. In our study, out of 5107 people, 3800 (74.41%) belonged to rural areas where as only 1307 (25.59%) belonged to urban areas. The overall prevalence of obesity was 7.05% in our study which include 5107 people, in which 360 came out to be obese. Abbas et al. (2003)[22] reported a prevalence of 7% obesity in their study .Similar trends were found by Khan et al (8%) (2003)[23], Laurier D et al.[24] (7%) and Pragati Chabra et al. (6.1%) 2007[25]. Al-Mahroos and Al-Roomi (2001)[26] reported, the prevalence of obesity was

significantly higher among female subjects than males in all the age groups. Overweight and obesity were more prevalent among those with high incomes. Obesity was inversely related to physical activity. Health survey of Singapore, (1999)[27] 24.4% of adults (Aged 18-69 years) were overweight and 6.0% were obese. Obesity ratio was slightly more in females (6.7%) than males (5.03%). Serena Low et al. (2009);[28] The prevalence of being overweight for males and females ranged from 23.2% in Japan to 66.3% in the USA among the developed countries, and from 13.4% in Indonesia to 72.5% in Saudi Arabia among the developing countries. The prevalence of obesity for males and females ranged from 2.4% in the Republic of Korea to 32.2% in the USA among the developed countries, and from 2.4% in Indonesia to 35.6% in Saudi Arabia. No obvious trends were noted between males and females for adult obesity among the developed countries. However, it was noted that the prevalence of obesity was generally higher among females compared to males in the developing countries. A gender difference was also noted with females having a higher prevalence of obesity in both rural and urban areas. BA Swinburn, et al.[29] the prevalence of obesity is increasing throughout the world's population. There has been a rapid increase in obesity where the prevalence among urban men with high incomes is about 10%, but still only 1% in rural areas. Women in all regions are generally more obese than men and the prevalence for those on low income is still increasing. The sex has a significant impact on obesity which has been found in many studies conducted from time to time in different regions of globe, reported by Serena Low et al.[28] We reported in our study a prevalence of obesity 8.26% in females as compared to males 6.05% with a ratio of 1.26:1 which is consistent with the study conducted by ministry of health Singapore in 1999.[30] A lack of physical activity as well as low frequency of employment makes females more susceptible to obesity.[21]

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